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THE

BUILDING NEWS

AND

ENGINEERING JOURNAL.

VOLUME THE TWENTY-FOURTH.

JANUARY TO JUNE. 1873.

OFFICE FOR PUBLICATION AND ADVERTISEMENTS:

31, TAVISTOCK STREET, COVENT GARDEN, LONDON, W.C.

LONDON:

C. W. BRADLEY, PRINTER,
1, PLOUGH COURT, FETTER LANE, E.C.

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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

NOTICE.

THE BUILDING NEWS to-day undergoes a remarkable development. When it was started eighteen years since its price was fourpence weekly, with *one* page of illustration. For some time past, as our readers know, its price has been threepence, with two pages of illustrations weekly on an average. From to-day the BUILDING NEWS will be published at its original price of fourpence, with *SIX* pages of lithographic illustrations weekly. Charging threepence, when other professional papers of the same size charged fourpence, has subjected us to a disadvantage. That disadvantage will no longer exist. Illustrations are the language of Architecture and Engineering, and in materially increasing the quantity of our illustrations without impairing their quality, we shall no doubt have the universal sanction of our readers, as we shall now give weekly as many illustrations as all the other professional journals put together have hitherto given. In doing this we have not forgotten the Italian motto: "*Be bold, be bold, but not too bold.*"

CONSTRUCTION OF MODERN WAREHOUSES.

IT cannot escape observation that the introduction of any new material into one branch of the constructive arts, invariably leads to its employment and adoption in others. Experience has also demonstrated the truth of the inverse of this statement, that is, that the failure and subsequent abandonment of any particular material in one description of engineering or architectural work, is the prelude to the abolition of the use of it in numerous similar situations. Cast iron was extensively employed some years ago, not only as girders for railway bridges of large span, but also in the erection of factories, mills, and industrial workshops. It is not much more than thirty years, since the old system of erecting buildings of the description under notice was abandoned, and the newer and more modern introduced. In effecting this change it must be admitted that the frequent occurrence of fires played a very important part. A mill or factory of ancient date, with its huge timber pillars, massive longitudinal and cross beams, heavy roof, and planked floors, was little better than so much tinder. The accidental lighting of a single lucifer, a mere spark, was sufficient to set the whole structure in a blaze. Another circumstance that tended considerably to favour the introduction of a more improved principle of construction was the increasing use made of machinery and mechanical means and appliances for accomplishing various processes and operations, previously performed by manual labour alone. The foundations of these old buildings were not suited to withstand the additional weight brought to bear upon them. Any one who has travelled in the manufacturing districts cannot have failed to notice this fact. In those old factories in which iron columns and heavy machinery

have been introduced, the walls are out of plumb, the windows and doorways distorted, and the angles and general lines of the building all out of square. Some months ago we visited an extensive warehouse and factory in Cheshire, in which the joists, from the increased weight brought upon them, deflected an inch and a quarter at the centre. It is impossible to avoid remarking that to load this floor with a crowd of human beings, as was constantly done during a pressure of work, was to place their lives on rather an insecure tenure.

The three principal points to be attended to in the construction of buildings of the character in question are, that they should be strong, durable, and fire-proof. Each of these qualities can only be insured by the exercise of much skill, patience, and discrimination in the selection of the different materials required. Above all, the necessity of a thoroughly reliable and secure foundation cannot be too forcibly borne in mind. Architects and engineers of late years have paid much greater attention to this point than formerly. Fortunately the universal employment of concrete, places at their disposal a material which, if properly used, never fails them. It is not too much to assert that in future every warehouse or other structure of a similarly extensive nature will, except under very peculiar circumstances, be founded on concrete. In London alone there is an almost unlimited demand for the ingredients of which concrete is made. Gravel, blue lias lime, or more usually Portland cement, are used daily as concrete, in hundreds of tons, in and about the metropolis. The manufacture of Portland cement received a stimulus about the time of the commencement of the Drainage and Embankment works in London, which led to an enormous development in that particular business. Not only was the quantity made increased beyond all precedent, but the quality was greatly improved, in consequence of the Metropolitan Board of Works insisting that the cement should be capable of withstanding certain well-defined tests with respect to its tenacity and powers of setting. A solid mass of concrete, having a depth varying with the nature of the ground, but not less than eighteen inches, may be considered to be essential to the proper formation of the foundation of extensive warehouses or manufacturing premises. There is no difficulty in selecting the gravel—one of the ingredients of concrete. It should be clean, sharp, and dry, and not too small. Every practical builder knows good gravel at a glance, but it requires more than a glance to ascertain whether the other ingredient, Portland cement, is of the proper quality. It is in many instances the architect's or engineer's business to cause the cement to be properly tested, and to satisfy himself that it is up to the proper standard. The best guarantee to the builder and contractor of the genuine character of the cement is to purchase it from a good manufacturer. When a material is so universally used in the constructive arts as Portland cement, there are, as a matter of

course, numerous spurious and adulterated imitations of it to be purchased *cheaply* in the market. Cement of a bad quality, however good it may appear to the eye, and however well it may set apparently, soon becomes no better than so much mud—a very unstable sort of a foundation for a large industrial establishment.

The foundations having been got in, the "carcase" of the building, as it is termed, can be proceeded with. This consists of the side walls and roof. The walls are either of stone or brick, and frequently of both, one material serving to give strength, the other ornament. A series of alternate wall and arches constituted the carcase of the older factories and mills, and scarcely any attempt at ornament was ever thought of. A very noticeable feature in the walls of the most recently built buildings of the kind is the introduction of wrought iron plate and box girders. A very good example may be seen at Stiff's pottery, in Lambeth, and most of the new shops erected in Ludgate-hill will be found to be designed in a very similar manner. The arches employed in former times are not applicable to the modern system. They take up too much headway, and, moreover, cannot afford the open and uninterrupted interval of space which is now indispensable. There is one advantage in employing iron girders in the walls of a building which is not always apparent. If the floor should be built, as frequently occurs, of arches, the final thrust is thrown upon the girders, and not upon the walls. Stone or brick, or both, cast and wrought iron, but preferably the latter, are therefore the materials constituting the carcase of the modern buildings we are considering. The windows, or more appropriately speaking, the casements, are often constructed of cast iron frames, into which glass panes are fixed, so that the use of timber thus far is confined to the doors, and even in some instances these latter are also made of iron. In any case, it can be readily understood that the materials mentioned are sufficient, exclusive of wood altogether, to build the exterior portions of factories and warehouses. As a proof of the few materials which are absolutely necessary in the construction of large buildings, it may be observed that Milan cathedral is built entirely of marble and glass. The design of the interior of a factory must depend upon the purposes to which the building is applied. As a rule, cast iron columns or girders, with arches of brick, comprise the materials selected. In some modern examples, wrought iron has been substituted for cast, chiefly on account of its greater strength and lightness. It has been stated that wrought iron should be always used instead of cast, inasmuch as the latter is liable to be melted by the action of fire. An accident of this nature is extremely improbable, and there is only one instance on record. It occurred at the works of Messrs. Sharp, Roberts, & Co., Manchester, in which some cast-iron columns melted and broke. But the circumstances were very peculiar and excep-

tional. A large quantity of fuel was heaped up round about the columns; this became inflamed, and generated a very intense heat, so that the columns were in nearly the same position as if they had been subjected designedly to a regular remelting. There is one point to be carefully attended to in supporting iron beams or girders upon the side walls of these buildings. The ends which bear upon the walls should be raised half-an-inch or a little more, to allow for the settlement of the walls. This slight settlement, which takes place in all walls newly built, is not necessarily due to any defect in the foundation. It is simply the result of its own superincumbent weight, and when once it has subsided, will not occur a second time.

There remains now to be considered the floors and the roofs of the buildings under notice. If the structure is to have any pretensions to being fire-proof, the floor must partake of that character. This can be easily accomplished by the use of brick arches and concrete filling-in of the spandrels. Instead of brick arches, wrought-iron plates bent to a curve are frequently used, being much lighter and not occupying so much headway. The objection respecting the employment of brick arches on account of their weight, can be obviated to some extent by using hollow bricks, as was done in the Saltaire Mills, near Bradford. There have been several "fire-proof floors" patented, which are so well known to our readers that it is needless to refer to them. It must, however, be admitted that in the construction of the floors, as well as of the roofs of these structures, timber is still very extensively employed. Moreover, the interior fittings of large buildings, which are not strictly manufacturing, are usually of wood. The staircase should always be of either stone or iron. If the staircase of a building on fire be consumed, the only chance of egress for the inmates is the fire-escape. As a means of communication with the different parts of a warehouse, speaking-tubes have superseded bells of every description, although those of the electrical character are occasionally adopted. Roofs are usually of timber when the building has any pretensions to architectural merit, but of wrought-iron trusses in other instances. A feature of great moment in this construction is that means are taken to ensure thorough ventilation. Increased accommodation, more space, more light, more air, and more comfort, may be said to constitute the distinguishing feature of the modern structures to which we have drawn attention, in comparison with those of an older date. There is one disadvantage under which we labour in the metropolis with regard to the æsthetical effect of our large mercantile and industrial establishments. It is that we have no cheap, good building-stone near at hand, and are in consequence obliged to use brick. We are not about to discuss the relative merits of the two materials, as it must be allowed that the employment of the former imparts an imposing and solid appearance to these buildings, which is peculiarly in accordance with their proportions and the purposes for which they are designed. A structure which supports on each storey some thousands of tons of material is more fitly constructed of stone than brick.

A NEW SYSTEM OF GLASS-PAINTING.

WE have had the pleasure of inspecting some examples of a new system of glass-painting, by Messrs. Sutherland and Son, of Manchester, applicable to all the purposes for which stained and painted glass is used, but differing from stained glass so-called in the fact that all the colours required are all painted on one sheet of glass.

It will be necessary, in order to thoroughly understand the advantages of the new system of glass-painting, that we should describe how and at what cost, ordinary stained and painted

glass is produced, and why it is costly. Stained and painted glass, as a means of decoration and as a pictorial record of remarkable events both in sacred and profane history, has been held in great esteem from the earliest ages to the present time. The architect and the artist find in it a medium for the expression of their thoughts and the creations of their fancy with a richness and brilliancy of effect possessed by no other means. With the revival of Gothic architecture in England the art of glass-staining revived also, and has progressed so rapidly that a high authority estimates the annual amount expended in England alone at £100,000 sterling, and this for high-class windows alone.* The art of glass-staining, as now generally practised, must not be confounded with glass-painting. The latter is a method of painting with some semi-transparent enamels on white glass, which are afterwards fused at a red heat so as to incorporate the colour with the surface of the glass. This method was practised a few years ago to the exclusion of the former. It is well calculated to produce pictorial windows, but is costly and, as some think, unsatisfactory. The Reynolds window, in New College Chapel, Oxford, and the East window of St. George's Chapel, Windsor, are examples of this style of painting; there are also many fine Swiss paintings of this kind in which the colours are very brilliant. The coloured enamels, however, as used in England, are indifferent, and liable to peel off when exposed to the atmosphere. We may note here that the imperfect and altogether worthless enamel referred to is used to an enormous extent by all the second-rate glass-painters, and on high class, or rather we should say, on costly work which should be high class, with the inevitable result that after a few years' exposure it becomes so soft and friable that it may be scraped off with the finger-nail, and in many cases will rub off with the finger, and we could give scores of instances of this were it needful. We could name one window but recently put up, and which cost the large sum of £500, on which the enamel may be rubbed off easily, and which will in a short time, no doubt, crumble away and fall off without rubbing.

An anecdote is told of a celebrated glass-painter in the North "who was one of our earliest and best," quite *apropos* to this matter. Standing with a clergyman opposite a stained window which had only been fixed a few years, "Ah!" said he, "it is very beautiful while it lasts! but unfortunately we modern painters are a long way behind the monks of old, who made their own glass, their own colour, and their own stains. Their enamel is as good now as it was when first done some five or six hundred years ago; but this,"—taking his walking stick, and rubbing off a strip of enamel with the end of it—"this is the perfection to which we have arrived in these latter days. We are so much afraid of spoiling the surface of the glass that we don't fire it enough, or else we go to the other extreme and burn the value out of it, and it becomes a dry non-adhesive powder, and crumbles away when exposed to the air." *Revenons aux moutons.*

A stained window, as most people will be aware, is made up of a multitude of small pieces of coloured glass, secured together and fixed in their proper places by strips of what is called window-lead. The coloured glass is produced by mixing oxides of metals, &c., with the various minerals of which the glass is composed, and the whole is reduced to a liquid state and then blown into cylinders for the manufacture of sheet glass, and into tables or circles in the manufacture of crown glass. Some of this coloured glass is called pot-metal, because the colour permeates the body of the glass and is homogeneous; but the glass most commonly and extensively used is called flashed glass, which is formed of white

glass, having a coating of coloured glass on one side of it only, and is produced thus:—The glass-blower first takes up a sufficient quantity of white glass on the end of his blow-pipe and then dips the ball of white glass into the liquid coloured glass, taking up a certain amount of coloured glass on the outside of the white glass. The whole is then blown in the usual manner, the coloured glass covering the whole of one side of the sheet, however large. In the case of sheet glass, the coloured glass will have, as near as possible, one uniform thickness throughout, varying from a sixteenth to an eighth of an inch. This is not the case with crown glass, as the coloured glass will be thicker the nearer it is to the centre, where the blow-pipe is attached, which forms a knob, or what is technically called a bull's-eye. Fluoric acid will remove this coating of coloured glass, and so reveal the white glass underneath, leaving a white figure on a coloured ground, or a coloured glass on a white ground. There are many instances of this process in fifteenth and sixteenth century windows, especially when the panes of glass were too small to be worked with lead. There is much of this work in the fine old east window of the Beauchamp Chapel, Warwick.*

Previously to the middle of the fourteenth century each colour was loaded up separately, but afterwards we find the white glass partially stained with narrow tints of yellow. Silver is the basis of this stain, and is the only true stain used to this day.

The outlines and shadows of a stained or painted window are painted (on the panes of coloured glass) in an opaque enamel, which is afterwards fused into the glass at a full red heat. It is a frequent custom to test the quality of the enamel by scratching it with a knife or file, and it is considered good if it will bear the test and remain as glassy as sealing-wax. This test is, however, by no means satisfactory. We could mention works of great beauty, painted within these last ten years, in which the enamel has entirely disappeared; in fact, we have known glass painted with a very glossy enamel which, after being laid by for a few years, and in a comparatively dry place, show the painted parts covered with a white powder (hydrous borate of soda), a certain sign of decay.

During the process of painting the glass has to be fired at a red heat two or three times, to burn in portions of the painting which cannot be done at one firing; this burning of the glass is always attended with a considerable amount of risk. It may not be heated enough, and in this case will require reburning; or too much heat may be applied, when the enamel will be burnt away; or the whole may be run into one indistinct mass, and so be irretrievably spoiled; the least evil will, at all events, result in the whole being repainted. The annealing of painted glass is also a most important part of the process, and it frequently happens that the glass, when not properly annealed, although it may remain intact during the construction of the window and for months afterwards, will on a sudden change of temperature show its want of sufficient annealing by falling to pieces.

In the foregoing *resumé* of our modern system of glass-painting, we have confined ourselves to a brief summary of the points necessary to illustrate the difference existing between it and the new system. In considering what we have been describing, we must arrive at certain conclusions which deserve the careful study of glass-painters. From these conclusions we gather—first, that painting in enamel colours as practised in England is (except in rare instances) a failure; and that our English enamels will not stand exposure to the atmosphere. Second, that the semi-opaque enamels used for painting upon coloured glass, even on the very best windows, are in innumerable cases complete failures, in so far as their capability of resisting the united influence of foul air, damp, and other influ-

* We are indebted for much of the information here contained to the catalogue of the eminent firm of glass-stainers, Messrs. Heaton, Butler, and Bayne.

* Heaton, Butler and Bayne.

ences is concerned. The necessity for a stained glass window being composed of innumerable panes fastened together by bands of lead necessarily causes such work to be costly, and the various manipulative processes consequent thereon involve a large amount of skilled labour; and the risks attendant upon the repeated firings while in progress of painting are such as to still further increase the cost making these works at all times and under all circumstances expensive and difficult to execute, consequently limiting their application.

Many attempts have been made from time to time to substitute a system of glass-painting in which all the blues, reds, greens, and other colours necessary should be painted on one piece or sheet of glass, thus doing away with the cumbrous leadwork, and at the same time producing all the brilliancy, richness, and translucency necessary to make a successful window.

We now proceed to discuss the new system of glass-painting. The vital principle of the process is only known to the inventors, and is not secured by patent or otherwise; it will therefore be obvious that a certain degree of reticence is an absolute condition of the description. But we may, without breach of confidence, say that the designs and working drawings are prepared in the usual way, the outlines being painted in with a special mixture, which admits of either fine or broad lines. The colours are then painted in, grounds for draperies, &c., &c., and when ready for shading and putting in the detail of the design, this work is painted in the usual way, the shades being laid in and stippled in semi-opaque and transparent colours, somewhat in the same manner as in the glass enamel, but of course with colours and mediums known only to the inventors. The finished work is now subject to a certain degree of heat, involving no risk nor chance of failure, thus completing the painting.

The inventors claim that by their system works of art can be executed in rich and brilliant colours, so nearly approaching the brilliancy and translucency of pot-metal or flashed glass that only an expert, by close inspection, could detect the difference. In Greek or Italian buildings we often see stained windows which seem (from the fact of their being made up of small pieces of glass leaded) out of place and not in accord with their surroundings. This objection does not apply to the new method of painting: any style of window may be executed in strict accordance with the style of the architecture and the surrounding decorations, without the intervention of the leads.

Simplicity of manipulation and safety in finish is another important feature in the new process, in addition to which the work may be executed upon either common sheet glass, crown glass, British plate, or Hartley's rolled plate, enabling the artist to execute his design upon any size of a sheet he may desire, thus simplifying the process and reducing the cost.

We now come to what is generally considered a crucial test—namely, price. Here again the inventors offer a great advantage, inasmuch as owing to the simplicity of the process, they are able to fix the cost at about one-half the usual price charged, thus opening out a wide field for its use, from which stained glass has hitherto been excluded on account of its great cost. It must not be supposed that this invention is a mere imitation of stained glass. No greater mistake could be made, for while it has all the beauties of stained glass, many qualities and effects may be got by its use totally beyond the capabilities of stained glass.

Another important improvement introduced in connection with this system of glass-painting is the principle of securing two squares of glass together by India-rubber piping and laps, by which means the squares of glass having the painting between the two can be

put together so as to hermetically seal the work from the influence of foul air, damp, abrasions, or other deleterious influences—a valuable means of protection this, and one likely to come into extensive use. Another plan is to glue two squares together, putting the plain square in first, being well bedded with prepared putty or cement, then placing the painted side of the painted square against the plain one, and then cementing or puttying up the two, thus sealing them up. While not professing to take the place of the best stained glass work, the new system will supply a want, and enable us to use painted glass for many purposes and in many places to a much greater extent than it has hitherto been used.

(To be Continued.)

QUANTITIES.—I.

BY THE AUTHOR OF "DILAPIDATIONS."

I PRESUME there is no professional subject that has been more treated of, or about which so much difference of opinion exists, as that relating to the measurement of artificers' work; and yet withal, one that requires the greatest possible amount of accuracy, combined with a practical acquaintance of the several trades which come under the head of Building. Some of the differences that exist arise from the fact that surveyors adopt their own peculiar methods of measuring certain classes of work, and frequently from a lack of experience, and imperfect knowledge of the art of building. Where this want of knowledge exists, many quantity surveyors frequently measure their work *full*, to give a margin of allowances for omissions in the description of labour, which they intentionally omit, or are unable to measure; or again, where all is properly measured, certain additions are made to provide for any discrepancies which may have occurred in the hurry of taking off. Frequently these allowances are made for *small and difficult works, cuttings, &c.*, which ought to be separately measured, and paid for according to the amount of labour expended upon them. It is a well-known fact that many builders themselves (so-called practical men), do not know the actual technical terms used to express certain classes of work; and in many cases where the item is small, a price is placed at a venture. This accounts in a slight degree for the variations in tendering which we so often meet with. And as a proof that many surveyors themselves are not strictly accurate, or that their methods differ somehow from each other (to put the matter more pleasantly), it is found that the builders who know them well, in tendering from their quantities for works, can generally withstand any outsider who may be unacquainted with them. This arises from their having the advantage of knowing from experience the allowance which they can make for excess of quantities. In some cases, the writer has known builders to price the quantities, and then take off a certain percentage, taking it for granted that the works have been measured full.

It is considered, therefore, that no apology is needed for introducing a subject about which so much variance exists; and in treating of it I purpose entering fully into it, showing how the different classes of work are measured, and scheduling these works under the several trades, basing my observations upon my own practical experience, and upon conclusions drawn from the works of the ablest writers on the subject. It may be as well to observe that they will be the rules generally adopted by the metropolitan surveyors, as their experience must necessarily be larger than that of our country brethren, and generally more diversified and particularised. With this object, then, in view, I hope to fully elucidate the subject, so that an uniformity of measurement may be adopted throughout the kingdom, whereby all differences may cease to exist. Until this takes place, we shall have the random tendering of builders always before us, and the surprise of our client, who wonders who

is in fault, when he sees the highest tender so much above the amount of the lowest, and yet both builders perhaps men of standing and judgment. Should failure await these intentions, at least instruction will be given in a condensed form in the same manner (as far as the subject permits) as in the articles on "Dilapidations," useful alike in teaching the young practitioner, and, it is hoped, as a reference to the more mature.

In proceeding to the study of quantities, it is necessary that the reader should be thoroughly acquainted with the *practical*, and not be content with mere theory. Otherwise he will find it impossible to accomplish his task. This will present itself more clearly to his mind when measuring from working drawings, where much more care and knowledge are required. Before commencing to measure from drawings it is advisable to make a careful inspection of them and the specification, so as to comprehend their full intent and meaning. The surveyor will then ascertain the exact amount of the several materials of the different trades, and then take the labours, giving a full description of the same. Whether measuring from the building or from the drawings, the procedure is much the same; but as before stated, greater care will be necessary in the latter case to avoid omitting anything.

The operations necessary to produce a schedule from which builders tender, are "taking-off," by which we mean the taking-off the several dimensions from the drawings; "abstracting," that is arranging and apportioning the several works from the dimensions; and "billing," that is bringing the quantities from the abstract into bill. By "measuring up" is meant the taking the dimensions from the building itself after its execution; "extras" are measured in this way. The dimensions are generally taken off and entered in a measuring book, or on paper ruled for the purpose, thus:—

Specimen of Dimension Book.

	D	A		
	41-0 30-0 6-0	7380-0	Digging and wheeling to surface.	Waste 36-0 36-0 24-0 24-0
	120-0 10-0	1200-0	2 Brick Wall (external walls)	120-0
2	18-0 10-0	360-0	1 B add. (division wall)	
3	6-6 3-0	58-6	1 B ddt. (door)	

The dimensions are placed in the column which I mark for reference D, the adjoining column to the right, A, being for the superficial area, or cubical contents of the dimensions. Opposite to this the description of the work is placed. To the left of the dimensions is placed the number of times any particular dimension may occur. Where there are several dimensions of the same character, as, for example, walls of same height and thickness, a separate entry is not necessary for each, but they are placed on the right hand of the book; a column sometimes being ruled for this purpose and termed "Waste." They are then cast up and the sum placed in the column D, as a collection of works of the same height and description. In the illustration given, we have a number of walls, each 10ft. high, and of the same thickness; they are therefore added together, and the one dimension of 120ft. will save the trouble of making four entries of the same kind. It is advisable to collect the work as much as possible, as it materially shortens the labour; but care must be taken to state, in addition to the description of the work, the particular situation of it, as by this means the surveyor can the more readily find a dimension at any future time should it be required.

In writing the descriptions of the various labours, &c., we would not advise many

abbreviations. They are all very well in their way, but where the abstracting has to be done by a second person, he will find difficulty in making them out, and so the time saved by the person taking off, will be lost by the person abstracting. Certain abbreviations, however, may be found desirable, as, for example, "Add." for additions, and "Ddt." for deductions. In taking off, always make an uniform starting point, and adopt a general course throughout. By this means it will be much easier to find any required dimension hereafter.

It is customary to commence at the left hand corner of the building, and from thence work round to the right hand. Also adopt one method of taking the dimensions, thus: In internal dimensions in every trade take floor by floor, commencing at the left as before. Take the length first, secondly the breadth or width, and lastly the depth or height.

In the proposed chapters on the subject it is intended firstly, to show how the several works are measured, and at the conclusion of each trade to give the order of abstracting and bringing the quantities into bill. Many surveyors have their own method of abstracting, but we think it preferable to have only one general plan throughout the profession. The order in which we shall treat of the several trades will be as follows:—

- | | |
|-------------------------|--------------------------|
| 1.—Excavator. | 7.—Smith and Founder. |
| 2.—Bricklayer. | 8.—Plasterer. |
| 3.—Slater. | 9.—Plumber. |
| 4.—Carpenter. | 10.—Painter and Glazier. |
| 5.—Joiner & Ironmonger. | 11.—Paperhanger. |
| 6.—Mason. | 12.—Gilder. |

B. F.

NOTES ON STONEMWORK.*—I.

IT is to be hoped that we are emerging from the cheap and gloomy fit that has committed us to the hard and ugly features of construction to which we have of late years been subject to a daily acquaintance with; and so much so that when we do now by chance meet with a stone bridge or a stone house we are unwittingly pleased and stand still before it, as when an exceptionally fine day occurs and reveals the beauties of the earth to a pent-up townsman.

Brick is a very good substitute for stone when properly handled and disposed in form of outline and of colour, and when the bulk of it is relieved by stone dressings: it is chiefly iron and plaster that offend us in our daily walks—enormous iron bridges thrown up into the sky with absolutely no regard to form except that which comes of hard mathematical calculation, and in houses comes of the desire—not the necessity—of cheapness; resulting in flimsy show instead of beauty and utility. But we occasionally hear warning symptoms of the decay of these wrought-iron girder bridges that are so ugly, and we see the plaster peeling off the houses, so perhaps the evil may wear itself out in time, and open a way for the freer use of stone, or of brick and stone combined.

Except granite, the stone mostly used in architectural and engineering works is derived from the sedimentary rocks, and from this fact comes the well-known admonition of all architects and engineers, that stones should be laid in a building on their natural bed; for they have been deposited—at least they have all the appearance of having been deposited—by little and little, in thin layers, sometimes twenty in the depth of an inch, with partings of matter of a different nature, and sometimes not very cohesive; so that when stones are set with their natural edges downwards, the natural bed is exposed to the full erosive action of the atmosphere, and the thin films one by one drop off. This is so with sandstones, oolite, magnesian limestone, and all bedded stone.

He who works in stone should be a geologist (to know how the stones were formed, and in

what position they lie with respect to other rocks), a mineralogist (to know of what they are composed, as of quartz grains, sand, of lime, of magnesia, &c.), and a chemist (in order that he may know of what elementary substances each of these, and of every mineral which enters into the composition of the stone he has to handle, consists). The system of the division of labour leaves men no time to understand what they are doing. One man gets a stone from the quarry, another cuts it into blocks, another works it, and another sets it, and by the time it is got into its place its original position is lost sight of. True, some stones are so distinctly marked in the bedding that 'twould be a 'prentice hand indeed who should make any mistake in this matter; but in other kinds of stone the natural bed is not so evident, and yet, so insidious is the chemical action of the acids of the atmosphere, that this non-appearance of a bed will not save the stone from decay if it be set in a wrong position. The more, then, that division of labour is carried out, the more necessary is it that the mason should be able to judge from the internal evidence presented by the stone which he is about to work whether it has been properly cut at the quarry, and if not, to reject it. And so also with the stone-setter; a block may be wrongly cut at the quarry, and may even pass the hands of the mason without detection, but as he is the man who actually puts the stone into the building, his judgment ought to be the more supreme.

The study of geology shows that the sandstones have been formed from the particles of the older igneous rocks, such as granite, worn away by the action of air and water, and carried down by rain to some lower position and there deposited in layers—as a rule horizontally, though in some places inclined.

Stones, after being quarried from their geological position, are to be considered in respect of what minerals they contain, and chemically in respect of what those minerals are composed of. Thus the geologist says that granite is an igneous rock, eruptive or disruptive, associated with rocks of every formation, or passing in veins through strata of different epochs. The mineralogist says it is composed of three simple minerals—quartz, felspar, and mica. The quartz is of itself colourless, but is frequently coloured in different shades of white, grey, yellow, and other colours. Common quartz, occurring in masses and in various shades of white, is spoken of as milk quartz, glassy quartz, &c., according to its colour and lustre. Felspar, he says, is also colourless of itself, but is usually coloured of shades of greyish white, reddish yellow, or green. In ordinary granite it is readily distinguished from the quartz by its flat lustrous fracture, and by its being scratched by the knife, while the quartz resists it. Mica has a metallic lustre, and is divisible into thin glistening plates or scales. When disintegrated from granite and crystalline rocks it enters into the composition of the sedimentary strata, as shales and sandstones, giving them a flaky and laminated texture. Thus, in the stone of Darley Dale, near Bakewell, in Derbyshire, we find quartz sand and decomposed felspar with plates of mica, all cemented together with a clayey-flinty substance, (argillo-siliceous), the whole being of a light irony-brown colour. Sand is defined in Page's Handbook of Geological Terms to be "any aggregation of waterworn particles, derived from pre-existing rocks and other mineral substances." It is generally composed of quartz grains, quartz being one of the hardest of simple minerals, and longest resisting the processes of attrition."

Professor Ansted, in his Elementary Course of Geology and Mineralogy, says that the simplest mechanical condition of sandstone rocks is "that of fine white sand, the particles being small, of uniform size, and consisting of nearly pure quartz. Such material is frequently seen by the seaside, and it is there found to be absorbent of water, becoming then compact, and even hard, admitting readily of

impressions upon its surface, and retaining them for some time. . . . If we take up a piece of ordinary white sandstone, and compare it with this loose sand, some difference will be recognised, and we thus are introduced to the first and simplest modification of a rock. The particles have now been consolidated, and a texture is observable which may be fine or coarse, according to the size of the component particles, and loose or compact, according to the way in which it has become solidified. The process of consolidation thus induced may be merely the result of the force of cohesion, for no doubt the continued contact of the particles under heavy pressure may produce such change; but the infiltration of water containing the small quantities of silica usually present in sea water, or of a little clay or lime, or iron, also found there in small quantities, is often the immediate cause of this consolidation, while a little carbon or bitumen frequently points to organic agency." Sandstones, however, are usually devoid of bitumen. There is none to be found in Darley Dale stone, nor in that of Craigeleith (near Edinburgh), Heddon and Kenton in Northumberland, or Mansfield in Nottinghamshire; neither in the magnesian limestone of Bolsover in Derbyshire, or of Huddlestone, Roach Abbey, or Park Nook, in Yorkshire; but in the oolites of Ancaster in Lincolnshire, Box in Somersetshire, Ketton in Rutlandshire, and Portland in Dorsetshire, there is a trace of bitumen, and also in the limestones of Barnack in Northamptonshire, Chilmark in Wiltshire, and Ham Hill in Somersetshire.

The Darley Dale stone belongs to the geological formation called the Carboniferous system, and is of one of those thick beds of sandstone, known as the millstone grit, which lie upon the carboniferous or mountain limestone, interstratified with beds of shale, and above which, in geological order, lie the upper or true coal measures. Although these beds of sandstone are now found tilted up at various angles, and form hills of considerable height above the average level of the ground, yet in geological order of succession they lie very low down indeed. Since they were deposited, not only have the coal measures been formed, but the Magnesian Limestone (or Permian series of rocks) has been laid down in their strata, until they have attained a thickness estimated by Professor Phillips to be about 300ft.; the New Red sandstone, or Triassic system, estimated at about 900ft. in depth; the Lias, more than 1,000ft.; the Bath or Great Oolite, nearly 400ft.; the Middle Oolite, about the same or more; the Upper Oolite, nearly 400ft.; the Wealden formation, perhaps 900ft.; the Greensand beds, nearly 500ft.; the Chalk, 600ft.; and since the chalk, all the Tertiary beds, consisting of the plastic and the London clays, the Bagshot sands, and the coralline crag of Suffolk; and all the gravels, boulder drift, and recent clays and peat; so that abundance of time has been allowed for the consolidation of these sandstone beds, and they must have received, too, an abundance of pressure from the superincumbent strata.

The newest workable stone appears to be the coralline crag of Suffolk, consisting of compact and flaggy beds of impure limestone, which ranges over an area of about twenty miles in length, and three or four in breadth, between the rivers Alde and Stour. It is sometimes made up of fragments of shells and zoophytes, but occasionally, as at Tattingstone, consists of a greenish marl with a few stony beds, and some of the harder portions are quarried for building stone. The total thickness of the coralline crag is generally under 20ft., as stated by Professor Ansted, although, in some particular localities, as at Sudbury, near Orford, it is much thicker.

At the bottom of the chalk formation, or Upper Cretaceous system, there are hardish beds of chalk marl, or "clunch," from which stone is derived and used in the interior of thick walls in some cathedrals and other large public buildings, and in the Upper Greensand,

* By the Author of "Notes on Brickwork," "Notes on Carpentry," &c.

which lies immediately under the chalk marl, there are in some places layers of cherty or flinty concretions; and in the Blackdown hills, in Devonshire, which form an "outlier" of the Greensand formation, there are four of these layers from which whetstones are procured, and the looser stone is used for building.

The Kentish rag is the next workable stone which occurs in order downwards (geologically). It occurs as a seam in the Lower Greensand formation—see the diagram of the series of rocks Fig. 1—and is a highly fossiliferous

Fig. 1.

Tertiary	Modern Deposits.	
	Boulder Clay.	
	Coralline Crag of Suffolk.	*
	Bagshot Sands.	
	London Clay.	
Cretaceous	Plastic Clay.	
	Upper or White Chalk.	
	Lower or Grey Chalk.	
	Chalk, Marl, or Clunch.	*
Greensand	Upper Greensand.	
	Gault Clay.	
	Lower Greensand	
Wealden	Kentish Rag	*
	Petworth Marble	*
	Building Stone	*
	Purbeck Marble.	*
Oolitic	Portland Stone.	

grey sandy limestone, much used for building in Kent and Sussex.

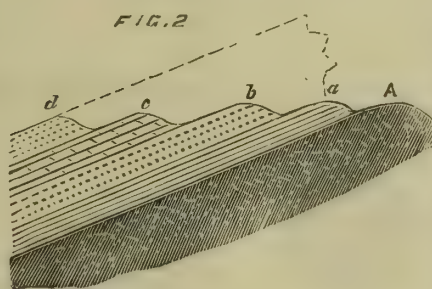
Under the Greensand formation is the Wealden clay, and in it are beds of fresh-water limestone at Petworth, in Sussex, called Sussex marble, occurring in layers which vary from a few inches to a foot in thickness. It is almost entirely made up of fossil shells, united by a calcareous cement into a compact marble, and has been used in the internal decoration of churches and cathedrals, and to make the small insulated shafts of pillars in Gothic architecture.

In the "Hastings sands" formation, below the Weald clay, there is a series of sandy beds, containing a fine building stone, full of the organic remains of fresh-water molluscs, and below these there are other beds of blueish-grey shelly limestones and grit.

We next come to the Purbeck marble. Professor Phillips, Professor Ansted, and others, have classed the Purbeck beds with the Wealden formation; but Mr. Page, in his "Introductory" and "Advanced" Text-books of Geology, includes these with the next lower formation,—the Oolitic, without, however, as it appears to us, any good reason, for there is nothing of the character of the Oolitic formation in the Purbeck beds, except that several of the lower Wealden strata contain fossils of animals the species of which are the same as those of the Upper Oolite, but these are not the only two consecutive systems of strata of which the same thing may be said. The compact fossiliferous limestones of the upper portion of the Purbeck beds alternate with clay, and include a thick bed al-

most entirely composed of oyster-shells. The limestones of this part of the series are quarried for building stones, there being as many as fifty-five beds of useful stone, according to Professor at the Ansted. The beds top consist chiefly of the remains of a univalve shell, cemented together by carbonate of lime and a large proportion of green matter. This is the Purbeck marble that has been so much used in the interior of cathedrals and churches for small pillars and columns. The next below the Purbeck is the Portland stone, an oolitic limestone of great importance in both the useful and ornamental arts; but we must defer any mention of it until next week.

Notwithstanding that the successive strata have been deposited one upon another as indicated by Fig. 1, and generally in a horizontal position, yet we find the stone mostly at the surface. This is accounted for by the action of the internal forces of the earth raising ridges, as at A, Fig. 2, and



breaking the overlying strata, and exposing the outcrop or baset, as at *a*, *b*, *c*, *d*, &c., where it is quarried for use; although some strata are mined, after the manner of coal mining. The general surface from *a* to *d* may be horizontal, the intervening ground being broken into hills and valleys by the edges or basets of the several strata. The internal forces of the earth which raise up these lines of elevation are always in action, and probably have always been so since the formation of strata by the deposition of sand, mud, lime, and other detritus of pre-existing rocks began to take place, and their action has been sometimes gradual and sometimes violent. Even as they are now, the general effect has been to throw up to the surface the edges of those strata which had been theretofore covered by others. The portion of the strata enclosed by the dotted lines in Fig. 2 would probably be completely shattered, and afterwards washed away, or otherwise transported into the valleys to form more recent beds, such as the boulder clay, the drift gravel, &c., or into the sea, where the currents would wear the more tenacious portions into shingle, and the more brittle into sand.

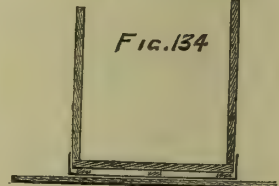
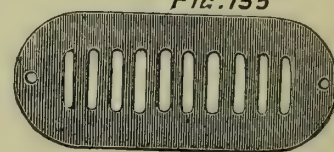
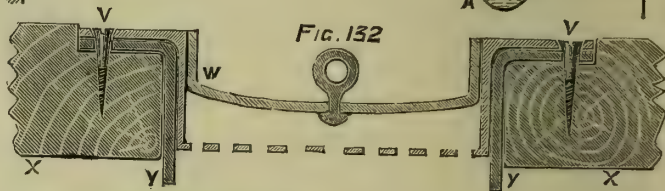
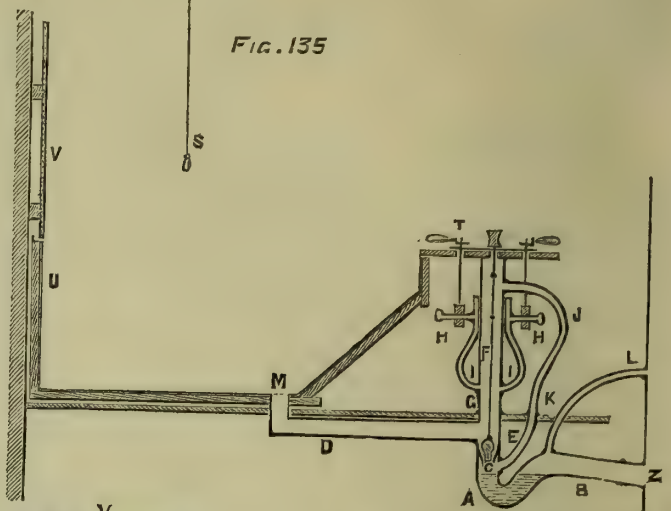
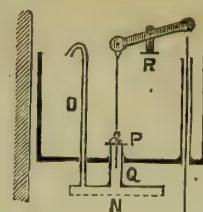
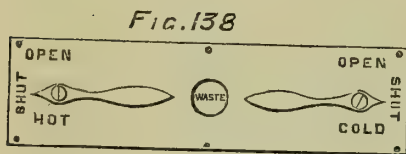
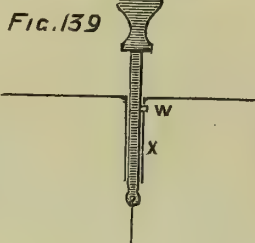
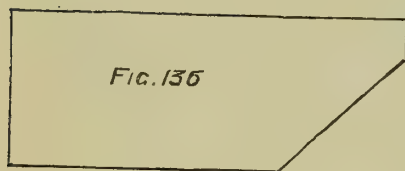
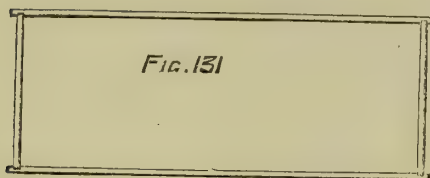
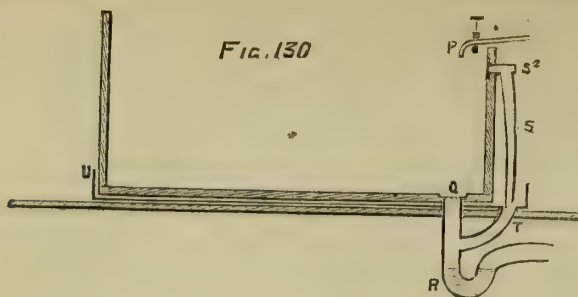
In most quarries we find some of the beds to yield good stone throughout, some good in parts only, others of wholly inferior quality, and others again not of themselves worth working. These different appearances and qualities of stone may be accounted for on the reasonable supposition, founded on observation of the minerals contained in the different beds, that during the deposition of one bed there may have been conveyed into it coarse and fine material together, from which we derive a conglomerate rock; in the next bed we see evidence of a fine, free, and clean sand having been conveyed into it, together with cementing substances, from which we derive a good building stone; in the next bed there appears to have been a mixture of good and bad material, for we find some parts of the same bed to yield good stone and other parts very poor stone; and then, before the disturbance of the formation by internal forces, there may have been deposited upon all a layer of mud, containing lime or other ingredients, and forming the loose trashy beds which have to be removed before the workable stone can be reached.

PLUMBING.

THE last article, at pp. 197-199 of The BUILDING NEWS for September 13th, 1872, treated upon the ventilation of soil-pipes and upon water-closets. In this case I shall say a few words about baths. The simplest style of bath, and one which serves its purpose very well, is the wooden one. It may be made either quite square at both ends as per Fig. 130, which gives longitudinal section, or one end may be sloped, as per Fig. 135. It is made of 1½ in. wood planed on both sides, and jointed as per Fig. 131, the ends being checked or inserted into the sides to the depth of about ½ in. white lead being used for the joints. It is then nailed together. After the bath has been made the plumber has to fit it up, which may be done in various styles. The simplest is that shown by Fig. 130, where bath is filled by simple bib-crane P, and the waste water discharged at socket-grating Q. Into brass socket-grating Q a ground brass plug fits, which is put in when bath is to be filled and withdrawn when it is to be emptied. This brass plug has strong brass chain attached to it, the other end of chain being fixed to or near top of bath. R is the syphon-trap underneath bath, while S is the overflow-pipe which leads into safe-pipe T. This safe-pipe T takes any water away which may fall into lead safe or tray U, should the bath happen to leak at bottom or seams. The lead tray is set up at ends and sides about 4 or 5 inches.* Sheet lead, 4lbs. per square foot, does very well for lead tray. When fitting up this and all other plunge-baths, the plumber ought to be careful to see that the bath is so placed that, upon the withdrawal of plug, all the water runs easily out at grating Q. For this purpose the end of bath at Q ought to be the lowest, while the other end ought to be raised up a little higher. In the case of Fig. 130 three slips of wood, each about 6 feet long, 2½ in. broad and about 1½ in. thick at one end, regularly reduced to about ½ in. thick at other end, should be placed underneath the bath. These slips will not only give the bath the necessary declivity to Q (supposing floor to be level), but in the case of Fig. 130 also prevent the bottom of bath from lying soaking in any water which might get into lead-safe, U.

Fig. 134 shows cross section of bath with the wooden slips referred to under it. To give satisfaction it is very necessary that proper brass gratings are put in, especially for bottom one at Q. Fig. 132 shows section of circular brass socket-grating and plug *in situ*, the diameter over all of socket-grating from V to V being 5½ in., and the diameter over all of plug W fully 3 in. The breadth of top flange V is about 1 in.; it has four holes bored and countersunk in it for 1 in. brass screws to fix socket-grating down to bath. XX, Fig. 132, is the wooden bottom of bath, and Y Y the top of lead syphon-trap—R, Fig. 130—(or rather top of short piece of 3½ in. lead pipe joined on to top of syphon-trap) going up through wood and bent over wood and under brass flange, as shown. Before being bent or worked over, it is well coated with white lead, so as to make a tight joint. It will also be observed that at V V, Fig. 132, the wood is checked down or cut out to the depth of ½ in., so that after the lead has been turned over and the brass socket-grating put in, the top of brass may be rather lower than surface of bottom of bath, which allows all the water to run off freely. Fig. 133 shows style of brass overflow-grating for wooden bath; it is 6½ in. long by 2½ in. broad over all, and ½ in. thick. The wood of bath is checked out about ½ in. where it goes, allowing for thickness of lead and brass, so that when fixed the face of brass may be flush with wood. I have said that the size of brass overflow-grating is 6½ in. by 2½ in., but the lead mouthpiece, S² Fig. 130, while also of oval form, is only 4½ in. by 1½ in.

* The top of syphon-trap, just under Q, where it passes through lead pipe, is of course soldered round there to lead-safe.



across, the hole cut through wood of bath being made to fit lead mouthpiece, *i.e.* about 5in. long by 1½in. broad.

In Fig. 130 only one crane is shown, as if bath were only for cold water, but all that is necessary to make it serve for both hot and cold is simply to put on a hot crane (provided you have hot water supply) either alongside P, Fig. 130, or else at other end of bath, just as may be most suitable. These wooden baths do not require to be lined up along front, but merely up the ends, or if the bath be in a corner, up one end; a piece of wood skirting however, about 6in. broad, goes along bottom of front.

Another style of bath largely used is the wooden one lined with lead. It is generally shaped as per Fig. 135, which shows longitudinal section of it. In this case the wood does not require to be planed, as it is all hid or covered in. A common size is 6ft. over all in length, which, as the wood used is 1½in. thick, gives 5ft. 9in. for the length inside, the inside breadth and depth being each (say) 2ft. Sometimes the inside length is more than 5ft. 9in., and also often less, perhaps 5ft. 6in. or 5ft. 4in. In lining this bath with lead, either 6, 7, or 8lbs. per square foot, as the case may be—if for hot water it is better to be strong—the plumber cuts out the ends and bottom all in one piece, and if we suppose the inside length of the bath to be 5ft. 9in., and the breadth and depth each 2ft., then the length of lead for bottom and ends will be 2in. + 2ft. + 4ft. + 2ft. 3½in. + 6in. + 2in., which gives 9ft. 1in. by 2ft., as the size of the piece of lead for bottom and ends. The two pieces of lead for sides are then cut out in shape, as per Fig. 137, the greatest length of each being

5ft. 9in. along top, and the depth 2ft. + 2in. = 2ft. 2in. The length along bottom is 4ft. These sides being fitted to bath and edges of lead planed straight, they are smudged (see page 95, Feb. 2, 1872) down each side and along bottom, and then scraped all along edge where soldering is to be, about ¼in. broad. After being scraped, the cleansed surface of lead is rubbed over with grease or tallow. The bottom piece of lead, being also smudged, scraped, and greased, is put into bath first and dressed into its place properly, after which the sides are put in and tacked all along site of soldering with ¼in. tinned iron tacks, one being put in between edges of lead at every 4in. or so. After each side of bath has been soldered or "wiped," small pieces of sheet lead, each 2in. square, are soldered into top corners of bath with copper bolt to make up deficiencies of lead there, caused by lead being folded back over top edge of bath. The bath is now ready to be fitted up, and instead of doing it as per fig. 130 we shall suppose it is to have a rod-pipe, ground brass valve, and hot and cold water supply, and also cold water shower-bath above. As in this case the waste pipe of bath is to be discharged into soil-pipe Z, Fig. 135, a branch has been left at Z as shown for that purpose. The first thing to be done is to put in 3in. syphon trap A Fig. 135, with 3in. waste-pipe, B, attached, but before doing so the socket of valve, C, Fig. 135, has to be soldered in, and also the branch D to bath, likewise portion of bath overflow-pipe sufficient to go up through floor as at E. As will be seen from Fig. 135, the branch D to bath joins in, at end next syphon-trap, a little above valve. In order, therefore, that it may have something to join into, when valve socket C is put into top of syphon-trap, about 7in. or 8in. of 3in.

lead pipe is soldered to top of syphon-trap along with valve socket; this 7in. of 3in. pipe, while it has the branch pipe D, which goes under the floor, inserted into it, must also be left of sufficient length thereafter to pass up through floor and be flanged back about ¾in. on floor, after the flooring has been laid. This flanging back after flooring is in helps to support syphon-trap (the joiner must be ordered to fit his flooring neatly and properly round pipes), and to this part flanged back the bottom of rod-pipe F is afterwards soldered, as at G. This rod-pipe F (so called because the rod of valve works up through it), is a piece of 3in. lead pipe, about 2ft. 2in. long. *In situ*, its top is level with top of bath, and should depth of bath be either more or less than 2ft., its length must of course be in proportion. The sheet lead used ought not to be less than 6lbs. per square foot, and may with advantage be 7 or 8lbs. The same may be said of lead for syphon-trap and waste pipes. Before the rod-pipe is set into its place, it has first to be mounted with the hot and cold water cranes H H. These in Fig. 135 are two stuffing stop-cocks with ground keys (when of good brass and properly fitted they do well for pressures about or under 20ft.; for higher pressures screw-down or valve cocks can be used), one end of each being inserted into and soldered to piece of 1in. lead pipe, of say 9 or 10lbs. per yard, and 18in. long. The two cranes being soldered to 1in. pipe, after the pipes have been bent into the harp shape shown, the top ends of pipes are soldered up, and the pipes afterwards joined to rod-pipe at I I, and in order to keep cranes steady, the backs of 1in. pipes next rod-pipe, at the height where cranes are joined, are attached to rod-pipe by being "bolted" or soldered thereto. The overflow

pipe J, made of 2in. lead pipe, is also joined to rod-pipe, being attached about 4-6in. down from top. After all these have been joined to rod-pipe, the rod-pipe is then fixed into its place by being soldered at G, while the overflow pipe is also soldered at K. The hot and cold cranes are then attached to their respective supply pipes. In order to show the principle of fitting up rod-pipes as clearly as possible, I have drawn Fig 135 with rod-pipe and cranes end on to end of bath, but in my experience the rod-pipes and cranes are more generally fitted up across, or along end of bath, the rod-pipe being placed quite close to end of bath, and the overflow-pipe, in place of bending out from rod-pipe as far as shown in Fig 135, is pretty close to it—perhaps 1½in. between the two, the two cranes being joined to rod-pipe, one at back and one at front, while the overflow pipe is attached to one side of rod-pipe, the other side of rod-pipe being closed to end of bath; however, the principle in each case is the same. The pipe shown at L, Fig 135, is ventilating pipe for bath waste-pipe; it is here shown joined to soil-pipe, but it may be carried up independently to roof; ¾in. lead pipe, 5lbs. to the yard, will serve for this purpose. In tenemental houses, where a bath is fitted up for each house on each flat, the bath in one house or flat being perpendicular with the bath in other houses above or below, if it is not wished to join the ventilating pipe L to soil-pipe, a 1in. 8lbs. patent lead pipe—or even a 1½in. pipe—may be carried up all the way to roof from lowest bath, the ¾in. ventilating pipes of other bath syphon-traps branching into it. I need not, however, recapitulate what has been said upon ventilation in article X, page 392 of the BUILDING NEWS for May 17th, 1872. After the rod-pipe and its fittings have been put in, the bath may then be lifted into its site (in many cases of course, the bath is set in before the rod-pipe, and in Fig. 135 the pipes under floor being all in it, matters little whether rod-pipe or bath be put in first); but before doing so, a hole 2½in. in diameter has first to be cut at M, Fig. 135. After being cut right through, the lead inside and around hole is lifted up a little and the wood cut away in a sloping style for a about ¾in. back, all around hole, the lead is then dressed down, smudged, and cleaned, and the bath then lifted into its place. When there, the top part of branch D, Fig. 135, being cut to the necessary height, it is flanged back about ¾in. at M, and the brass rose-grating, being tinned at edge, covered with paper temporarily, and put down, one soldering joins lead bottom of bath, lead pipe D, and grating all together at M. Fig. 137 shows style of brass rose-grating. It is simply a brass perforated disc about 3½in. in diameter, and about ¾in. thick; it is generally cast. The plumber's work of plunge-bath being thus far finished, the shower bath N, Fig. 135 is next put up, being attached to bottom of cistern. It may be either a round one, 1ft. in diameter, or else oval, and about 1ft. 6in. by 11in. O is the ¾in. air-pipe which allows shower to empty after valve P has been let down. Q is 2in. or 2½in. lead valve pipe attaching shower to cistern; R is iron lever, supposed to be screwed to wood board laid across cistern, while S is cord and pull by which to work shower. When S is pulled down it lifts valve P, and water falls; when S is let go valve P shuts, and water stops. Fig. 138 shows brass index-plate for plunge-bath fittings, with the two lever handles of cranes, and the brass knob for working valve; the index-plate is put on after all the pipes, &c. are covered in, and woodwork of bath finished. In Fig. 135 it is put on at T. Fig. 139 shows the valve-knob—marked “waste” on index-plate—in position when valve is lifted up, or open, the small pin W being turned into notch cut for it to rest on; when knob is lowered to shut valve the pin W slides down in slit cut for it in brass tube X, Fig. 139.

At U, Fig. 135, it will be observed that lead stands up ¾in. at back of wood lining V; this

is to prevent any water getting down back of plunge bath or going on floor when shower-bath is used. Fig. 135, being longitudinal sectional view, the wood lining V, which is put up between top of plunge-bath and wood lining of bottom of cistern, though only shown there at end of bath, is also carried round about 2ft. on each side of bath.

(To be Continued.)

CUSTOM AND INVENTION IN ART.— PROFESSIONAL EDUCATION.

(Continued from Page 455, Vol. XXIII.)

CLASSIFYING the kinds of knowledge which call into exercise or represent the successive stages of mental development, we have:—

1st. **FACT KNOWLEDGE**, or that depending on our perception and observation.

2nd. **SIGN KNOWLEDGE**—the translating medium of our perceptions and facts, as language. Here our ideas are expressed in words and definitions. This process, or vehicle of knowledge, should invariably follow, never precede, facts or experiences, as it does under the conventional school discipline, which teaches facts through the medium of words and names, the uses and properties of things being acquired second-hand.

3rd. **ABSTRACT KNOWLEDGE**, or reasoning in which the faculties of analysis and abstraction are engaged. Here we have the classification and generalisation of facts, the deductions of reason applied to establish principles and formulas.

It is in the above order the mind must proceed to acquire any substantial knowledge. Nations in a rude primitive condition acquire facts imperfectly, and convert them into fancies; thus early sciences, which depend on facts and experiences, are generally chimerical, or pass into the region of the imagination. In like manner, the first efforts of abstract reason are directed to the most simple order of facts, such as geometrical or mathematical truths. The earliest impressions are the most vivid, and the earliest deductions of reason the most universal and obvious. Under such conditions, the arts were most developed, and acquired a sort of excellence that has baffled modern historians and artists. The reason is simple. The facts of nature were interpreted at first hand, and transformed into the wants and necessities of art. Art reposed on the simple basis of nature and necessity, without the intervention or intermedium of conventional ideas or language. Moral truths, mathematical truths, and poetical inspiration alike reposed on the same basis, hence the moral code of the Greek philosophy was as natural as it was perfect. Greece had little systematic discipline or deference to ideas, but its art and its intellect were as perfect as they could be, because they were free and unfettered. The Greek cultivated his faculties naturally: the physical and mental were both brought into exercise and mutually sustained. Hellenic thought reached modern civilisation through the medium of the Latin language and literature, and though its freshness and vigour were somewhat impaired, it is yet the most perfect model of untrammelled culture; and for this reason, if style is to be studied, I should recommend the Greek and the Romanesque as the only two genuine germs for development. The perfection of art, and indeed of all the efforts of the human mind, is possible only twice—first, when men intuitively look to Nature as their one guide; and secondly, when they are guided by reason.

Let us apply these principles to the training of professional artists. How is their education conducted at present? Precisely in the same manner and by the same method general education is conducted. Differences of mental endowment are in the first place disregarded. There are comparatively few in the architectural profession whom Nature has specially

fitted for it. We see shoemakers who ought to have been poets, and “poets” and “artists” who should have been clerks and copyists. But the most grievous mistake in professional education is the almost exclusive study of ancient examples, or the ancient languages of art. I have shown the fruitful source of mediocrity to be the want of developing natural faculties in their proper order—by the cramming system of the day, in which the study of Greek and Latin is made paramount. The “signs” and “vehicles”—the mere media of representation—are taught before the facts, ideas, and thoughts they represent. Art instruction is not one tittle better. Instead of Nature being made our sole guide, both in her method and example, the copy of the Antique is looked upon as the only means of learning beauty; as Dr. Spurzheim says, in a work mentioned before, “For what reason are we to admire all that is ancient? The ancients had no exclusive privilege of genius, nor did they necessarily exhaust all the sources of excellence so as to leave to posterity no resource but to copy them.” “The only criterion, then, of greater or less perfection in works of art is their resemblance to Nature.” “Now if the ancients have brought forth masterpieces in imitating Nature, why should not we do the same, since Nature, though infinite in her modification, is constant in her laws?” Here, in a few words, is the gist of art excellence. As children, we copy Nature with our own eyes and hands, as the ancients in fact did, and were successful; as mature and reasoning men, while we still look to her as our guide, we can dispense with some of her leading-strings by following her unerring laws, and by adopting her *method* rather than her manner. On the contrary, we copy the manner only, and even that at second-hand. Our fashionable architects are, in fact, following the productions of certain periods, and are really as unreasonable as musicians who would follow only the productions of one or several great composers, and pronounce all other music bad. Nature is still open to us as of old, and as fresh as ever. We can still go and learn her facts with our own eyes and hands, without the intervention of signs or copies or antiques, and yet we madly prefer to study her second-hand, through the imperfections of age, base imitations, and obscure language. Until the activities of the mind are brought into exercise by ocular and demonstrable evidence, all education—general, scientific, and artistic—will be fruitless. No clear idea or new thought can be excited by a word or a sound, unless previously acquired; nor can a drawing or a fragment of an old building give us any more than the mere unintelligible record of a certain arrangement of parts without any apparent cause and effect. It even often leaves us without the impression or idea that the designer himself had, and upon which alone its fitness or beauty depends. To know or understand the special merit of an old building or feature, we require to know the components of which it is the resultant, to speak mechanically; we want to be brought into direct acquaintance or evidence with the bricks, stones, purpose, and knowledge of construction of the building itself, and its builder; for unless we understand all these matters personally, the mere ocular impression is useless as a means of instruction, however beautiful the result may be.

According to this view, then, which my readers will see is at least a reasonable one, of what avail is the instruction in the styles and periods of architecture, or the value of studying old examples at all? Substantially, none. Of no greater value than a study of the works of Mozart or Haydn would be to a student in the principles of harmony. Allied to more useful and practical knowledge, such studies are agreeable accompaniments, however. To imagine that a knowledge of art or architecture can be given by drawing and copying old buildings and works of art, is about as ridiculous as teaching children natural history by mere description; or a student in medicine

the theory of diseases by mere superficial appearances; or anatomy or *materia medica* without a practical knowledge of physiological functions or the morbid symptoms of patients themselves. Nature first, then description and theory—is too frequently reversed in all professional education. The uses, properties, and meanings of things should be simultaneous with their knowledge. Now this is generally ignored. Medical students frequently learn osteology (or the bones) before the knowledge of the muscles, viscera, and nerves has been acquired. Architectural students are taught conventional combinations and detail of the most unmeaning character, before they have understood the uses and requirements of materials and their intention in the structure. Fifty years ago the five Classic orders were first taught, and every “module,” and “minute,” and moulding was copied *ad nauseam*, without the slightest meaning being conveyed. In 1872, in quite as ridiculous a manner, although medievalists would be shocked at the assertion, we copy and repeat, joint, moulding, and notch, mechanical ignorance and mediæval clumsiness, in the same unmeaning though in a more inexcusable way, for mere sentiment has more to do with it. The theories of Burke, Hogarth, Alison, and others, at least were respected when our Classical forefathers practised, whereas, in the present day, fitness and beauty are placed aside for the mere rage of fashion and sentiment, the result of ecclesiasticism or archaeological pedantry. The too evident “affectedness” of modern art is entirely due to the unreal and artificial mode of education of our artists. Unfortunately, the opinions of some of our well-known practitioners and teachers are too often contradictory and erratic. Mr. Roger Smith, in one of his otherwise suggestive lectures on “Professional Practice,” recently reported, mentions the undeniable fact of many of our eminent architects having no power of drawing, or a very slight one, and the further fact I have before alluded to, that as architecture declined, draughtsmanship improved. Inconsistently with this statement, he recommends drawing as the *best* means of study and the only vehicle of design, and cites the names of Messrs. Street, Burges, Nesfield, Shaw, and others, as among the best draughtsmen of the day and, therefore, *ipso facto*, the most accomplished architects! Now, without calling into question the abilities of these gentlemen, the actual history of architects and their works refutes this idea. If, indeed, by the term “architect,” a deviser is meant, the two most able architects have been least accomplished as draughtsmen. Sir C. Wren and our mediæval builders, as representative instances, were not mere drawers in the sense here understood. It will be found our best planners and constructionists are frequently anything but expert with their pencil, though they may possess the power of portrayal to a certain extent. The power of expressing intelligibly an idea or form on paper is distinct from the power of copying, and this distinction should be remembered. The power of design and that of drawing are distinct powers—the first requires the effort of several faculties—the latter is the mechanical vehicle of expression, in which the eye and hand are chiefly concerned. I do not undervalue the facility of drawing or sketching, in stating this. It is a great gift to the architect to possess a correct means of conveying his thoughts, but it is a mistake to imagine it gives him ideas or any power of design he does not possess, though this is really the presumption. It is a valuable auxiliary, and may be considered in its function as the language of design, though it often becomes more entitled to rank as mere penmanship. In the latter capacity only, draughtsmanship is generally acquired and regarded. After all, it must be remembered, lines and shadows can only express form conventionally, and that real architectural form can be intelligibly rendered only by models or

by plans and sections. Elevational drawing cannot convey solid form, and therefore stereographic or perspective delineation would be of far greater use to the architect in designing buildings. Drawing, to be of any practical value to the student of this art, should be more explanatory than it is; pictorial drawing is too often the test of the draughtsman's work. Any architectural collection of drawings, competition or otherwise, indicates this weakness too plainly. But the great evil of the modern draughtsman's education is that he is taught to copy, instead of delineate his own ideas. If drawing were to become an exercise of mind, eye, and hand, and our pupils were taught to design and express on paper, instead of so much conventional drawing of plans and elevations; if solids and their sections were practically taught during a certain period of pupilage, instead of useless show drawings and sketching old buildings—if, in one word, drawing were made the vehicle of expression instead of, as now, a test of an architect's ability—this qualification would be infinitely of more value, and we should have thinkers in art instead of copyists.

G. HUSKISSON GUILLAUME.

ARCHITECTURAL PROFESSIONAL PRACTICE AND CHARGES.

THE following is a schedule of rules for professional practice and charges of architects, published under the sanction of the Royal Institute of British Architects, and confirmed at a general conference of architects of the United Kingdom, 1872:—

1. The usual remuneration for an architect's services, except as hereinafter mentioned, is a commission of 5 per cent. on the total cost of the works executed from his designs; besides which, all travelling and other incidental expenses incurred by the architect are paid by the employer, who may be also charged for time occupied in travelling if the work be executed at a considerable or inconvenient distance, or if more than ordinary personal attendance is required.

2. But for all works in which the expenditure is mainly for skilled labour, and not for materials, e.g. in designs for the fittings and furniture of buildings, for their decoration with painting or mosaic, for their sculpture, for stained glass, and other like works, the architect's charge is not made by way of commission on the cost, but should be regulated by special circumstances and conditions.

3. When several similar but distinct buildings are erected at the same time from a single specification and one set of drawings and under one contract, the commission of 5 per cent. should be charged on the cost of one such building, and a modified arrangement should be made in respect of the others.

4. In works of small value, say £500 in amount, 5 per cent is not remunerative, and the charge should be by time, or by an ascending scale, reaching 10 per cent. for works under £100.

5. The commission is reckoned upon the total cost of the works, valued as if executed by a builder, and of new materials. 2½ per cent. is charged upon any works originally included in the contract, but subsequently omitted in execution.

This is exclusive of the charge for measuring extras and omissions.

6. The architect is entitled during the progress of the building to payment on account at the rate of 5 per cent. on the instalments paid to the builder, or otherwise to half the commission on the signing of the contract or the commencement of the works, and the remainder by instalments as above.

N.B.—The terms of payment adopted by Her Majesty's Office of Works and Public Buildings may also be taken as an equitable method of payment on account, viz.:—

One-third part of the commission shall be paid to the architect immediately after the signing of the contract;

One-third part shall be paid to the architect as soon as one-half of the contract sum has been paid to the builder;

And the remaining one-third part shall be paid to the architect after the final payment to the builder.

7. The above charges do not cover professional services in connection with negotiations for site,

in surveying it and taking levels, in making surveys and plans of buildings to be altered, in arrangements respecting party walls, or right of lights, nor services incidental to arrangements consequent upon the failure of builders whilst carrying out work, or in cases of subsequent litigation; but all such services are charged for in addition.

8. If the employer, after having agreed to a design, and had the contract drawings prepared, should have material alterations made, whether before or after the contract is prepared, an extra charge should be made, unless such alterations are rendered necessary by an unreasonable excess in the builder's tender beyond the architect's approximate estimate.

9. If the architect should have drawn out the approved design complete, with plans, elevations, sections, and specification, the charge is half the commission upon the estimated cost. If he should, in addition, have procured tenders in accordance with the instruction of his employer, the charge is one-half per cent. extra.

10. For works in the alteration of premises, a special charge may be made on account of the special difficulties and trouble generally involved.

11. The following are the professional services included in the ordinary charge of 5 per cent.:—

The requisite preliminary sketches, drawings, and specifications sufficient for an estimate and contract.

Detailed drawings and instructions for execution.

One set of tracings and duplicate specification.

General superintendence of works (exclusive of clerk of the works).

Examining and passing the accounts, exclusive of measuring and making out extras and omissions.

12. No additional remuneration is due for making an approximate estimate, such as may be obtained, for instance, by cubing out the contents. If a detailed estimate be required by the employer, an additional percentage charge may be made.

13. The charge per day made by architects depends upon their professional position, the minimum charge being three guineas per day.

14. The above payments alluded to in this document are to be made by the employer to the architect, who is not to receive commission or payment of any kind from the builder, or any tradesman, in respect of works executed under the architect's direction.

15. When an architect supplies builders with quantities, on which to form tenders for executing his designs, he should do so with the concurrence of his employer; and it is desirable, when practicable, that the architect should be paid by him rather than by the builder, the cost of such extra labour not being included in the commission of 5 per cent.

16. In respect of the ownership of drawings and specifications, it has hitherto been the general custom for the architect to be paid for their use only, those documents remaining his property.

N.B.—In case of sketches for works abandoned this custom is recognized by the office of Her Majesty's Works and Public Buildings. No authoritative decision in the Courts of Law has, however, as yet been given on the subject; it is therefore desirable, for the present at least, that the architect should have a distinct understanding with his employer on this point.

17. The charge for taking a plan of an estate, laying it out, and arranging for building upon it, should be regulated by the time, skill and trouble involved.

18. For actually letting the several plots (in ordinary cases) a sum not exceeding a whole year's ground rent may be charged.

19. For inspecting the buildings during their progress (so far as may be necessary to ensure the conditions being fulfilled) and finally certifying for lease, the charge should be a percentage not exceeding one-half per cent. up to £5,000 and above that by special arrangement.

20. All the above fees to be exclusive of travelling expenses, and time occupied in travelling, as before mentioned.

21. The charge for the above does not include the commission for preparing specification, directing, superintending, and certifying the proper formation of roads, fences, and other works executed at the cost of the employer, nor for putting the plans on the leases.

The following definite charges are recognised for valuation of property:

The charge throughout is 1 per cent. on the first £1,000, and half per cent. on the remainder up to £10,000. Below £1,000 and beyond £10,000 by special arrangement.

These charges do not include travelling expenses, nor attendance before juries, arbitrators, &c.

The charge for estimating dilapidations is 5 per cent. on the estimate, and in no case less than two guineas.

IMPORTING A HOUSE FROM NORWAY.

WE are indebted to the *Times* for the following description of importing a house from Norway:—

A gentleman in Devonshire, being compelled in the course of last year to build a house, and finding that the estimates submitted to him for plans of the usual kind exceeded what he was willing to spend, bethought him of what he had seen of houses in Norway. It so happened that he had rented a salmon river in that country for several years, and circumstances had caused him to see more than English sportsmen commonly see of the domestic life of the well-to-do class. He had been particularly struck with the comfort, elegance and notable cleanliness of their houses, with the equable temperature that was preserved in them in spite of a climate liable to extremes of heat and cold, and with the freshness, airiness, and general pleasantness of the rooms. An application to an architect in Christiania brought him several plans, one of which happened to be the plan of a house in Bergen which he had inspected and admired. This plan, after a few modifications had been made in it, was adopted. An estimate and specification were then obtained from a builder in Christiania, who undertook to erect the framework of the house, to pull it down, and to deliver the materials, duly numbered and prepared for transport and reconstruction, alongside a ship which the purchaser was to charter. The order for the house was sent in January, and within three months it was ready for transport. Some delay was incurred in getting a vessel, and it did not leave Christiania till the 18th of May. A tedious voyage further delayed its arrival in England till the same time in June. It was then conveyed by railway to its destination, and on the 28th of June the work of re-erecting it was begun. Early in the present month it was ready for occupation, though, owing to the dampness of the Devonshire climate, it has been found expedient to delay until the spring the putting on of the outer shell.

While the house was in course of construction at Christiania, certain necessary works of preparation had been going on in England. The cellars had been made in the usual way, a stone wall on which the wooden structure was to rest, rising about four feet from the ground, was built, and the brick flues of the house had been in part erected. It may not be superfluous to suggest to anyone who may be meditating a similar importation the necessity of extreme accuracy in reducing the "alen" of the Norwegian ground-plan to English feet. It would be a disastrous mistake to construct foundations which your house would not fit.

The walls are made of pine wood about six inches thick, the interstices of the logs being filled with oakum, and the whole surface being plastered with a mixture of cowhair and lime. Outside the main wall there is a shell of wood, which is protected with paint against the action of the weather; and again inside there is another shell, which serves as a panelling to the rooms. By staining and varnishing this a good effect is produced. The cornices are carved, by the use of the riband saw, in devices of excellent taste. It should be noted that neither paper for the walls nor plaster for the ceiling is used throughout the house. It is important to observe that everywhere the logs of timber are placed vertically, an arrangement which adds somewhat to the expense of building, but which, as the contraction of wood in drying is not lateral but vertical, prevents the unevenness so often to be observed in the woodwork of English houses. To avoid the resonance which might be expected in a house so constructed, dry sand to the depth of four inches is placed between the ceilings of the cellars and the floors of the ground rooms, and again between the ceilings of these and the floors of the rooms above. In addition to this the floors of both stories of the house are laid with deals two inches thick, and millboard is placed under each, with the effect of thoroughly deadening all sound. The house, which presents

externally the appearance of a handsome villa residence, brighter, indeed, in colour than we commonly see in this country, is an oblong of about 74ft. by 56ft. On the ground floor, besides the kitchen with its offices, butler's pantry, front and inner hall, there are these principal rooms:—Drawing-room, 29ft. by 16ft.; second drawing-room, 24ft. by 16ft.; library, 16ft. by 12ft.; dining-room, 24ft. by 20ft.; business-room, 16ft. by 14ft.; ante-room, 12ft. by 12ft. All the rooms on this floor are 13ft. in height. On the first floor, which is 10ft. 6in. in height, there are:—Day nursery, 26ft. by 13ft.; night nursery, 13ft. by 12ft. 6in.; bath-room, 15ft. 6in. by 13ft. 6in.; bedroom, 24ft. by 21ft.; ditto, 24ft. by 21ft.; ditto, 21ft. by 15ft.; ditto, 15ft. by 14ft.; ditto, 15ft. by 13ft.; ditto, 20ft. by 11ft. All of these are furnished with stoves. There are also two wardrobe rooms, each measuring 15ft. by 13ft., one of which has a stove, and may be used as a bedroom, and a linen room, 14ft. by 7ft. It may be observed that there is room and opportunity for constructing attics in the roof, an addition which can be the more easily made owing to the circumstances that the slates are laid, not on laths and battens, but on panelled wood.

Now as to cost. The stone foundation-wall cost £60; the builder's estimate, including 16 stoves, doors, window-frames, door-handles, locks, and other fittings, amounted to £877; the sea-freight was £204, to which something must be added for carriage by railway; a fee of £112 was paid to the architect; and to these sums must be added the cost of window-glass, slates, &c. The total cost will be *something under two thousand pounds*. The estimates previously obtained for a stone house containing about the same amount of accommodation had reached the sum of £4,600; extras, an important item in building expenses, not being included in this amount.

Probably the first question which every reader will ask is this:—"But will not a house of wood be especially liable to fire?" That houses of wood generally are so liable is certain, but it is possible that proper precautions taken in their construction and management may very materially reduce the risk. A practical proof that some such result may be attained is found in comparing the Norwegian with the English charge for fire insurance. Here the rate for an ordinary risk is 1s. 6d. per cent.; in Norway it is one dollar (4s. 6d.) per thousand dollars, or 2s. per cent., an excess not indicating a much greater danger, and, in fact, easily to be accounted for by the smaller amount of business transacted by the Norwegian fire offices. One fertile source of danger is removed by the total separation between the flues and the rest of the building. That common cause of fire, the beam heated by too close proximity to a fireplace, cannot occur in a house constructed as has been described above. Safety is also provided for by the substitution of stoves for the grates commonly used in this country. When we speak of "stoves," however, it must not be imagined that the Norsk stoves are of the kind called the "close" stove. In the principal sitting-rooms they are so constructed as to allow the luxury, which nothing but sheer necessity will make an Englishman relinquish, of an open fire. At the same time, it is evident that such a house, having once taken fire, would burn very rapidly, and would be completely destroyed. It would be wise to provide ready means of escape for the inmates. Another obvious precaution would be not to raise such a house to any great height, or, certainly, not to use as a sleeping-room any chamber that might be constructed above the first floor.

Doubts about the durability of such a structure may be more satisfactorily disposed of. The climate of Norway may be supposed to be even more trying than ours to wooden buildings. Not only are there greater variations of temperature, but the average rainfall is higher than ours. At Bergen, for instance, that average is 89 inches—more, certainly, than falls in any English town. Yet, as a matter of fact, wooden erections of considerable antiquity are not uncommon in the country. Dwelling-houses may frequently be seen there, which, though very old, appear as sound as when they were first erected; and it is certainly true that, whether old or new, they do not need the incessant repair which in England so considerably increases the total of a householder's rent. But, whatever may be the age of Norwegian dwelling-houses—in England there are but few which are as much as two centuries old, and of these a considerable proportion are of wood—the churches afford incontestable proof of the durability of wooden buildings. The church at

Hittedal, to mention two only out of the many instances which might be cited, was built in 1300, and that of Fortundal is said to be 800 years old. These figures may possibly be exaggerated, but there are certainly gigantic pieces of timber in this structure whose history may be traced back for many centuries. These timbers are in the interior of the church; they are not painted, and they appear as fresh as if they had been cut down a year or two ago, no trace of worm or dry rot being observable in them.

To sum up. It seems that an English purchaser can import a house from Norway for something less than half the sum which it would cost to build one here in the usual way. It appears also that this house may easily be made of handsome appearance, both within and without, wood being more susceptible than either stone or brick of an ornamentation which is at once tasteful and cheap; that it will be somewhat less liable to fire, but pretty certain, should fire once lay hold of it, to be rapidly and totally consumed; that it will be cleaner, will need less repair, and will, in all probability, be equally durable.

TURNER'S PLATES AND ENGRAVINGS.

A very extensive and interesting sale of engravings, by and after Turner, the landscape painter, is to come on at Messrs. Christie's in March. This sale will comprise (according to the London correspondent of the *Manchester Guardian*) the stock which that eccentric genius used to sell from at his own house during his life, and which were found there after his death. The compromise ultimately arrived at respecting the property of the late artist provided that the stock of engravings and the plates should pass to his next of kin. The engravings were valuable—20,000,—and include thousands of copies of the larger and more expensive plates. The plates themselves are likewise valuable, many being in excellent condition, and some of them plates of exquisite beauty, from which no more prints have been taken than can be counted on one's fingers. Strange to say, this property has been for 20 years uncared for in the house in Queen Anne-street, where Turner's studio was. This house, tenantless, dirty, literally rotting away, of which the neighbours said it was a disgrace and an eye-sore to their street, contained the treasures which Messrs. Christie are about to offer to the world. Death has lately removed the man who was ostensible custodian of the property, and after his death there were found in the old house in Queen Anne-street piles of engravings of all kinds reaching breast-high round the room. Slates had fallen off the roof, the water had dripped in and was actually standing in tiny pools on some of the heaps of prints, and the floors had so far rotted that some of them appeared unsafe to carry a single person. By purchase or by death, several of the claims on the property have become extinguished, until it is now vested jointly in the hands of two gentlemen, distant relatives of the painter, one of whom had to be fetched from the wilder parts of Alabama to establish his identity and his right to a share of these treasures. The sale will include quantities varying from about 400 to 600 each of the larger and more popular engravings, such as "Caligula's Bridge," "Dido and Æneas," "Mercury and Argus," "Mercury and Hecate," and "Crossing the Brook;" more than 500 sets of the England and Wales series, and large numbers of the smaller book plates illustrating the works of Scott, Byron, Milton, Campbell, and Rogers, together with those done for the Keepsakes, Annual Tours, and other works. Of the published plates and the "Liber Studiorum" there are few or no good examples, but collectors may enrich their folios from the etchings, of which there are more than 700 of the published series, and more than 80 of the rarer unpublished. A number of the copper-plates of the unpublished part of the work were found lying heaped in a corner of some old cupboard, where a charwoman had pitched them out of the way. They are in various states of rust and decay, but a few, it is believed, may still prove fit to print from.

We learn from India that Captain Wood, an engineer in the Madras Department of Public Works, was mobbed the other day by some of his contractors, backed up by 70 or 80 men, with the view of extorting payment for bad work. The ringleader was fined 300 rupees, and sentenced, on appeal, to three in place of 12 months' rigorous imprisonment.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE BUILDING NEWS has hitherto contained, on an average, two single pages (or one double page) lithographic illustrations weekly. It is now our intention to give *six* single pages or *three* double pages weekly, or three times as much as we have hitherto given. And the illustrations we shall give will be as varied as the phases and interests of architecture and the wants of architects and builders, as they will consist of perspectives, elevations, sections, plans and details of ancient and modern buildings of all kinds. We shall also give illustrations of civil engineering works, both at home and abroad; also illustrations of furniture and decoration, for ecclesiastical, civil, and domestic purposes; and also engravings for art students and art workmen. And in order that this department of the BUILDING NEWS may not lack variety, we shall occasionally give reproductions from great masters like Albert Dürer, and representations of painting and sculpture.

We shall be glad to hear whether the alteration we have made finds favour with our readers.

BOSSES, NOTRE-DAME, PARIS.

It is with satisfaction we are enabled to give this week engravings of four of the Bosses of Notre-Dame, Paris. They are fair specimens of thousands of similar examples scattered over France—products of the Queen of Middle Age centuries in relation to art. Norman Shaw and others have given us beautiful illustrations of many of the cathedrals and churches of France and Belgium, but they have given us comparatively little of *detail*. Now we have more elbow room in the BUILDING NEWS, we shall endeavour, in some degree, to supply this deficiency, by giving frequently, perhaps from week to week, lithographic engravings of some of the richest bits of French ancient architecture. These engravings will be found to be as useful to the art-workman and the designer as they are unquestionably interesting to all as pictures.

BLACKBURN FREE LIBRARY MUSEUM.

As we have now "ample room and scope enough," we shall give illustrations of the best works we can get, unmindful whether or not they have been given elsewhere. We have, therefore, pleasure in giving a perspective view of the Blackburn Free Library and Museum, which worthily won the first place in a public competition. Thirty-eight sets of drawings were sent in, and that by Messrs. Woodzell and Colcutt, architects, Finsbury, was, by the wise advice of Mr. Waterhouse, selected as the best. The museum is on the first floor, and is partially top-lighted. The cost of the carrying out the building has been about £6,000, exclusive of fittings, which formed a separate contract. We shall give another example of Messrs. Woodzell and Colcutt's excellent work in a week or two.

BUONSIGNORI PALACE AT SIENNA.

As many English architects of late years have caught their inspiration from the productions of the Italian architectural masters of the thirteenth and fourteenth centuries, we give this week, and shall continue to give in subsequent numbers, illustrations of those productions. We have selected this week the Buonsignori Palace at Siena, of which we give an elevation and a page of details. The building is composed almost entirely of brick and terra-cotta, and is in excellent preservation. The workmanship is of a very perfect character; so that on the façade, which is not covered with cement, it is almost impossible to perceive the joints of the brickwork.

There are, in the ground storey, three large openings, and four of much smaller size, all arched. The central one, which is for entrance, is somewhat larger than the two lateral, one of which is entirely blocked up for the staircase, while the

other is partly blocked, the upper part being window.

The archivolt, it will be seen, is of peculiar construction. The arch bricks do not converge to the centres of the segments, but are all directed to the point of intersection of the axis of the opening with the line of the impost. External to these is a hoodmould enriched with foliage and dentils. Under the pointed arch there is a circular segment resting on the extreme points of the impost from which the sides of the arch rise, and the enclosed space is filled with bricks. The construction of the four small openings is similar to that now given. Above the two extreme openings there are marble scutcheons, belonging to the family who have occupied the palace during two centuries. With exception of the basement, the impost, and one of the courses, into which several iron rings are fixed, all the rest of the ground storey is of terra-cotta. The use of these rings, which are found in nearly all town buildings of this period, was probably the attachment of banners, tapestry, &c., on *fête* days; and not, as some have supposed, to give a fastening for barricade chains in riotous or war times (the perfection of the work being an objection to the latter view). At the upper part of the ground storey is a marble cornice, under which are small arches resting on corbels.

The first storey contains seven arch-shaped windows, all alike; the large arch in each enclosing three of smaller size, which rest on beautiful marble pillars. At the intersections of the small arches, which form the window, there are two rings of terra-cotta, which possibly served the same purpose as those of iron. In the intervals between the windows, iron hooks are fixed in a line, and having a downward projecting bar, with a ring at its extremity. This storey has also a cornice and arches, like those of the ground storey. The second storey is quite similar to the first, and the cause of this similarity, which may seem monotonous, is probably to be sought in the principle of economy; the cost of material being small, whereas models and moulds would be very expensive. The crowning part of the edifice consists of an arcade larger than those already described, above which there is a crenellated structure of terra-cotta, sustaining the roof. The openings admitted light and air to the mansard storey. This structure no longer exists (unfortunately for completeness of architectural character); in restoring the palace the roof has been lowered, as it was feared the crenellated structure might prove insufficient for its weight.

S. LEONARD'S PRIORY, STAMFORD.

Mr. John Langham, of Leicester, has been kind enough to send us his sketch, with capitals of this Priory, which obtained honourable mention in the competition for the silver medal of the Royal Institute of British Architects. Mr. Langham was one of the contributors to the "Building News Sketch Book," and as we are about to devote much more space than hitherto to illustrations, including sketches of ancient examples, we shall be glad to hear from Mr. Langham, at his earliest convenience, again.

FRONT OF NO. 69, LUDGATE HILL.

Last, and certainly least, we give this week a view of a new building, recently erected on Ludgate-hill. The building designed by Messrs. Woodzell and Colcutt is worthy of imitation, and we are sorry it is not in our power to say the same of the one now under notice. The premises in our illustration, which extend from Ludgate-hill in the front to Little Bridge-street at the back, a depth of 109ft., are being erected for Mr. Thomas Treloar, for the purposes of his business. The front towards Ludgate-hill is to be faced with solid white Suffolk bricks, with dressings and enrichments of Portland stone,

Pether's patent bricks being used for the diaper work over first-floor windows. The pilasters on ground storey are to be of polished grey granite, with an incised enrichment on each, the caps and bases of Portland stone. The panels under third-floor windows, as well as those in brackets over shop-front, are to be filled in with Messrs. Maw and Co's. encaustic tiles. The architect for the building is Mr. Henry Warre Hayward, and Mr. Thomas Elkington is the contractor.

ARCHITECTURAL COMPETITIONS.

THE following are the general regulations for the conduct of Architectural Competitions in cases in which competition shall be justified by the extent and importance of the work, or other special circumstances, as approved and adopted at the General Conference of Architects, held at the Royal Institute of British Architects in June, 1872.

1. The promoters of every competition should appoint one or more Professional Assessors whose names should be published in the advertisements and instructions. It should be the duty of these Assessors.

(a.) to advise upon the details of the instruction.

(b.) to determine which of the designs conform to those instructions.

(c.) to exclude all others; and

(d.) to advise the promoters on the relative merits of the designs admitted to the competition.

2. Every member of the committee of Adjudication and every assessor must necessarily abstain from taking a part in the competition, or in the execution of the proposed work.

3. The number and scale of the required drawings must be distinctly stated, and they should not be more in number or to a larger scale than necessary in order clearly to explain the design. If perspective views be required, the instructions should be such as to ensure uniformity of size, number, mode of colouring, &c.

4. The instructions should clearly state whether the plans are to be marked with the author's names or with mottoes, and whether the amount proposed to be expended will be strictly limited, or may be considered as approximate only.

5. Designs ought to be excluded from competition—

(a.) if sent in after the period named (accidents in transit excepted);

(b.) if in violation of any of the instructions;

(c.) if they do not substantially give the accommodation asked for;

(d.) if they exceed the limits of site; and

(e.) if the assessor (with or without the assistance of a surveyor), should determine that their probable cost will exceed by ten per cent. the intended outlay, or the estimate of the competitor.

6. All submitted designs, *unless excluded under rule 5*, should be publicly exhibited *after* the final award. The report of the Assessor and the decision of the Committee should be published at the time of exhibition.

7. It should always be an undertaking by the parties inviting plans in competition, that—subject to compliance with the conditions, especially as to a tender being obtained within ten per cent. of the competitor's estimate—the author of the design declared to be the best is to be employed on the work if carried out, subject to any special arrangements which may be recommended by the Assessors in the interest of the work.

8. The first premium should not be less than one-half per cent. of the proposed outlay; it is not to be merged in the commission, but must be subsequently increased by one-half per cent. if the premiated design be not carried out, or if the work be abandoned. Other premiums should be offered, the aggregate amount of which should not be less than one per cent. upon the intended outlay, divided into as many premiums as may be convenient. The above applies to works over £10,000 in value; in the case of smaller works the percentage of remuneration should be increased. In cases of *limited competition* each competitor should receive some payment in order to meet his expenses.

9. Designs for which premiums have been adjudged and paid ought not thereby to become the property of the promoters.

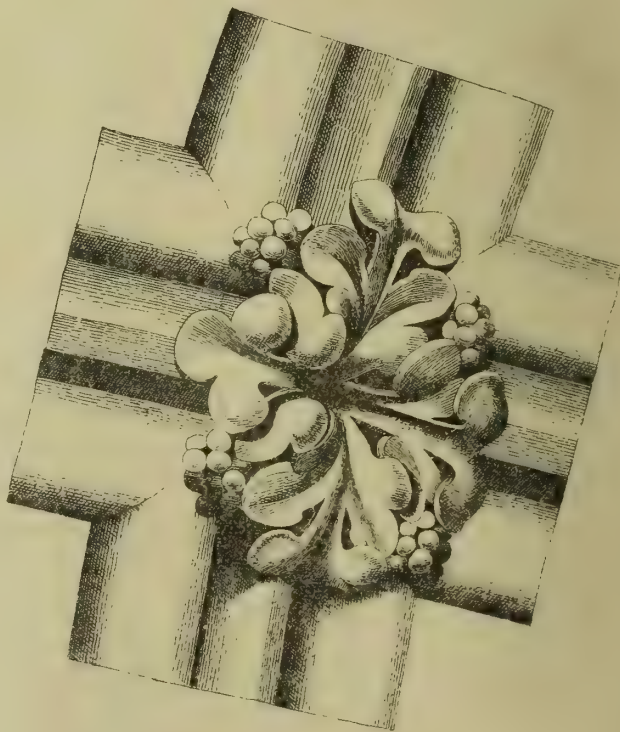
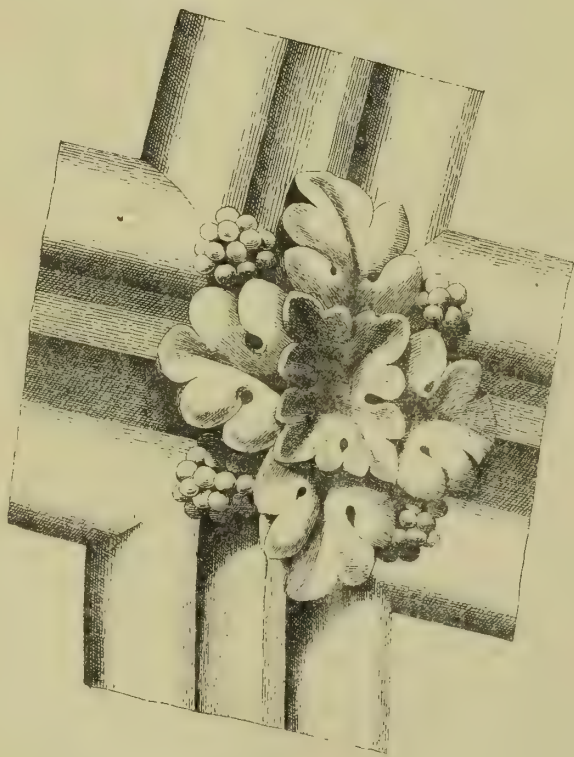
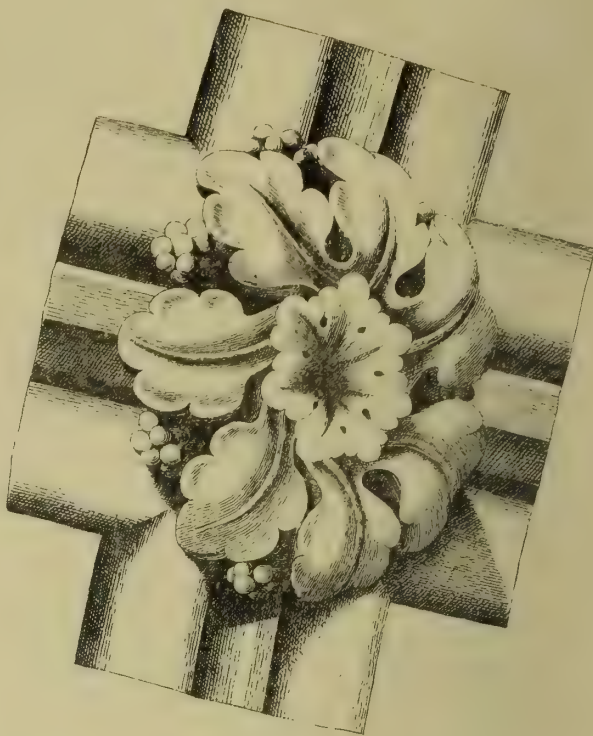
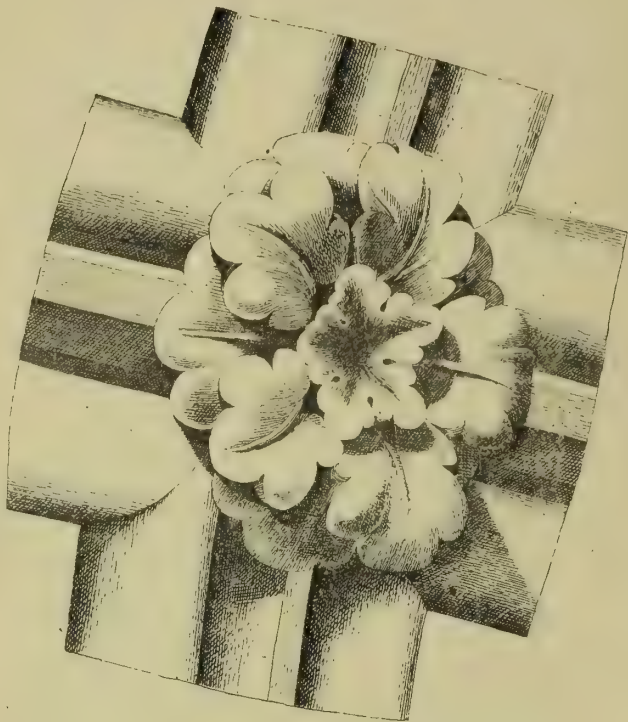
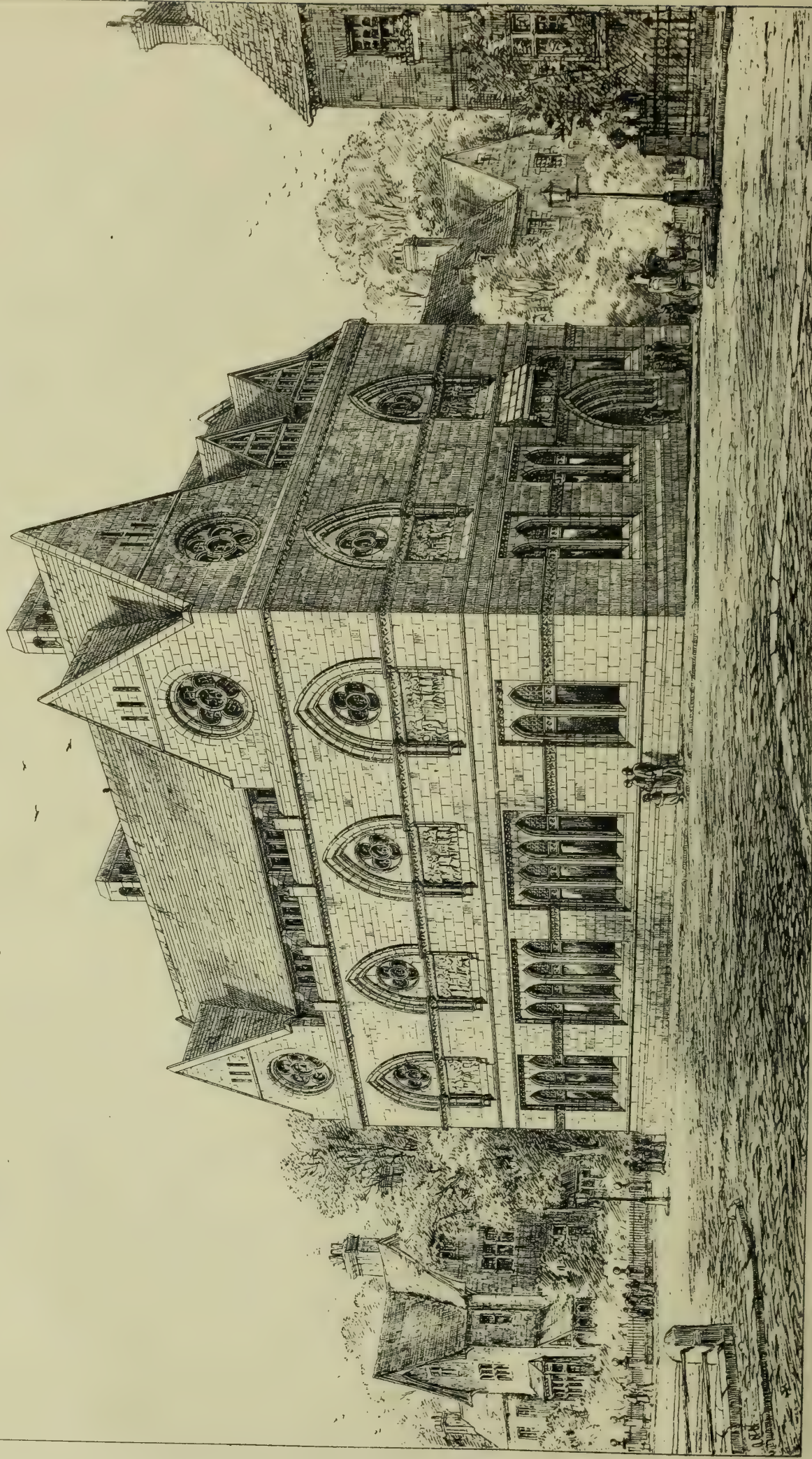


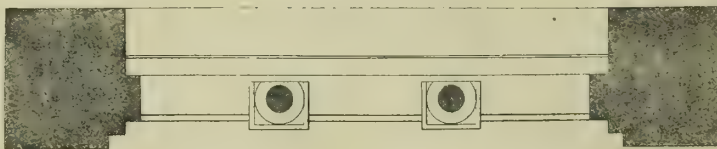
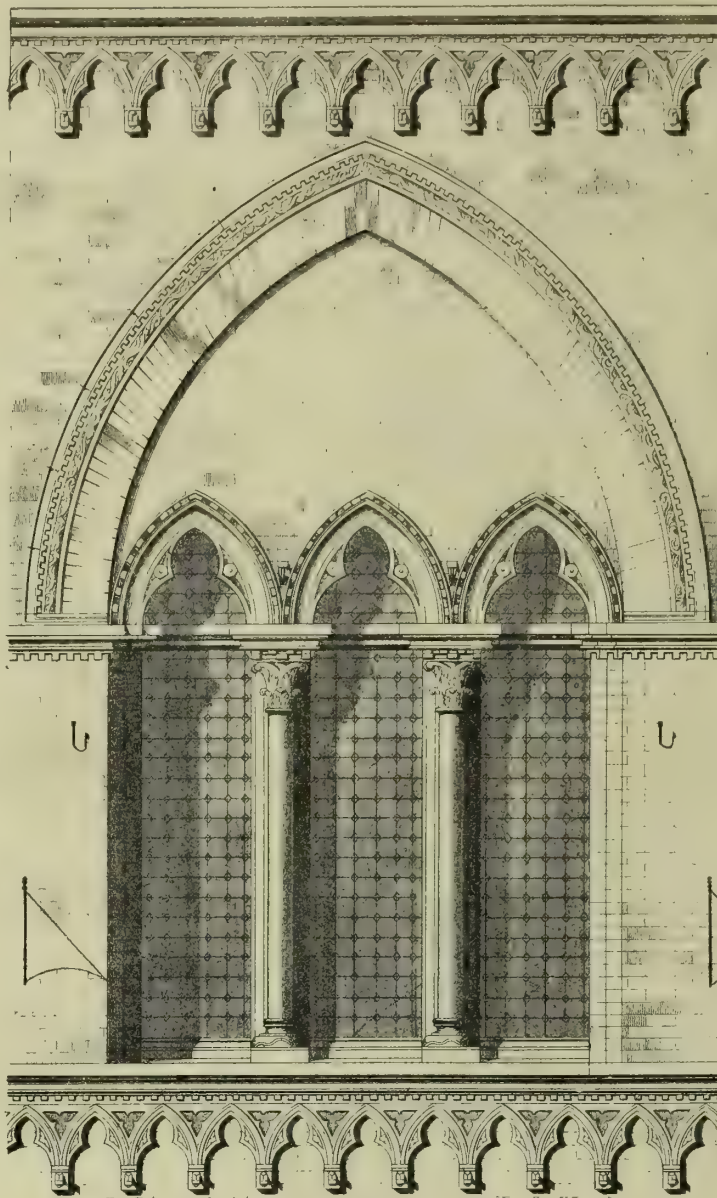
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BOSSES, NOTRE-DAME, PARIS.
13TH CENTURY.



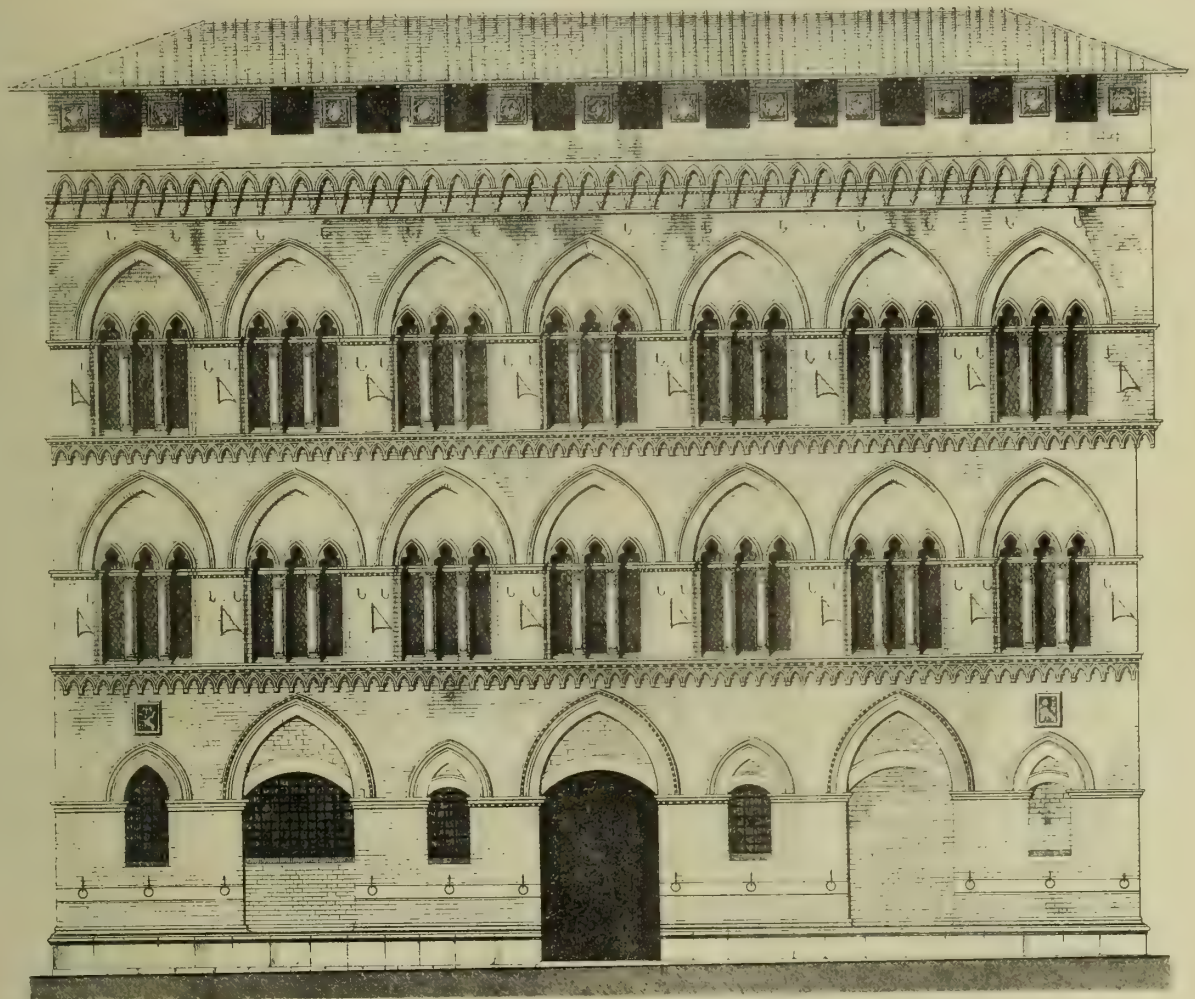
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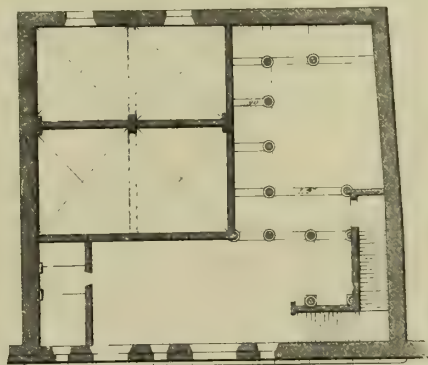


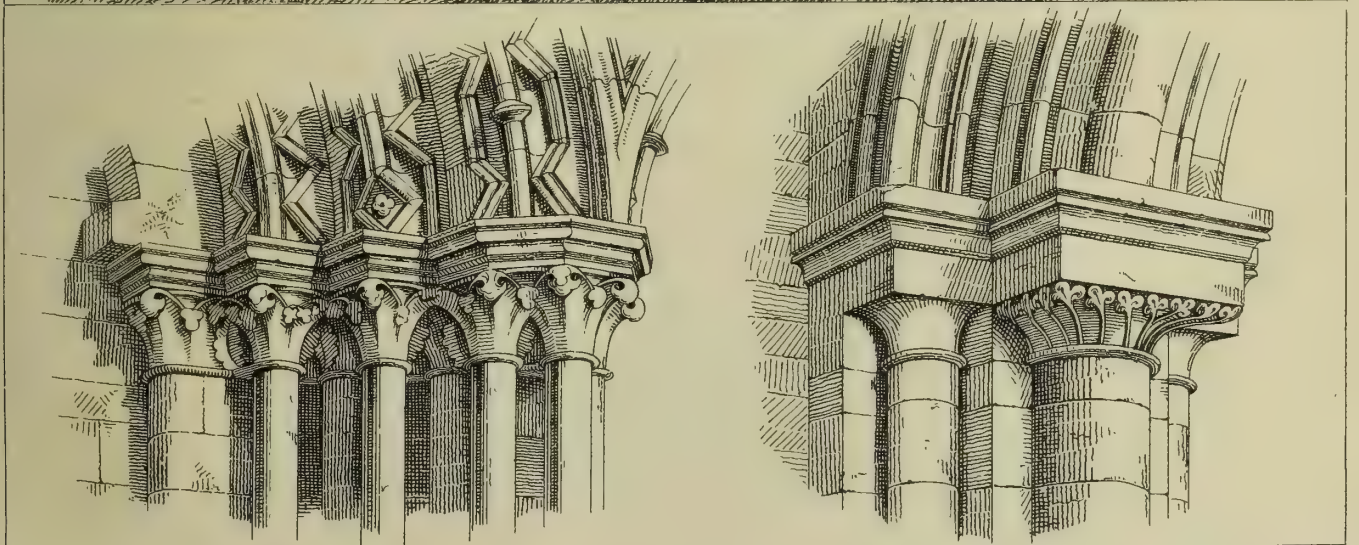
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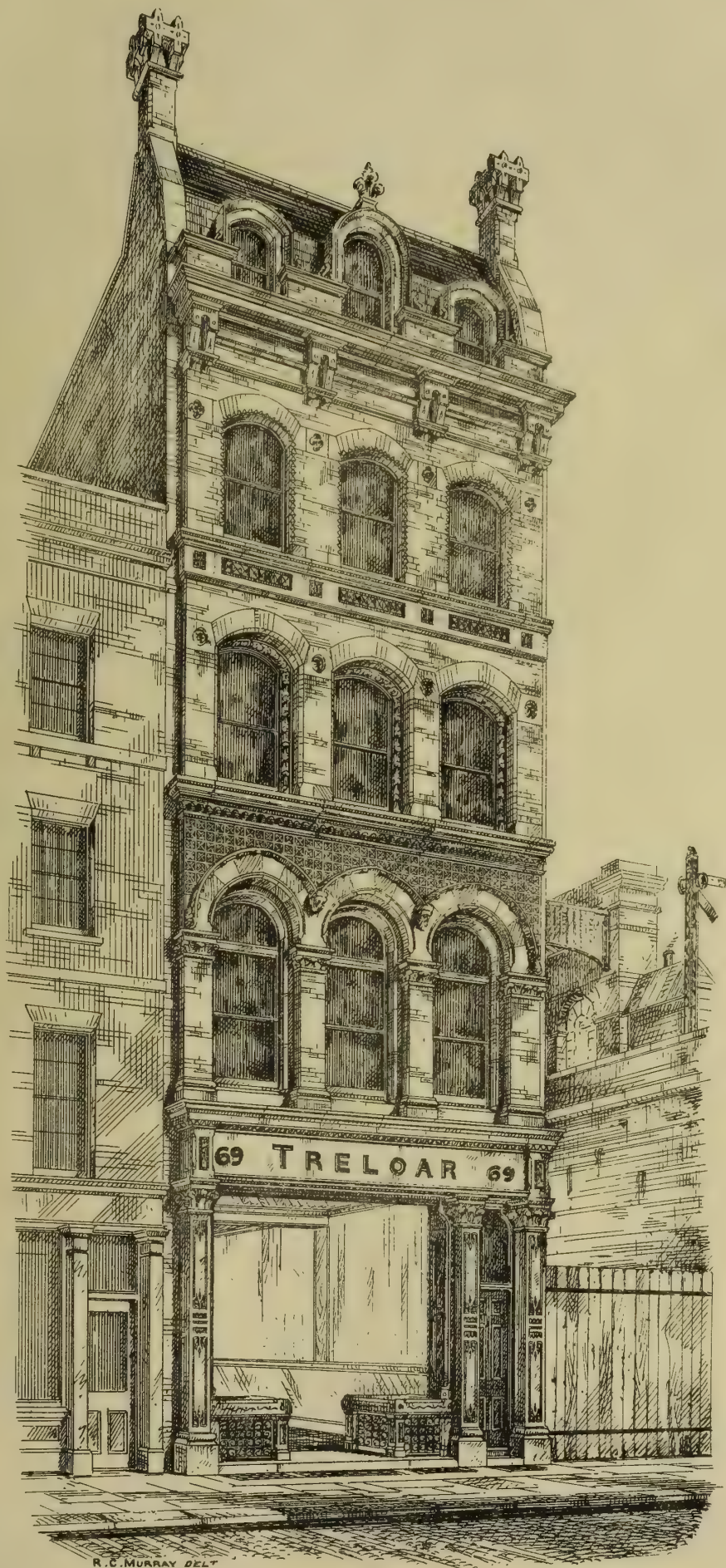


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FRONT OF N° 69 LUDGATE HILL.
H. W. HAYWARD. ARCHT

EXAMPLES OF GROINED VAULTING.

THE following is the substance of a paper read before the Manchester Architectural Association, and also before the Liverpool Architectural and Archaeological Association, by Mr. J. Battye, architect, Manchester.*

INTRODUCTORY.

One of the simplest cases of a groined vault is that in which a square room is covered by semi-cylindrical vaulting crossing at right angles, and without ribs at the intersections or groins, as shown in Fig. 1, which is a view looking down upon the top of such a vault, without the enclosing walls, Figs. 2, 3, and 4 being respectively plan, elevation, and diagonal section of the same. The groins in this case would generally start from a mere point in the angles, and not as here shown from a square plan, requiring corbels to support them. The section of the vault taken on a diagonal line would be a true semi-ellipse, and might be drawn by means of a trammel, or found by ordinates, as indicated by the dotted lines 1 1, 2 2, &c. In such a vault each course of stone or brick would be level and parallel to one or other of the side walls; this is the ordinary form of a Roman vault.

Fig. 5 shows a pointed vault on the same principle; the plan being square as before, the intersections on the diagonal lines would be portions of an ellipse, just as the arches in elevation would be portions of circles, and might be found as before. The courses of stone would in this case also be level, and run parallel to the side walls.

Now in a vault like either of the preceding examples, the intersections of the cross vaults would be the weakest parts, on account of each stone of the angular groin acting to some extent as a corbel, and one corbel standing upon another all the way up, as indicated in Fig. 6. To avoid this defect the next step taken in the art of constructing groined vaults would most likely be that of putting ribs under the angles of the groins; this might be done by cutting away the angle, and throwing arched ribs across the vault on the diagonal lines, as shown in Fig. 7, which is a section through the angle of the groin. Perhaps the next step would be the introduction of wall ribs, as shown in Figs. 8 and 9. Another important change would be made in the plan of the springer. It will be seen from the plan of the springer, Fig. 8, that the ribs are drawn as if they commenced from the springing at once the full size of the rib. In a case like this, as soon as the ribs begin to rise, they separate from each other, and the plain surface of the vaulting betwixt the ribs commences immediately from a point at the springing level. The ribs would then have no mitreing at the springing, but each one might be worked out of a separate stone from its commencement. This arrangement would take up a great deal of space in the angles of the vaults, and besides looking heavy, would require large corbels or shafts in the angles; but if instead of this, we set the feet of the ribs back one into the other, as it were (see Fig. 10.), we should do away with that objection, and get a more compact-looking springer, and the ribs would then have to rise some distance above the springing level, radiating as they rise, before they became completely detached from each other; the springers being worked in solid courses up to the points of separation, and the mould of each rib gradually developing itself till it becomes completely formed.

Now as far as we have yet gone, we have supposed the plain surface of the vaulting to be level on any line taken across from rib to rib in a direction parallel to, or at right angles to, one or other of the sides of the vault, as shown in Figs. 1 and 5, and in the compartments *a a*, of the plan in Fig. 9; but another change would be made by taking each course of stone across the spaces betwixt the diagonal and wall ribs, in a direction at right angles to a line bisecting the angles formed by those ribs on plan, as shown in compartments *b b*, Fig. 9. In this case the form of the diagonal ribs would not necessarily be

* During the erection of the Assize Courts, Manchester, the writer of the above paper was engaged to lay down the full-size diagrams for the masonry, and to set out and superintend the making of moulds, templates, &c., for the same; and finding from his own experience that works giving practical examples of groining, thoroughly and simply, were scarce and not easy of access, he was induced to put together the above matter, with the accompanying illustrations, hoping, that to the younger members of the profession, as well to builders and workmen generally, they may be found of use in making clear some of the practical problems connected with groined vaulting.

PLATE I.

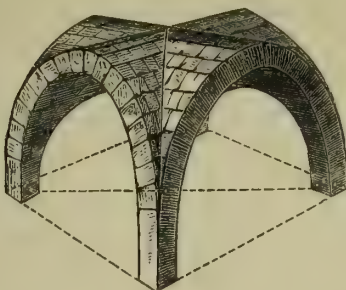


FIG. 1.

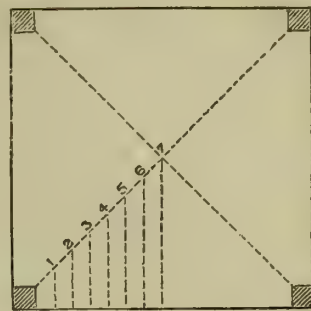


FIG. 2.

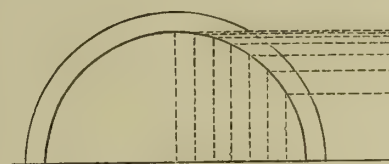


FIG. 3.

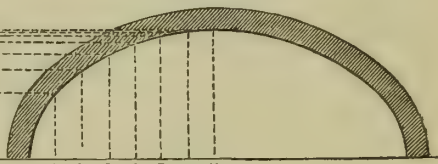


FIG. 4.

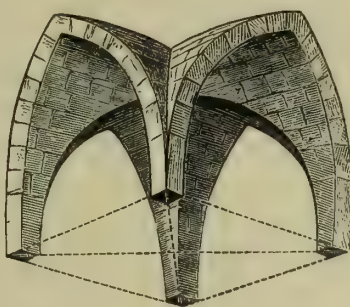


FIG. 5.

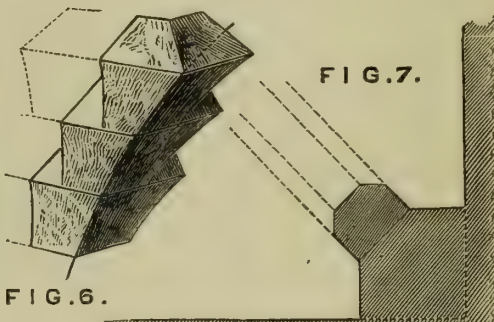


FIG. 6.

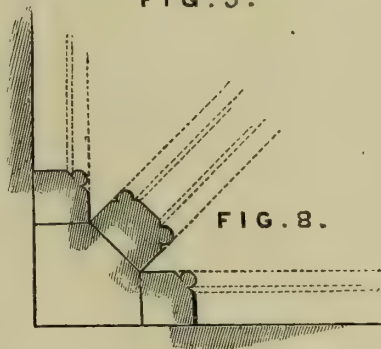


FIG. 8.

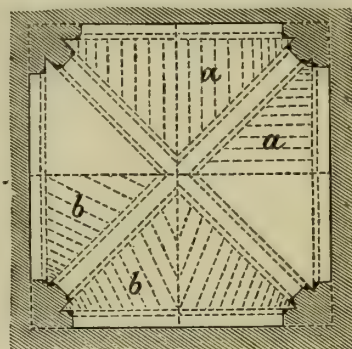


FIG. 9.

elliptical, but might be struck out with the same radius as the wall ribs, either wholly or in part.

Another change would be the introduction of intermediate ribs, and then again of ridge ribs, as shown in Figs. 11 and 12. Now in this case a little difficulty would arise with regard to keeping the surface of the vaulting level on lines parallel to the walls, as in the first example. This could be done: but if it was so done, the moulds on the intermediate ribs must either be twisted in section, or they would shew different and varying depths on their opposite sides. This will be seen on referring to Figs. 11, 13, and 14. In Fig. 11 the line *a b c* represents a level joint parallel to one of the side walls, and consequently the upper edge of the rib at the point *c* would be level with the upper edge on the opposite side of the rib in the line *b c*; but this cannot be if we keep the section of the rib level when taken square across it, as at *b d*, because the surface of the vault rises from *d* to *c*, therefore, whatever the surface of the vault falls along the side of the rib from *c* to *d*, keeping the line *a b c* level, it would come that much lower down on the side of the rib at *d* than it does at *b*, as shown in Figs. 13 and 14, and the rib would either have to be twisted in section, as in Fig. 13, or show different margins on opposite sides, and also vary the same throughout its length; or it might be twisted out of its perpendicular, as shown by the dotted lines in Fig. 14, which would be bad construction, so that in the next step we abandon the idea of keeping the surface of the vaulting level in lines parallel to

the walls as in the first cases. In fact the whole affair is changed, and instead of true and regular arched vaulting surfaces constructed to bear all the weight, and intersecting without ribs, we have now a series of ribs crossing the vault on a regular geometrical plan, the curve of each rib being designed independently of every consideration but what will produce the best effect in itself, and at the same time enable it to do its proper share of the work, the vaulting surface having now become merely a thin filling-in or panel, and the ribs really doing all the work.

I don't positively assert that this is the exact order in which the changes took place in mediæval vaulting. I have not mentioned, for instance, what effect an oblong plan would have upon the matter, but have been trying to show, as briefly as possible, some of the principal points in a gradual change from a simple Roman vault to the one now to be illustrated.

(To be continued.)

ON PROFESSIONAL PRACTICE.
LECTURE IV.—WORKS.

MR. ROGER SMITH said that in this lecture (delivered on Monday evening last) he had to treat on what had to be done by the architect when his design was actually ordered to be carried into execution. An architect who was engaged for the first time in the actual carrying out of a building might be compared to a man who was placed on a coachbox for the first time.

For the latter to accomplish his task without mishap of any kind depended a great deal upon the length of his journey and the quality of the team he had to drive; and for the former to carry a work to a successful conclusion depended upon the character and extent of the work and the qualifications of builder, foreman, and clerk of works. To accomplish either task successfully constant attention was necessary. However, he was not going so much to consider in this lecture what had to be done in case of actually coming to grief, as to point out what precautions ought to be taken to prevent the occurrence of such a calamity. In the preparation of the actual working drawings it should be kept constantly in mind that they were to be *worked from*. As a general rule, fair precedents might be obtained as to what ought to be done. With reference to thicknesses of walls—fewer precedents existed than as to timbers, &c. He did not think they could have better precedents with regard to the thicknesses of walls than those prescribed by the Metropolitan Building Act, which were pretty near the mark, as sailing pretty evenly between the two extremes of extravagance and weakness. As a general principle, it would be quite safe to take the dimensions prescribed by the London Building Act for buildings in any part of the country constructed of the same materials as those for which the dimensions were enacted. Another most important point to be attended to was the specification. A good specification ought to be one of two things; the best was the one in which every portion of work was described in its proper place, and so described, too, that there could hardly be any mistake in knowing what was meant to be done. The other sort of specification was exceedingly general in character, giving no *minutiae*, but merely describing in brief and general terms the mode in which the work had to be done, and specifying that the materials were to be good of their kind, and that this sort of wood and that sort of stone were to be used. It was possible to make very good work with this second class of specification. A most imperfect and unsatisfactory document was the specification which partook in places of the nature of the first kind, the full and elaborate specification, and in places of the second kind, the general specification. It was very unsatisfactory to specify in the same work the masonry for instance, in brief and general terms, and to specify at great length the joiners' work; but it was still worse to specify fully one part of the masonry or joinery, and to write the other portions briefly. Such hybrid specifications as these were very embarrassing documents, and were the source of no end of perplexity and disputes. A general specification ought to be accompanied by a very careful set of drawings. It would greatly conduce to convenience and saving of time to make an index to every specification of any length. The trades should be arranged one after another in the usual order, and good marginal descriptions should be placed at the heads of each paragraph—a single word would generally suffice. It required a good deal of experience to prepare a thoroughly good specification, and in the actual writing of such a document, it was a very good plan to have a good example of specification for the class of building under treatment. This would act as a guide, and help to prevent omissions. A book of examples of specifications, such as Bartholomew's or Donaldson's books, would be of great value. In many cases, the specification was written or partly written after the quantities were taken out. If an architect took out the quantities himself, the specification was probably best written after the quantities had been taken out, because by the process of quantity-taking the architect had already analysed the building, and was therefore much better able to make a full and complete specification. If, however, the architect did not take the quantities out himself, but had thorough confidence in his quantity surveyor, it was a very wise plan to give him the specification in draft, although as perfect as possible, and give him leave to add to or take from it, subject to the architect's approval. This resulted in almost perfecting the specification. When the materials had been described and the workmanship particularised, it was necessary to pay careful attention to the general working conditions, or conditions of contract. These formed a most important part of the specification. The purely legal conditions he should pass over, as they were not part of the subject of this lecture. But the majority of the general conditions were framed with a view

of settling such difficulties as might arise during the progress of a work. Some time ago it was attempted to draw up something that should embody the usual conditions in a uniform shape; but this undertaking was found to be a very difficult one, and a model contract was not eventually arrived at. Something like it was, however, decided upon between a Committee of Master Builders and the Council of the Royal Institute of British Architects, and a series of clauses or headings of contracts were issued. That document included all the usual clauses that had to be introduced into a contract. He thought, however, that the conditions of contract issued by the London School Board were among the best and fullest he had seen; they were, in the main, an amplification of the Institute headings, though in several cases the positions of the headings were altered. As the School Board conditions had not been published, he was not at liberty to detail them at any length; he would therefore read and comment upon the most notable of the conditions of contract agreed to between the master builders and the Royal Institute of British Architects*—(1) "Contractor to provide everything necessary for works, as per drawings and specifications; and if drawings and specifications differ, architect to decide which is to be followed." This clause of a contract rendered the contractor under an obligation to find all materials, plant, and labour of every description necessary for carrying out the works, and stipulated that if the drawings and specifications were found not to agree, or the drawings did not agree with each other, the architect should be the person to state what his intentions were. It had sometimes been contended by contractors that some special thing which they had to provide was not included in the contract, and where some such clause as this had not been inserted, the contractor had often got the best of it. Again, where differences occurred, as they sometimes did, in the drawings, it would be quite possible for the contractor, without some such precaution as this clause afforded, to consider that the simplest, cheapest, or poorest way of doing the work was what was intended by the architect if one drawing showed the thing in a simple way. Where there was a difference between the drawings and the specifications, the drawings to the largest scale should be followed in preference to those on a small scale, and the specification in preference to the drawings. (2) "Contractor to conform to general acts, regulations, and by-laws relating to buildings; to give notices thereby required to be given to local authorities, and pay fees payable thereunder." This clause was of considerable importance, especially in building in towns. The London Building Act did not recognise the architect as responsible to the district surveyor that all the stipulations of the Building Act were adhered to. The contractor or the person employing him was the party who was legally responsible. It was very important to have this clause included in the conditions of contract, so that the builder had the sole responsibility of giving the requisite notices. (3) "Contractor to set out works, to rectify errors, provide appliances, and produce vouchers proving materials to be as described and genuine, when required. The contractor to provide plant, labour, materials, &c., required. All materials and workmanship to be the best of their several kinds. To leave all perfect and clean." This clause would of course be written out at very considerable length, before it was made into an ordinary and legal clause. A most important condition of this clause was that which stipulated that the architect was to set out works and rectify errors. The London School Board way of putting this condition was as follows: "He [the contractor] shall set out and be responsible for the correct setting out of the several works, and for the accuracy of the several dimensions of the same." He advised every architect to introduce some such clause as this into their contracts, and to stick to it. The builder or his foreman should set out the work. The clerk of the works should not be allowed to do so unless the builder took all responsibility of errors, for if the architect or the clerk of works were to set out the work and made a mistake in so doing,

it was doubtful whether the builder could be compelled to rectify the error, except at the expense of the architect or his client. In connection with the provision of plant and materials, there was often a special clause stipulating that the contractor should provide water for the works. The expense of this item was often considerable, and the absence of such a clause frequently caused great difficulty and delay. "All materials and workmanship to be the best of their several kinds," was a very desirable stipulation; but if this were stipulated, the architect should not specify the best unless he meant the best. There was a great deal of work which was quite efficiently done if second or third quality materials were used. The quality and price of the materials should be described. (4) "Contractor to keep on ground a competent foreman, and to be supplied with a complete copy of drawings and specification by the architect or measuring surveyor. Not to sub-let without consent." As he (Mr. Smith) had already pointed out in a former lecture, there was nothing that tended more to the success or failure of a building than having a good foreman. As to sub-letting, where the rule was broken, a great deal of inconvenience and mistake often arose, because the general contractor had not the same control over the sub-contractor's men as he had over his own men. The architect should never consent to any portion of the works being sub-let unless the general contractor continued responsible for the due and proper fulfilment of the works. (5) "Architect to have at all times access to the works, which are to be entirely under his control. He may require contractor to dismiss any workman incompetent or misconducting himself, and thereupon the contractor is to do so." This clause did not call for any special remark. (6) "Contractor not to deviate from drawings or specification, or execute extra works, unless required to comply with the aforesaid acts and regulations or by-laws, or unless upon authority of architect, to be shown by written order, or by plan or drawing expressly given and signed, or initiated as extra or variation, or by subsequent written approval signed or initiated. Vouchers for all such extras to be delivered to the architect or clerk of the works weekly in case of day work. No day-work to be admissible unless so ordered, or for work impossible to be measured," and (7) "Alterations in or additions to works, not to vitiate contract, and if no price be agreed, the value thereof to be added to or deducted from contract, according to schedule of prices or fair measure and value." These clauses referred to what was perhaps the most troublesome portion of the whole process of carrying out a building. It was often next to impossible for the architect to thoroughly think out every portion of his building as he would wish it to be finished, and often, as the works went on, he saw some improvement which it was desirable to make, or something which he had neglected to provide for, or some new requirement of his employer had to be attended to, or it was advisable, for some cause or another, to deviate from what had been contracted for. Some architects, were fond of deviating from the contract remorselessly, wilfully, and to almost any extent, and got into no end of trouble in consequence. If, however, the architect was painstaking and careful, it was possible to avoid, to a great extent, serious alterations of this sort. There should also be a distinct understanding as to what each deviation from the contract was going to cost. As far as practicable, the architect should make it a primary duty to keep such alterations as he had to make *within* the contract. (8) "Work and materials brought on ground to be considered property of the employer when included in any paid certificate, and not to be removed without architect's consent; but employer not to be liable for loss or damage thereto." This clause was more important from a legal point of view, and was not introduced into the School-Board conditions of contract. (9) "Architects may require such materials to be removed as in his opinion are not according to specification, and others to be substituted; and in case of delay, the employer may remove same, and substitute others at contractor's cost." It was very important for the architect to insist on such materials being removed from the site, and to see that it was done. (10) "Architect may require work in his opinion executed with improper materials, or defective workmanship, to be re-executed, and in case of delay, may

* These "General Headings for Clauses of Contracts" appeared in full in the BUILDING NEWS for October 28, 1870, Vol. XIX., p. 318. Emendations of clauses 19 and 20 appeared in the BUILDING NEWS for January 6, 1871, Vol. XX., p. 5. A full draft of these "conditions" as agreed upon by the London Builders' Society and the Royal Institute of British Architects, appeared in the BUILDING NEWS for March 1, 1872, Vol. XXII., p. 182.

cause same to be done at contractor's cost." (11) "Faults arising from improper or defective workmanship or materials, within — months after completion to be made good by contractor; and in case of default, employer may recover costs thereof from contractor." These clauses were all of great importance, and should never be omitted. Another very important stipulation was the following: (12) "Contractor to insure, in office to be approved, in joint names, in half amount of contract until works covered in, and thenceforth in three-fourths until completion, and to produce policies and receipts of premium. Moneys received to be applied in re-building or reparation. In case of neglect, employer may insure at contractor's cost." As soon as ever the building was so far advanced that it could be damaged by fire, its insurance must be effected, and the insurance must be kept up and increased in amount as the building progressed. In case of repairs or alterations to an existing building, even although the building might be insured, the insurance office should always be notified of contemplated alterations, and if necessary, a new insurance effected; for some offices considered that an insurance upon a building was vitiated by sending in workmen. (13) "Building to be under contractor's sole charge, who is to make good damage by fire, or from causes under his own control; and to hold employer harmless as to injuries to person and structural damage to property." This was an important clause and was followed by (14) "Employer to have access to building, and may execute other works, for which contractor is to give reasonable facilities, so that his work be not impeded; contractor not to be responsible for damages to or occasioned by such other works." These were the general conditions of contract; the others which followed were more strictly legal in character. When the tenders which had been received greatly exceeded what had been hoped for and sanguinely expected, and the work had to undergo the process of "cutting down," it was a great thing if the architect could reduce the cost of the work without any material alteration of the general design. A work could often be very materially reduced in cost by removing excrescences. Characteristic features should not be given up except as a last resource; and anything removed in the process of cutting down should be so removed as to make it easy to reinstate it if the employer wished. One of the first preliminaries to building in London was to give the required notices under the Building Act. A client had a right to deal in various ways with the party-wall which separated him from his next door neighbour, subject to giving him three months' notice. If it was pretty certain that the building would be carried into execution this notice should be served early, as it could then be maturing while the plans, &c., were being prepared. It was always desirable, in works of any importance, to see the district surveyor and show him the plans. In addition, the surveyor to the District Board of Works should be seen in reference to level of basement floors, capabilities of drainage, &c. The lecturer next proceeded at some length to indicate the best manner of fixing upon a site—where the building had not been designed for any exact spot—and showed on the black-board the best method of setting out the principal lines of such a building. Careful examination should be made to see what sort of soil the building had to stand upon, and if the architect was at all in doubt it would be the truest economy to take the advice of a good practical expert. Digging to a great depth for foundations was not always necessary, as had been demonstrated in the *Parentalia*, by Wren, with regard to St. Paul's Cathedral. No great extent of foundations should be opened at one time, for water would accumulate in them. Where water did accumulate in foundation trenches, it should not only be pumped out, but the sludge or slush at the bottom should be cleaned out, so as to begin building on a perfectly hard and clean surface. Several other points were dwelt upon by Mr. Smith in conclusion, the most important being that no pains should be spared to get a thoroughly honest clerk of the works.

Several questions having been asked and answered, a vote of thanks was accorded to the lecturer, and the proceedings terminated.

[CORRECTION.—In our report of the third lecture at p. 485 of the BUILDING NEWS of a fortnight ago, third column, twelfth line from end of report, the sentence "the contract drawings were retained by the builder until his account was settled," should read "Copies of the contract drawings," &c.]

NOTES FOR THE BUILDING TRADES.

FELT ROOFING.—The *Revue Hebdomadaire de Chimie*, in giving an account of asphaltic roofing felt as applied to the *Dépôt du Havre*, states that after it has been nailed on it should receive a coating of gas-tar and lime, well mixed together and then applied with a brush, and for roofs which are to be permanent this coating should be renewed every four or five years.

COATING LEAD PIPES.—Robert P. Perry, of Newport, R. I., has recently patented an improved process for performing this operation of coating, the chief features of which are as follows:—He employs a solution of chromate or bichromate of potassa, acidulated or not, as the case may be, which is brought by any of the known processes into contact with the lead to be protected. The articles to be treated may be immersed in the solution, or, if lead pipes are to be coated internally, the solution may be poured into them; the surface of articles may also be coated by applying the solution with a brush, care being taken to allow sufficiently prolonged contact of the solution with the lead, or to repeat the application until the protective coating is of the required thickness. Articles either old or new may be treated, and the pipes in houses may be coated without disturbing their position by simply pouring the solution into them. Pipes which have been treated may be bent or soldered without materially impairing the prepared surface. An insoluble chromate of lead is thus formed, which, while it is alleged to protect the water from contamination, does not interfere with soldering in the least.

FIREPROOF CONSTRUCTION.—Mr. Thomas Bellamy, Past Vice-President of the Institute, has published a description of a system of fireproof construction of which he says his experience as an architect for upwards of forty-five years enables him to speak with confidence. He proposes that the floor should be carried by groined arches springing from columns. The columns are to be cast in the coarsest sand, and to have slots throughout their length, so as to admit of the protrusion of a concrete core, which would thus form with the fillets or ridges a key for an encasement of Portland cement $\frac{1}{2}$ inch in thickness. By these means the quantity of metal, it is thought, might be reduced to a minimum, and the column would be effectually protected externally and at the core by plastic and concrete material, which would also be fireproof. The arches would be groined and formed of plain tiles in cement, with brick abutments over the columns, and with a sufficient thickness of concrete over to guard the arches against injury from impact, and the floor itself is proposed to be of Portland cement, with a floated surface. Mr. Bellamy, in the drawing he furnishes, represents an area of 100ft. by 50ft., divided into bays of 23ft. 6in., three columns only being shown as required.

COVERING THE ROOFS OF HOUSES WITH CEMENT.

—A correspondent says:—"Could not the roofs of large buildings be covered with a kind of cement, which would be without the chief objection to lead roofs,—the 'careless plumber,'—and the second objection,—their enormous cost; which would be cheaper at the outset, and would require less frequent repairs than either lead or slate; which would be lighter, and what is of great consequence, a worse conductor of heat, than either; which could be repaired with the greatest expedition, and by the simplest means, when it became defective in any point; which would be free from the pettiness of the jointed slate roof, and might be left in one unbroken expanse, or, if it were thought desirable, might receive some vertical divisions, like those which add lightness to the effect of a lead covering; and which might, at the architect's discretion, be made of such a colour as would best harmonize with the tint of the stonework of the building, as slaty blue certainly does not always do."

NOTES FROM VICTORIA.

THE Board appointed to select the stone for the new Government House at Melbourne have arrived at a decision. The Tasmanian freestones approved of are priced at about 4s. 6d., delivered on the ground; and the Castlemaine granite, which has superior quality to recommend it, could be obtained for a little over 2s. The cost of working, however, would in the case of the granite counterbalance cheapness in the first instance. The colour of the granite is black and white. A great deal was thought of the sample

of milk-white marble received from the Gladstone quarries, Queensland; the quality was very good, but we could not build Government House of marble, and therefore the Board did not place the sample in the list. The freestone from Oamaru, N.Z., had staring whiteness to recommend it; but the Independent Church, Collins-street, bears witness to the quickness with which this stone turns black. Granite has been picked out, so that native quarries may have a chance.

Dr. W. McCrea, chief medical officer of Melbourne, Victoria, has submitted a report to the Central Board of Health of that city, of some experiments on the deodorisation of night-soil recently conducted by him at the Melbourne Gaol. "On the 21st August last a solution of bichromate of potash, containing 480 grains (1 1-5th ounce) deodorised one gallon of night-soil, collected fresh within the preceding 24 hours. At the end of a week, when the mixture was again examined, there was an odour of mouldy cheese, but no smell of night-soil. On the 2nd September experiments were made on night-soil which had accumulated in the gaol cesspool for some time previously. A solution of the same quantity of bichromate of potash—viz., 480 grains—was mixed with a gallon of sewage, which it immediately deodorised, and at the end of nine days no offensive smell was perceptible in the mixture. A preparation of Mr. Draper's was then tried. Two fluid ounces of this, called the 'Eureka Deodoriser,' were mixed with a gallon of sewage, which was immediately and perfectly deodorised. When the mixture was again examined nine days afterwards, no offensive smell was perceptible. These substances cost respectively—bichromate of potash, 1s. per lb., which quantity is sufficient to deodorise 13 gallons of sewage—17s. 6d. to deodorise a ton; and Draper's 'Eureka Deodoriser,' 6s. a gallon, which is sufficient to deodorise 100 gallons of night-soil—13s. 6d. to deodorise a ton. These deodorisers are much more costly than Forbes's Carbolic Oil, but there is none of the smell of tar attending their use."

At a special meeting of the Victorian Institute of Architects, held on the 23rd September last, the President, J. Reed, Esq., in the chair, the necessary steps were taken to request the Government to throw open the important public works of the colony to general competition, and with this object a deputation was formed to wait upon the Commissioner of Public Works. At the usual monthly meeting, held on the 7th October, at the Port Philip Club, Messrs. Davidson and Henderson, of Geelong, were elected members, and Mr. W. Smith, of Warrnambool, and Mr. W. C. Cornish, of Melbourne, were elected associates.

The following current rates of wages in the building trades are quoted by the Victorian newspapers:—Stonemasons, 10s. per day; carpenters, 8s. to 9s. per day; slaters, 10s. to 11s.; bricklayers, 10s.; plasterers, 10s.; pick-and-shovel men and labourers, 6s. to 7s.; painters and glaziers, 9s. to 10s. Cabinetmakers, from 6s. to 9s. per day; ironworkers, 10s.

In some parts of Riverina, especially near Wahgunyah, there exist vast forests of a peculiar pine adapted for building purposes. It resembles ordinary pine in most respects—perhaps a trifle more dense, beautifully veined, and the knots are no harder than the other portions. This wood makes excellent furniture, being very easily wrought, and possesses an aromatic perfume resembling pencil cedar. It can be purchased at Wahgunyah at about nine shillings per hundred feet, in sawn boards of $1\frac{1}{2}$ in. thickness. The new North-eastern Railway will, when opened, doubtless bring this valuable and cheap wood to Melbourne in large quantities.

WINDOW BLINDS.

NO doubt the first uses that were made of window blinds was to intercept the rays of the sun, and to prevent prying observation; but in more modern times they are being used in a far greater variety of ways, and are now considered one of the essential parts of the house. They are made in materials of every colour and design—namely, linen, holland, striped cloth of varied patterns, worsted tammy, printed cambric, painted transparencies, gauze wire, zinc, and very many of wood.

Blinds not only conduce to the personal comfort of the inmates of the house, but will repay their own cost in the preservation of furniture, curtains, and carpets by excluding sun and dust. Those known as sun-blinds are much appreciated, as they keep the room cool during the day, and

if left down during the night prevent the early glare of the summer sun from inconveniencing the sleeper at too early an hour in the morning. They, moreover, are of the greatest service to the sick and invalided, not only in darkening the room, but in preventing much of the noise of passing traffic from entering. Blinds have also been applied to draughty windows and doors, and found very useful; also to the fronts of bookcases, wardrobes, cupboards, &c., to keep out dust, and when fitted up in conservatories prevent the flowers of most delicate plants being burnt up by the summer sun. There is even a description of blind which answers not only as a sun-blind, but even as a protection against burglars.

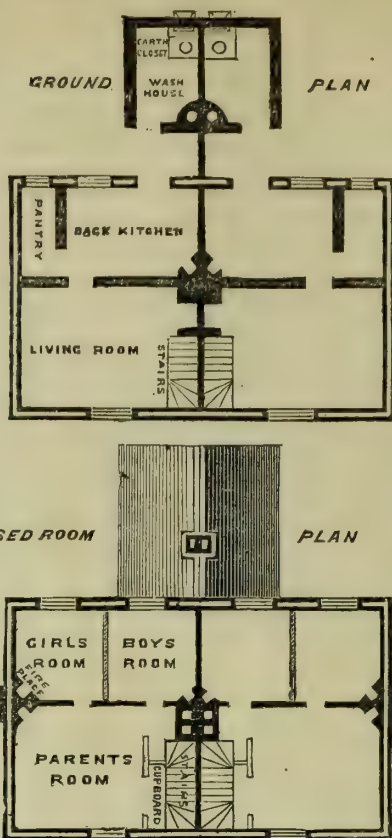
Architects very often, when planning mansions, public buildings, or cottages, seem to forget that blinds are sure to be required, as they so seldom make proper provision for them. We have seen good specimens of architecture impaired in appearance because the thought of sun-blinds never seemed to have entered into anyone's mind until after the buildings were finished. A good blind-maker studies how to make his blinds, and can add to the beauty of the building, but is often compelled to do otherwise, because no room has been left nor provision made when it was erected.

Sun-blinds have hitherto been a luxury which, on account of their expense, have been very much confined to the most wealthy classes; but we are glad to find there is a movement with the times even in these comforts, and have lately had our attention called to a very simple, effectual, and yet economical sun-blind recently patented by Mr. G. A. Williams, of Queen's-road, Bayswater. One of his sun-blinds can be procured and fixed complete from £1.12s. each. This blind is simple in its construction, and it is difficult to put it out of order, and it can be drawn up when not in use. It is adapted for the country or abroad, as its simplicity, we are informed, renders it quite unnecessary to send men to measure for or fix it.

A vast improvement has now been made in Venetian blinds by affixing to them a very effectual patent fastening, which supersedes the use of hooks, &c. at the sides of windows, also in roller blinds by mounting them on spring rollers which, though not so recently introduced, there seems to be a difficulty to get well made, so few blind-makers really knowing how to make them to act satisfactorily and durable. Improvement has also of late years been made in the gauze, wire, or zinc dwarf blinds, which are now very tastefully made and ornamented, adding very much to the appearance of house or office. The shop-keeper must find his shop-blind indispensable, protecting, as it does, his goods from the rays of the sun; and especially the much improved self-acting spring blind, which being shut up and drawn down in a moment, is exceedingly convenient. Blinds are invaluable to the artist and photographer, as they are so constructed as to admit only the amount of light required.

COTTAGES FOR AGRICULTURAL LABOURERS.

LORD DUCIE, in an article in the *Agricultural Gazette*, has lately pointed out, as we and other journals have repeatedly done, the extreme importance of providing sufficient and decent cottage accommodation for agricultural labourers, and our contemporary the *Field*, in the course of an article on the subject, gives the plan of a pair of double cottages which, it is alleged, can be built in a plain substantial form for sums varying from £200 to £250 the pair. On the ground floor is a living-room, back kitchen, pantry, and detached wash-house, with earth-closet adjoining. The roof of the wash-house is carried over to the back wall of the cottage, and forms a covered porch to the back kitchen door. On the first floor are separate bed-rooms for parents, boys, and girls. The external walls are 11in. thick, with a hollow space of 2in.; such can readily be built by having the headers 11in. in length, and adopting the Yorkshire bond, i.e., three courses of stretchers to one course of headers. Walls thus constructed are both dry and warm. With pressed bricks plastering is unnecessary; careful pointing and colouring the interior surface makes a good finish. If the bricks are clamp-burnt and rough, the walls must have two coats of plaster, which adds to the expense. The wall which divides the living-room from the back kitchen, and which, on the first floor, separates the parents' bed-room from the bed-rooms of the children, should be 9in. thick,



as it supports the roof to some extent; all the other walls may be constructed of 4½in. work, and the partitions between the children's bed-rooms of lath and plaster. The living-rooms are 8ft. from floor to ceiling; the bed-rooms only 6ft. high at the walls, but sufficient height is obtained by nailing the ceiling joists to the rafters about 2ft. above the walls, the ceilings thus being coved.

BUILDING STONES AND FIRE.

OUR columns have recently contained some useful information on building materials and great fires, such as those of Chicago and Boston. A fortnight since we recorded what American architects, at the annual convention of the American Institute of Architects, had to say on the subject, and the following, from an American scientific paper, is not without interest. That the various sandstones used in Chicago have stood the heat best, and that such must have been the case in Boston, may be concluded *a priori* from their chemical composition. Sandstones are, in fact, exceedingly well fitted for fireproof structures. "The only building in the burned district on the south side, which stood intact," says Mr. Wight, "was of Cleveland (sand) stone; and in that building there was not a flaw—nothing cracked or broken. In fact it was not injured at all, except that the solder in the galvanized iron cornice was melted, while the lantern of a lamp-post on the sidewalk was entirely melted, so that pieces of the tin framework hung down like ribbons." The predominant ingredient of sandstones is quartz, a substance particularly infusible. Its amount varies from 80 to 97 per cent., the other ingredient being mostly peroxide of iron, alumina, lime, and magnesia. The brown sandstone of New York, for instance, consists of quartz cemented by oxide of iron.

Granite, quartz, mica, slate, and other rocks belonging to the primary formation are generally considered to be almost indestructible, yet it is known that they readily get cracked and explode, even when only exposed to the heat radiated from neighbouring buildings. This is explained by the known fact that they all contain water. It is a fact well known among quarrymen that the surfaces of fracture in broken granite, syenite, &c., are often found to be more or less moist, and this moisture is found not only as an element in the exterior portions of rocks, but also even in the centre of blocks a foot thick, and in masses separated by blasting.

Regarding the artificial (Portland) cement stone, now coming so largely into use, we possess

in it a material in every respect suitable for building purposes. Being a compound of silicate of lime and alumina, with water chemically combined, not mechanically inclosed, it will, of course, stand heat almost, if not quite, as well as any sandstone. In respect to the buildings in Chicago erected of artificial stone, we learn from Mr. Wight that they were scarcely injured at all. Others say that they stood the test of the great fire better than any other building material in that city. Every stone left standing in the walls, our informant states, was found to be in a perfect condition, and builders have been drawing the blocks away to be used in the erection of other structures. In justice to the inventor, it should be stated that this was the Frear stone now so largely used all over the West.

With regard to bricks, we know that they do not readily give way under fire. Some say that as they have been burned, they must be of the best material imaginable. Yet these people forget that bricks are very absorbent and retentive of moisture. True, their moisture may readily escape, but then the bricks are left porous; and if over-heated and vitrified, as is often the case, they lose their strength and give way. We know that almost the whole city of Chicago was levelled to the ground, but this is principally due to the fact that the walls of the buildings were uncommonly thin in proportion to their height, and because they were generally built with a very inferior kind of material.

MR. BAILEY DENTON AND THE RAINFALL.

MR. BAILEY DENTON stands alone as the apologist of the recent bad weather. As "a careful observer of nature in relation to rainfall," he contends that the present excess of rain occurring at this particular season is "just what was wanted to restore the balance of our water supply, which the droughts of recent years had greatly and disadvantageously disturbed;" and by inference, therefore, instead of praying for fair weather, as recommended by the Primates of the Churches, we should offer thanksgivings for the many blessings in disguise represented by the floods, and mud, and mist which have everywhere surrounded us. Up to the present it seems, in spite of all the rain we have had, the deep wells dependent for their supply on the water-bearing strata show little indication of rising to their normal level at this season, but when the recent heavy downfall has had time to penetrate the earth, this deficiency will in all probability be remedied. Mr. Denton does not anticipate that the desired equilibrium will be recovered much before May or June next, when "as the days lengthen so the springs strengthen," and until that time, therefore, it would evidently, in his opinion, be premature to say we have had too much wet weather. Under another, and even more important aspect than its relation to our deep wells, Mr. Denton thinks the rainfall a matter for congratulation. He argues that the general health of the country was never better, if so satisfactory, as at this moment, and that "while we are all disposed to think that this is due to the cleansing effects of heavy rainfalls, in washing out the dirty places of our closely populated towns and villages, it is not at all impossible that the same benefit will follow the thorough washing of land, which will clear localities of endemic disease among the cattle and sheep."

THE RUINS OF OPHIR.

M. MAUCH, an African traveller, some time since discovered certain remains which he believed to be those of the ancient Ophir. The accuracy of that supposition was, however, called in doubt at the time, and the matter forgotten. But a letter has just appeared in the *Weser Gazette* from that gentleman, dated St. Helena, November 2, 1872, addressed to M. Mohr, a fellow-traveller, in which he says:—"I believe that I have found the real Ophir in lat. 20deg. 15min. S., long. 26deg. 30min. E., and I think I possess proofs of the fact. The ruins, which have been so often spoken about, are composed of two masses of edifices in a tolerably good state of preservation. The first is on a mountain of granite, and amongst other constructions is one which is an imitation of the Temple of Solomon, being fortress and sanctuary at the same time, the walls of which are built in wrought granite, without mortar, and still being more than 30ft. high.

Beams of cedar served as ceiling to the narrow and covered galleries, and I have brought away some fragments of it. In reality no inscription exists, but only some special designs of ornamentation, which announce a great antiquity. The whole western part of the mountain is covered with blocks of great size, which seem to indicate terraces. The second mass of ruins is situated to the south of the mountain, from which it is separated by a low valley; it retains a well-preserved circular form, with walls constructed as a labyrinth, also without mortar; a tower still exists 30ft. high, 17ft. in diameter at the base, and 9ft. at the top. Cedar wood is used there in the same manner as previously described, and if anything is astonishing, it is the fact that it should have endured so long without having suffered from the field-fires which occur every year. The circular edifice is accompanied by a large number of others situated in front, and which doubtless served as the habitation of the Queen of Sheba's suite. I have drawn, not without difficulty, a general sketch and a plan of this palace. I was confirmed by the natives themselves in the idea that these ruins date from the Queen's time, for about forty years ago, before the irruption of the Matebele from the west, and the Zulu from the east, sacrifices were still offered upon the mountain. The natives still call the circular building the "House of the Great Princess."

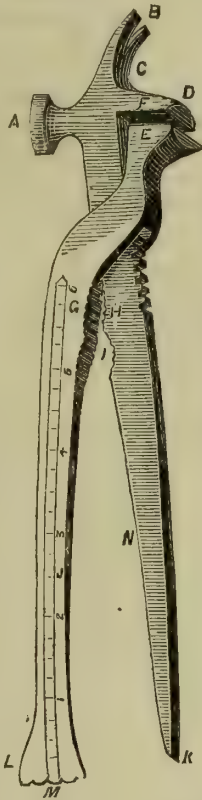
DEATH OF PROFESSOR RANKINE.

DR. W. J. MACQUORN RANKINE, Professor of Civil Engineering and Mechanics in Glasgow University, died at a late hour on Christmas-eve. The deceased gentleman had been suffering for some time from an affection of the heart, and at the commencement of the present session he found it necessary to transfer the duties of his University chair to a substitute, Mr. Edward Bamber, C.E. Since then Dr. Rankine had been alternately better and worse in health, but at no time was his condition very hopeful, and on Sunday he was seized with an attack of paralysis, from which he never recovered. He was not an old man, having been born in 1820, but had lived an exceedingly active and useful life, and has left many valuable works behind him. Professor Rankine was a native of Edinburgh, received his education at its University, and in Edinburgh also he acquired, under his father (Mr. David Rankine) and Sir John McNeill, a knowledge of the profession of which he was one of the first members. In 1852 he received the Keith Medal of the Royal Society of Edinburgh for his researches on the mechanical action of heat. After several years' practice in his native city, he removed to Glasgow, where he met with much success in business in company with Mr. John Thomson. His admirable judgment and superior engineering skill speedily won for him a foremost place in his profession, and his reputation was well established when in 1855 he was appointed to the chair of Engineering and Mechanics in the University. Previous to this time he had contributed several important works to the literature of his profession, and had rendered great service in promoting the improvement of marine engineering on the Clyde. He took a principal part in the formation of the Scotch Institution of Engineers, of which he was the first president. In the progress of this society he naturally took a deep interest, and on the occasion of its meeting jointly with the North of England Institution of Mining and Mechanical Engineers, in Glasgow, in August, 1870, he was presented with a bust of himself in acknowledgment of his successful labours in the cause of mechanical science. Professor Rankine was chosen as president of the Mathematical section of the British Association at one of its meetings, and on more than one occasion he presided in the Department of Mechanical Science. He was the author of a "Manual of Applied Mechanics," a "Manual of the Steam Engine and other Prime Movers," a valuable work on "Civil Engineering," one entitled "Useful Rules and Tables," the larger portion of a work on "Shipbuilding, Theoretical and Practical," a "Manual of Machinery and Millwork," and quite recently he published a memoir of the late Mr. John Elder, shipbuilder, who was one of his most cherished and intimate friends, and in some respects his fellow-labourer in connection with the progress of modern shipbuilding. Professor Rankine held the degree of LL.D. from Dublin University. He has been a most successful teacher; and besides the works mentioned, he found time to prepare a great many useful papers,

which were read before different learned societies, and to contribute a considerable amount of valuable matter to the professional journals. Last year he was appointed a member of the Committee on Designs for Ships of War. For a number of years he held the position of consulting engineer to the Highland and Agricultural Society of Scotland, and he was a member of the Institution of Naval Architects, and a Fellow of the Royal Society. Professor Rankine was also known among his own circle in Glasgow as the composer of a number of songs, to which he himself set the music; and two of his best lyrical efforts—one on the old stage-coach days and the other entitled "The Engine-Driver's Address to his Engine," appeared originally in *Blackwood's Magazine*.

COMBINED TOOL.

THE ingenuity of some of our inventors has often been exercised upon the combination, in one instrument, of the tools in daily use by some classes of mechanics, and especially by house-keepers; and we here illustrate a successful arrangement of many of the useful implements most commonly needed. It is not necessary that we should give a lengthy description, as our engraving will show the numerous and varied uses for which the appliance is available; and its simplicity of form is such that it can be sold at an economical price. The invention consists in combining the following named useful tools, in convenient form for general purposes, namely—hammer, A; tack and nail puller, B; stove cover lifter, C; scraper, D; pincers, E; adjustable wrench, F; gas burner tongs, G; nut cracker H; cork presser, I; six inch rule, J; screwdriver, K; box opener, L; carpet stretcher, M; door fastener, N. It was patented May 9, 1871, by Mr. J. Gorrick, of New York.



OPEN ROOFS AND SMOOTH CEILINGS.—Mr. Samuel Sharpe, the well-known Egyptologist, in view of somewhat extended chapel-building operations among the Unitarian body, writes as follows on architecture and acoustics:—"The modern taste is in favour of Gothic, and there is no disputing about tastes. I confine myself, therefore, to the question of open roofs or smooth ceilings, as they bear upon our power of hearing the speaker's voice. We have music-halls in London with flat or slightly arched smooth ceilings, in which nine hundred persons hear without difficulty any ordinary speaker's voice. And we have chapels of less than half the size in which the voice is so much caught in the open roof as to be quite lost to the side aisles. I speak only as an occasional hearer, or as one occasionally wishing to hear, under the open roofs of these chapels. But I believe the speaker is equally inconvenienced. He is aware that his voice does not reach the full distance, and has to exert himself accordingly. I do not think we should lay the blame on the architect, or charge him with ignorance of acoustics; he probably only followed orders. But when the subject has been discussed, and has reached the public at large, I think that those congregations who have got a minister whom they value, and whom they wish to keep, will probably put smooth ceilings to their chapels, although they may be a little out of harmony with the architecture of the building."

Building Intelligence.

CHURCHES AND CHAPELS.

BRISTOL.—The nave of the Temple Church Bristol, having been completed, the reopening services were held on Sunday. The ceiling has been beautifully panelled. A memorial window to John Wesley, representing scenes in the Temple, will be placed in the Weaver's Chapel. Another memorial window is intended to be put in the east end of the church, which has hitherto been blocked up by the Colston screen; this screen, however, will be removed to the Weaver's Chapel. A memorial window to Dr. White also will be put in the tower, in the place of the old battered window, which has some time been boarded up to keep out the rain. The font is placed on a marble floor under the tower, so as to form a kind of baptistry; and the old gates will be replaced.

BERECHURCH.—St. Michael's Church, Berechurch, Essex, was reopened on the 23rd ult., after having been closed for several months during restoration. The old high pews have been removed and open benches of stained wood substituted, and the lofty "three-decker" pulpit, with its old-fashioned sounding board, has been lowered. The chancel floor has been raised six inches above the level of the floor of the nave, and the church has been paved throughout with coloured Staffordshire tiles. A new Communion-rail has been provided, and the reredos has been decorated, from a design by the architect, by Mr. C. Basket, of Colchester. During the progress of the work, the workmen found an old piscina, which has been inserted into the new wall. In the north east angle, in the Audeley Chapel, the ponderous weight of the well-known monument to Sir Henry Audeley had forced the north wall considerably out of the perpendicular, and the old roof, worn by successive ages, had become too tender to be tampered with; so the whole chapel has been, as it were, encased in a new building, with the old roof about six inches under the new one. Everything inside, therefore, remains intact. The restoration has been most carefully carried out, and every detail saved which did not endanger the stability of the building. Mr. Charles Pertwee, of Chelmsford, is the architect, and Mr. W. Shead, of Berechurch, was the builder.

EALING.—The completion of St. Mary's Church Ealing, one of the most beautiful in the diocese of London, and of which an illustration appeared in the *Building News* for July 23, 1869 (Vol. XVII. p. 71), was celebrated on the Feast of the Circumcision. The present edifice supersedes one which had served the purposes of a church for about 130 years past, and which was constructed of red brick, with a square tower at the west end. The old edifice has been partially incorporated in the new, and an apse and ambulatory have been formed, and the flat ceiling has been taken away and replaced by an open roof. The style adopted is rather of Byzantine character. The works, under Mr. Teulon, as architect, have been prosecuted for some years past, and their cost has amounted to £11,500.

LIVERPOOL.—On the 27th ult., the foundation-stone of a new Jewish Synagogue was laid in Liverpool. The designs have been furnished by Messrs. Audsley, architects, and the building is intended to accommodate about 840 persons, and will cost about £10,000. The builders are Messrs. Jones Brothers, of Liverpool. The style adopted is Saracenic, very freely treated, and with the introduction of both Classic and Gothic forms. The synagogue is to be divided into a nave, and lateral aisles six bays in length. On the ground floor the seats are to be arranged to face north and south, leaving a centre space unoccupied by sittings throughout the whole length of the interior. At the eastern end of the nave, and under a lofty cusped arch, supported upon groups of red and green marble columns, is to be placed the ark, constructed of various materials, and richly decorated. A flight of marble steps will lead up to the marble floor, upon which the ark is to be placed. Behind the ark will be erected a lofty screen, and over it is to be the choristers' gallery. The columns of the nave are to be 23 feet high, and are to be surmounted by lofty pointed arches carrying a clerestory of 36 arched windows. The ceiling is to be semi-circular, richly moulded and panelled, and ultimately decorated in gold and colours. The internal dimensions of the building are to be 120 feet long by 60 feet wide, and it is to be seated for about 700 persons. The height of the interior is to be about 50 feet.

PRESTON.—On Sunday, the 22nd ultimo, the Sanctuary, Lady Chapel, and S. Joseph's Chapel, at the Church of the English Martyrs, Preston, were re-opened after decoration. The decorations, which may now be said to be completed, are by M. Rossi, and their effect is to render the Sanctuary one of the finest in the provinces. They comprise a series of frescoes, exquisitely painted, on the following subjects:—The Nativity, the Assumption, Our Lord preaching to Little Children, the Annunciation, and Giving of the Keys to S. Peter, and in addition, the ceiling has been painted in compartments with Scriptural illustrations. The entire cost has reached £1,200.

BUILDINGS.

WOLVERHAMPTON.—The alterations and additions made to the South Staffordshire Hospital in Wolverhampton are now consummated by the opening of a building for the treatment of fever cases. The original building, erected about the year 1848, was on the corridor plan, and consisted of a central building, with wings returning to the south or back of the main building. The recent alterations and additions consist of the removal of the out-patient department to a new wing, one-storey in height, on the eastern side. A further addition is the extension of the south-western wing, forming two spacious wards, each 80ft by 26ft. 6in., and arranged on the pavilion system. A further addition is the extension of the south-eastern wing for infectious cases, which is arranged for six separate wards—three on the ground-floor, and three on the first-floor, each accommodating three beds. The floors of the new building are of oak, and the walls plastered with Parian cement. The builder's work has been well carried out by Mr. Horsman, builder, of Darlington-street, Wolverhampton, at a cost of over £13,000, from the designs and under the superintendence of Mr. George Bidlake (Bidlake and Fleeming), architect, of Wolverhampton.

SCHOOLS.

BRADFORD.—On Tuesday week, at a meeting of this board, the tender of Mr. B. Dixon for plastering work at Bowling Back-lane School for £123 was accepted; as was also the tender of Mr. Squire Holdsworth, for the erection of Barker-end School at a cost of £9,886. The plans had been altered, and would have to be approved by the Department.

GARFORD.—A new school for the parish of Garford and Frilford is to be built immediately, from the designs of Mr. Edwin Dolby, of Abingdon, architect. The plan will comprise school-room, class-room, and a teacher's residence, with separate offices for the boys and girls, and a private enclosed yard attached to the teacher's house. The local stone will be used for the walls, and the windows will be of Bath stone, fitted with Messrs. Burt and Potts' iron lights; the roof of the school and class room will be partially exposed to view. The contract of Mr. R. F. Bryan, of Abingdon, has been accepted, and he is to commence forthwith.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for "Situations Wanted" are inserted at a charge of one shilling for the first twenty-four words, and sixpence for every succeeding eight words.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

Cases for binding the half-yearly volumes, 2s. each.

ALEXANDER ROSS.—Drawings to hand.

JAMES HICKS.—Your letter on "Cornish Granite" next week.

RECEIVED.—J. P. J. B. A. G. & Co.—H. H.—E. S.—J. M. Hay.—C. D.—W. Y.—J. P. S.—W. M. & Co.—R. M. S.—H. K. W.—J. R.—T. C. H. & Co.—W. S. & Son.—

G. E. H.—J. B.—B. and A.—W. R.—J. P. S.—W. H. L.—M. I. M.—Wolverton.—R. Y. T.—G. B.—R. W.—S. & W.—E. & E.—F. M.—W. D.—W. W. E.—R. N. S.—Stability.

P. AULD.—The drawings returned.

"R. R. R." AND TWO OTHERS.—Exercise a little patience. We hope to give the decision on school planning competition with the report next week, or certainly the week following. The arbitrators, Messrs. Roger Smith and Banister Fletcher, are doing their work certainly conscientiously, and we believe well.

W. WILLIAMS.—The third and concluding article on the Workman's Share in Architecture will appear next week.

M. B. ADAMS.—Yours on the "Cymagraph" next week.

E. T. C.—Your replies to queries next week.

HENRY MUIR.—Not suitable.

E. M. C.—We shall give a plan and elevation of a labourer's dwelling complete, which can be erected for £100, in a week or two.

Correspondence.

GRANITE AND MARBLE.

To the Editor of the BUILDING NEWS.

SIR,—The letter from which I quoted was written by the Boston correspondent of the *New York World*. I first read it in the *Manchester Guardian*. Mr. Travis will thus see that my information was not exclusive. Like him, I am not concerned in proving that marble is not inferior as a building material to granite; no doubt each has its merits. But it appears to be generally overlooked, in speaking of granite as a fire-proof material, that each and every quartz crystal in it contains a minute cell filled with free water, which, when heated, is converted into steam, and acts with explosive force in disrupting the material, and produces the phenomena described in the letter I quoted. This fact was, I believe, first discovered and shown by Mr. Sorby, of Sheffield. Marble and all other carbonates of lime, however, have their water chemically combined, and it requires a much greater heat to drive off the water thus held than in the other case. Hence their superiority as a fire-proof material—at least, up to a certain point. Beyond that point, however, I agree with Mr. Travis in thinking that we have no material equal to good slop bricks, which, if built well with Portland cement and sand, one to three, will form an absolutely fire-proof wall. The water held by the cement thus used is very small compared with the great bulk of the wall, and will be well protected in the interior. I may say here, in reply to many queries recently made, that no concrete construction can be fireproof beyond a certain point. I have tested gypsum concrete, as made by a well-known constructor, and find that when it is heated to redness the water of crystallisation is driven off, and the material on cooling is found to be disintegrated. If, however, it be cooled quickly by pouring on water, it disintegrates with violence, spurting and flying about. Portland cement concrete behaves in the same manner under similar circumstances, but in a less degree, the water of crystallisation being much less in quantity therein. To prevent its destruction in this way, I propose to face walls, ceilings, and all exposed surfaces, with thin wall tiles set in Portland cement, or with marble, as may be preferred. Good flat decorations for cities may thus be legitimately obtained at reasonable cost.—I am, Sir, &c. E. G.

FIRE-PROOF IMPERISHABLE STONE.

SIR,—From the correspondence on this subject, it appears to have been generally believed that granite is a fire-proof stone. It did not, however, require the burning of Boston to demonstrate that, before a continued heat, it is a very perishable material. Had your correspondents consulted a practical granite-mason on the point, they would not have made any asseverations to the contrary. Nor would they have been led away into enthusiasm as to its economy of use in bulk and cost. But seeing the rare use which London architects make of granite, I can well understand their scepticism. For such dressings as lintels, sills, and quoins, granite is doubtless the best material we have at command; but for ashlar facing and decorations, in smoky atmospheres especially—such as London—its effect is not commensurate with its cost. The fine interstices of the stone hold the soot, except in very exposed positions, while such is its depth of colour that it requires the invention of a new order of architecture to render its sole use attractive.

It is supposed by geologists that Aberdeen and most Scottish granite is of a much older formation than Cornish granite. There is not, however, much difference in the qualities of the stone from the respective districts, although each quarry may differ in degree in colour, texture, and hardness. Surface granite will resist greater heat than deep quarry granite, but for architectural purposes it is not nearly so desirable. The balusters and coping of the Thames Embankment are of Cornish granite; its advantage being that it is less expensive to work, and for that and like positions may be said to be literally imperishable.

To say, however, that marble resists heat more than granite, is simply absurd, at least so far as the marbles of this country are concerned. Of course it depends upon the strength of the heat and the nature and quality of the stone for its rapidity of disintegration or crumbling to pieces. But, like others, I am very sceptical indeed of the marble that is said to have resisted the Boston fire when granite crumbled to dust. My impression is that the marble must have escaped the fire; and before any inference can be drawn, it is necessary to prove how granite would have answered under similar treatment to the marble. A case however can be easily demonstrated in this way, and indeed the fire-resisting qualities of any stone ascertained by a very simple process. Place granite and marble rocks of similar shape and size in a well regulated lime-kiln. The average effect on the stone after passing the fiery ordeal will be that the granite, although easily powdered or disintegrated, will be almost whole, while the marble will be split into many pieces and perfectly calcined. It will be admitted, therefore, that, although in unequal degrees, neither granite nor marble are fire-resisting materials.

It is generally supposed that the best fire-resisting material is fire-brick. That, however, is not quite correct. The Elvan stone, which is found in abundance in the neighbourhood of Redruth, will last as long as the best bricks produced in this country. The cottagers in the locality sometimes use it instead of fire-brick for lining the cooking apparatus. Not only so; it is a beautiful building stone, easily worked to the finest surface and the sharpest arris. Some of the buildings which you have done me the honour to illustrate in the BUILDING NEWS are faced with this Elvan stone, and their freshness and colour is very generally admired. There are many species found throughout the country. Those from the Carn Brea Hill are much harder than granite, and very nearly the colour of Bath stone. Others from the neighbourhood of Camborne are apparently a mixture of Killas and granite, and are of a rougher quality. The stones, however, which seem most adapted for architectural purposes are the fine grit Elvan from St. Stythian's, Redruth. This stone is moderately soft when green from the quarry, but hardens on exposure to the sun. Its colour is a few shades warmer than Portland stone, having occasional stains of brown, caused by the presence of iron. It is easily dressed to a fine smooth surface, that will in a measure resist the adhesion of blacks. Its cost in every way is considerably less than that of granite, but it is not safe to calculate on finding blocks more than 5ft. in length. Finely dressed ashlar, in courses ranging from 4in. to 9in. high, cost on the quay, ready for shipment, about half-a-crown per foot superficial, and weighs about 20ft. superficial to a ton. As the freight to London docks is about 10s. per ton, it can therefore be had in London at 3s. 3d. to 3s. 6d. per foot superficial, or at the utmost 4s. per foot, delivered on the works. If the stones were worked in London the cost would be somewhat more. If worked in quarry they would be packed in sand, the refuse of tin and copper mines, which, with lime, makes excellent mortar.

We have, then, a perfectly fire-proof imperishable building stone at a moderate cost—not greater than that of Portland stone—even in decorative work; capable of being dressed to a fine smooth, glassy surface, that will resist the accumulation of soot, and is of a rich, subdued colour, streaked with picturesque washes of brown. They require no new style of architecture, being suitable for any purpose, from the roughest knobbling to the finest tracery. I have been induced to give these particulars because until lately the Elvan stones referred to have been almost wholly neglected, and because, if it is desirable to have fire-proof walls—and we may take a warning from Boston—it shall not be said they are not to be produced.—I am, Sir, &c., JAMES HICKS.

Redruth, 30th December, 1872.

GRANITE BUILDINGS.

SIR,—It was with much interest and satisfaction that I perused Mr. Travis's letters in late numbers of your journal, on the use of granite in our modern street architecture, and its more especial adaptation to the public buildings of the metropolis. That good granite possesses qualities infinitely superior to all other ordinary building stones for resisting the destructive atmosphere of London is a fact proved patent and unquestionable by experience. Its fire-resisting qualities are, however, more open to doubt. In this respect, when fairly tried, we strongly suspect it is neither better nor worse than the generality of other good building stones.

In advocating the claims of granite to a wider and more general practical application in the construction of our public buildings, Mr. Travis has, we think, rather under than over stated its more prominent advantages. In beauty of colour and richness of tint it stands unsurpassed by the most costly marbles, while its duration as compared with the evanescent glory and premature decay of Bath and Portland stone, is all but eternal. In all that pertains to its beauty and duration, we say, Amen! to all Mr. Travis's temperate eulogy, and it is only where he comes to the details of expense and manner of using it that we are obliged, not so much to differ with him, but to press the claims of granite much further than he has done. His estimate of the cost of the raw material is far too high, the price stated being that of large-sized stones for engineering and monumental purposes, while those more suitable for architecture (unless of the Stonehenge order), being of small size, can be supplied at rates considerably lower than those quoted. He is also over-diffident as to the way granite can be manipulated into carved and moulded decorations and enrichments. With little or no difficulty, many of the finest and most elaborate details of both classic and mediæval architecture can, with slight modification, be successfully and effectively executed in this material. True, the cost of production will at first be considerable, yet ultimately less than in any other, when we take into account the duration of granite, which will count by thousands of years as compared with the hundreds of the common London stones. In Aberdeen, the centre of granite manufacture, everything is done in this stone that can be done with more pliant materials. Mouldings of every kind are executed in it. Capitals of the most varied design and elaborate workmanship are carved from it, while several works of statuary have been very successfully executed out of the hardest granite. Were London once well built in granite, it would stand without decay for thousands of years, instead of requiring to be renewed every century as at present; and the saving to all concerned would be enormous.—I am, Sir, &c.,

Aberdeen, Dec. 28.

J. M.

THE OWNERSHIP OF DRAWINGS.

SIR,—Allow me briefly to reply to "A. B.," who extracts from your report of one of my lectures the advice "If the client asked for the drawings, they should be given him; but, as a rule they should not be offered to him," and dissents from it in terms more vigorous than polite. The report in your columns, and that sentence as part of it, must not be understood as a verbatim report, but as a condensation by your own reporter of my remarks, though the spirit of them is very well embodied in it. It would have been more satisfactory if "A. B.," instead of giving us the stock arguments over again (or at least some of them), had been able to tell us facts. The first part of my advice was based on a firm conviction that, however excellent these reasons may sound, they will not hold good in law; and that though the custom is all but universal, and is eminently convenient to all parties, for the architect to retain the drawings, yet that custom gives him no legal right to them as his private property. He holds them just as a solicitor keeps deeds and papers for his client. If "A. B." will give us a clear decided case of its having been settled in a court of law that the drawings belong to the architect, he will render an essential service.

When "A. B." adds that it is dishonest to advise students, when they become practitioners, to follow the ordinary custom of every architect and every solicitor throughout the kingdom, and retain the drawings and papers till they are called for, I need only, I think, appeal to the universality of the custom to acquit me of the charge. I believe that "A. B." is mistaken as to his legal rights.

—I am, Sir, &c.,

T. ROGER SMITH.

23, Bedford-street, Strand.

THE FIRE AT BOSTON, UNITED STATES, VERSUS GRANITE, MARBLE, AND SAND-STONES.

SIR,—Several letters have lately appeared in your journal referring to the fire at Boston, United States, and its effect upon the buildings in that city, which were faced externally with granite and marble.

The correspondents writing from Boston respecting the granite and marble subjected to the fire have left out many particulars which it is desirable we should know, in order to form a correct opinion, especially as to the character of the granite and marbles used.

To meet this difficulty, I have sent for some of these granites and marbles that have been exposed to the fire, and on their arrival here I hope to be able to lay some remarks thereon before your readers. As a matter of fact, fire will reduce granite to powder. Anyone may assure himself of this by putting a piece in his kitchen grate and taking it out in a few minutes, or as soon as it is red-hot, when it will be found thoroughly calcined—the cementing qualities destroyed. Let him repeat the experiment with either the oolites, marbles, or limestones, and he will find it will take a heat much more intense to calcine these. Then let him subject a piece of hard compact sandstone to the same process, and when red-hot, plunge it in cold water (the action of the fireman's hose), and it will come out of the ordeal discoloured, but sound; thus proving beyond all question that our city staircases (the flue of the buildings) should be constructed, not of granite, marble or limestone, but of hard sandstone, proving also that our strong rooms, to be fire-proof as well as thief-proof, should be built of hard sandstone.

What the best material is to use for the exterior of our buildings, raises another question, especially in London, where the walls of few buildings are composed entirely of stone, granite or marble, and these are rarely used constructively. It has been well said, "Our stone buildings are only veneer."

If anyone would take a walk with me in the City, I think I could readily prove to him that the most desirable building stone for London is either sandstone or Portland; although should the latter be subjected to the action of intense heat, it would calcine, and if slacked, form lime. This would not be the case with fine hard sandstones. Granites, unless polished (and even then if not frequently washed), become very dirty and black, sandstones more or less preserving their original colour. Marble as an external building material is not adapted for London: where used, the acids in the atmosphere eat off the polish, and then the marble quickly decays.

Notable instances may be seen of buildings decorated with limestone or marble, where the polish has already disappeared, or is being rapidly eaten away, although not long erected. Grey granites have a dead, cold appearance, whereas many of the sandstones are cheerful and warm. They can also be obtained in every variety of colour, from a dark red, to a pale pink, a dark blue to a bluish grey tinge, from a rich warm yellow to a pure white. Many of these sandstones fret well under the tool—a great advantage both to the mason and sculptor, particularly when fine mouldings and tracery, floral or other decorations, are largely introduced by the architect. I have elsewhere referred to the abundance of sandstones in the United Kingdom, and I am glad to see Mr. Sorby agrees with me, and uses them when he can. The more extensive employment of machinery in the building trade would facilitate the introduction of these beautiful stones, and cause them to be much more largely used in the future than they have been in the past.

If one visits Birmingham, Bradford, Huddersfield, Manchester, Liverpool, or many other of our manufacturing towns, he will be struck with the vast piles of buildings built of sandstone. Although some are soft and inferior, most of them are hard and fine in texture, and a beautiful warm rich colour, and of great durability. He will also see many notable instances of offices, factories, and mansions, where the quoins, cornices, window and door dressings are out of solid block stone, and the rest of exterior filled up with pitch-faced or hammer-dressed wall-stones. Wall-stones like these might be introduced in London with very good effect. Looking at the question of the future building of London, both as to beauty, durability,

and immunity from fire, I would say to our architects, Build with hard compact sandstones.—I am, Sir, &c.,

SAMUEL TRICKETT,

Stone and Granite Merchant.

Millwall, E., Dec. 31st, 1872.

ORGANS IN CHURCHES.

SIR,—As an architect, and one who has made music the study of his leisure, I am interested in the question mooted by your correspondent "W. W." as to the best position and provision which architects can make for organs in churches. The subject is one of importance, not only to the organ-builder, but to the choir and congregation. There are many circumstances which should determine the exact position of the organ, but under no circumstances should it be enclosed in a small chamber, with one side only exposed; which is so justly condemned by "W. W." As the result of my own experience, and from information gathered from several eminent organ-builders, I find: that the organ should not be too near the roof, or more than seven or eight feet from the ground, and nearer the floor than roof; that care should be taken to protect the instrument from damp and change of temperature; that it should not be against a window, but free of all walls, and room allowed for tuning, &c.

With respect to the position of the organ, the architect has to consider both the size of the church and whether there be a choir. The east end, where the rest of the service is conducted, seems the most appropriate place for the choir, who should be vested, having a part and official duty to perform in the services; though, as far as I know, there can be no impropriety in placing them at the west end. Practically, however, if the choir is to lead the congregation in the responses, &c., they are best in front, for (especially in large buildings) sound takes so long to travel that those seated at the west end will always be heard a few seconds after those in front. The same difficulty arises where the organ is placed at the west end and the choir in the chancel. To those seated in the nave they are never heard together. If we look at a regiment of soldiers marching to their band, the whole column appears in waving motion; the fact being that each man steps as the sound of the drum reaches him.

When there is no choir employed, there are advantages in placing the organ at the west end (free of walls). "W. W." quotes the organs in French churches; but in most of those I have seen, there is, in addition, a small "choir organ" in the chancel, and since the invention of the electric mechanism, the organist has sometimes played both from the chancel. The effect is certainly unspeakably grand when, after the choir has sung some anthem accompanied by the chancel organ, the organist has suddenly connected the instrument and the whole congregation joined, the grand organ being apparently the cue to the latter. But for ordinary churches, where a choir is employed in the chancel, I am inclined to favour the placing the organ in a transept or corresponding point. There is a charming effect produced by the breaking up of the waves of sound as they make their way through vaulted aisles and columns, which is lost if the organ is tightly enclosed in a small chamber.

Your correspondent "X. X." I fear considers that an organ should be selected "architecturally and artistically" by its "case," and against these he with justice exclaims, as being for the most part "hideous." But what does he mean in his reply to "W. W." that "the organs in France are placed at the west end because there happens to be no provision made for them elsewhere, the instrument being comparatively a modern invention?" The organ was first used in churches in the year 666, and in general use in Europe about the year 826. It has grown and increased somewhat in size, but that not even in comparatively modern times.—I am, Sir, &c.,

JOHN BELCHER, JUN.

5, Adelaide Place, E.C., Dec. 31, 1872.

THE PRESENT POSITION OF ARCHITECTS' ASSISTANTS.

SIR,—I suppose there are many of your readers who, like myself, were pained by reading in your last week's number the letter signed "A Brother," and who will join me in my regret that there should be any in the ranks of architects' assistants who could calmly advise their brethren to adopt the vulgar and clumsy expedient of a "strike" in the attempt to redress any abuses suffered by them at the hands of their employers. I presume it will be generally admitted that, socially considered, an architect is reputedly a scholar and a

gentleman; and the architect's assistant is essentially an architect minus the means and opportunities of independent practice, and therefore, in his service for hire, he is serving a brother merely, although one who has been more favoured by circumstances than himself. A "strike" inevitably divides those concerned into two distinct classes, separating their interests and putting them one against the other, and placing the strikers in the attitude of opposers of aggression and injustice. No one will doubt that there are now many architects' assistants miserably underpaid, while there be others who, according to merit and ability, receive much more than they are entitled to, and I believe there are reasons for this on both sides. There are architects whose morality is unsound, and who possess but a minimum of commercial integrity, and there are assistants of precisely the same character, proofs of which each one's individual experience will supply; and they are corroborated in the one case by the very many and just complaints made by builders from time to time against architects they have worked under; and in the other by the columns of our professional journals, where I have often seen advertisements for employment in which the rarest attainments have been catalogued and offered for hire at 30s. per week, or less, or for overtime work at 9d. per hour. If men will thus degrade themselves, they must expect abuses to exist; and the less trouble assistants take to keep themselves well up to the reputed standard of professional respectability and to exercise morality, the more these abuses will increase. But by a "strike" or any similarly-concerted measures of direct opposition, assistants will be separating themselves from their employers and raise an ill feeling which will only tend to keep open any breach once made, for ever. I am not a member of the Architectural Association and cannot combat the allegation made against it,—if it be aristocratic simply because many practising architects of high standing are within its ranks, I say the better far for the assistants who are members, that it be so; and as by the low rate of its subscription it is within the reach of all, or nearly so, and probably did a larger number of assistants seek admission the subscription might be reduced, there can be no need of any other association.

The tone of the letter of "A Brother" would lead one to infer that he supposes manliness and brotherly co-operation to consist in that temper of mind which is ever ready to assert individual rights, irrespective of the claims upon oneself having been duly met or acknowledged. Let assistants see to it that they be individually men, honourable, able, and true, not regarding their employers as mere capitalists, for they are not such: they are fellow workers, and but one interest exists for both. Let those who are under-paid ask without fear or pretence of favour for a higher and befitting wage, and let such be supported by a mutual and clear understanding both privately and publicly expressed, and in firm and courteous language made known to employers, that it be generally recognised in the profession that no assistant duly qualified up to a certain line of ability should be expected to give his services for less than a recognised sum, at least double the one I have mentioned; and that all merit beyond such line shall be paid for accordingly. If assistants be true to their own position, unprincipled employers would be shamed into justice and liberality. It is but just that a young man just free from his apprenticeship should receive a lower wage than one who by years of labour and varied experience has acquired deeper knowledge. In this profession knowledge and ability must be the gauge of remuneration, and it would be better far that all assistants should be paid upon a piece-work system, than that any "trade-unionism" should be brought into their ranks. I write as a brother professionally, and truly in a spirit of brotherly love.—I am, Sir, J. P.

"A Brother" could scarcely have been serious when he recommended architects' assistants "to strike." To "strike" with anything like effect requires combination, discipline, an abdication of individual claims, and a preparation for sacrifice. If architects' assistants possess these qualities then "A Brother" may seriously consider the propriety of adopting a trade-unionist policy.—Ed. B. N.]

RUSKIN.

SIR,—Mr. Ruskin, in an extract which appears in the BUILDING NEWS, appears to indulge in some amusing comments on the probable origin of his own name.

He assumes that the word may be divided as Rus-kin, as though it referred properly to "skin," the human integument. This I think is a misapprehension. I would divide the word as Rus-kin; the terminal being the well-known diminutive, as in Jenkin for little John; Wilkin for little Willy, and so on.

The nearest form of patronymic known to me is Rudkin, which I take it should be Rudge-kin, for little Roger. The prefix "Rus" is not clear, but it may be from "rose," judging by analogy; therefore, Ruskin may be "little rosey." The German *röschen* is not so very far off.—I am, &c., Dec. 30th, 1872. A. HALL.

PRICES OF TIMBER.

SIR,—We beg to call your attention to inaccuracies in your latest prices of materials in the current number, particulars of which we give below.

There is no Quebec birch in the market even at your highest quotation of £6. Inferior small wood is worth £6. 10s., while large square wood is worth £7. 10s. to £8.

Quebec Spruce, by entire cargoes, is fetching £15 10s. for third quality; your quotation is £14. 10s. The same remark will apply to St. John's Spruce.

There is no Finland Yellow at £7 10s.; the commonest handsawn battens fetch more than that.

First quality inch yellow flooring is worth at least 12s.; you quote 11s. I am, Sir, &c.

J. TERRY & SON,
109, Borough Road, S.E. Dec. 20th, 1872.
[We take the prices of materials weekly from the Public Ledger.—Ed.]

CONTRACTS AND QUANTITIES.

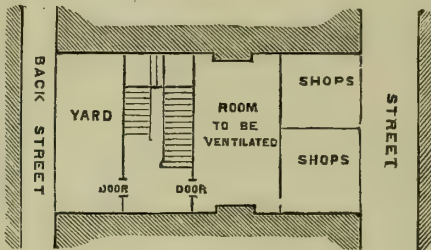
SIR,—I have read with much pleasure your exceedingly useful article on the above subject in last week's issue of the BUILDING NEWS. Our best thanks are due to you for bringing this most serious question in so prominent a manner before your readers. It is to be hoped that it will at once be carefully considered, not only by the architects of Manchester, but by every one; for is not this the root from which so much of the present unpopularity of our profession has sprung, and continues to receive strength? I thoroughly endorse the opinion of your correspondent "A. B.," that the quantity surveyor should be employed by the client and not by the builder. In the latter case, no architect can well acknowledge the quantities given in the quantity bill. The quantity surveyor is nothing more or less than the builder's servant, and therefore, as was remarked last week, naturally prefers his interests. I have just now had a case in point with the accounts and extras of a large contract lately completed in the South of England. Although the surveyor employed is of considerable reputation as one of the first in London, we found that the builder throughout was studied, and not the employer. None but those who have had similar difficulties to contend with can form an idea of the extent of this evil. I am, &c.

A CLERK OF THE WORKS.

Intercommunication.

QUESTIONS.

[2740].—Ventilation.—I am wishful to thoroughly ventilate a room having no outside walls (as shown on the accompanying plan); it has a room, over which extends



over the shops also, an open fire place at each end, a door where shown, and no window whatever is lighted by gas and required to be used as a smoke room. Use might be made of the shops in front or staircase at back in the way of inserting flues, &c. Would some brother kindly favour me with a suggestion.—B.

[2741].—Water in Vaults.—Can any of your readers inform me as to the best and most effectual method of keeping water out of cellars or vaults of churches. In a vault under a chancel just restored, there lies at present two or three feet of water. The church is close to a small river, and although the water in the vault is unusually deep this year, it enters more or less annually, oozing between the bricks and mortar of which the vault was built. A simple coat of asphalt 4 feet high would not, I fear, be sufficient.—COLUMBARIUM.

[2742].—Cleaning Walls.—Will anyone kindly inform me what is the best method of cleaning the black water stains from brickwork in cases where the water has been allowed for some time to run down the wall-surface, thus producing in places long streams of blackish stain.—C.

[2743].—Setting Fire-grates.—I have experienced the difficulty of preventing the rust, which always forms more or less on the back of fire-grates, from staining marble chimney-pieces. Will any practical reader inform me on the matter. I do not think the method of covering the back of grate with Roman cement, and then setting it with the same material, answers the purpose.—A CLERK OF WORKS.

[2744].—Substitute for Coal.—Will someone be good enough to inform me the best cementing material to make small dust coal and cinders into concrete blocks to be burnt in furnace instead of large coal, which is now so very expensive.—A SUBSCRIBER.

[2745].—Valve Water-closets.—I shall be obliged by being told which of the many patent water-closet apparatuses now in use are the simplest and best.—PLUMBER.

[2746].—Fonts in Churches.—Why must the font be placed, often to the inconvenience of the congregation, near the south-west entrance of a church, and not at the east end.—A PURITAN.

[2747].—Architects' Books.—As a young architect, I should be glad to know the best system of book-keeping for an architect to use.—M. O. S.

[2748].—Painswick Stone Chimney-piece.—What can be the cause of brown stains appearing in an other-

wise perfectly white Painswick stone mantelpiece, about two days after it was put up? The material used for the joints was plaster of Paris, and everything was perfectly clean. Can anyone suggest a remedy?—H. W. F.

[2749].—Paint Strainer.—Can any brother reader inform me the best way to make the above and easy to clean? Can it be made to revolve, like Nalder's patent screen?—F. T. S.

[2750].—Liability of Architects, Surveyors, and Builders.—If a surveyor takes out quantities from an architect's drawings, and the work is not executed, is the architect liable to the surveyor? If the work does go on, and the party for whom it is erected becomes bankrupt or flies the country, is the architect liable for the quantities? If an architect sends plans, &c., to several builders for tenders—they taking out their own quantities and pricing them out—if the building is not erected, can any one, or all of the builders charge the architect for their trouble? There seems much uncertainty on these points among architects and lawyers. Perhaps you could refer to some cases, and oblige, W. H. WORDLEY.

REPLIES.

[2717].—Best Material for Rubbings.—A late patron of mine, who turned to good account the leisure of a civil service appointment, by literary and antiquarian pursuits, became by my assistance a renowned rubber. I helped him to acquire accurate representations in black and white of some of the finest memorial brasses in the kingdom. But he proved dissatisfied at length, and threw me aside as slow and snobby, discarding also the stout lining-paper employed in conjunction with me, because tissue was lighter and easier to carry. To this he applied a coat of plumbago or bronze-powder by means of an unguented dabber, and with a smoothness and facility not otherwise attainable. Amateurs of the old school will, however, still find me very much at their service, if not (as mentioned at p. 470) the best medium.—HEEL BALL.

[2724].—Sketching Mouldings.—Several questions have been asked from time to time in the BUILDING NEWS with reference to the cymagraph, and generally without receiving very lucid replies. Last year through your intercommunication column I offered a correspondent the loan of the full-size drawing from which my cymagraph was made, and received in reply letters from almost all parts of England asking for tracings, and I continue to receive similar communications to this day. In order to answer these, together with the query put a week or two since by "S. S. H." on the above subject, I send herewith a copy of the drawing alluded to, with a brief description showing how to use the instrument.—M. B. ADAMS.

[The engraving and description will appear next week.—Ed. B.N.]

[2728].—To Remove Mould-seams from Plaster Casts.—Try me.—DUTCH RUSH.

[2733].—Chimney Stacks.—The following are the dimensions of a chimney erected some years ago in Lancashire:—

Circles of Chimney.		Ft. in.	
At floor line	...	20	0 diameter outside
30 feet height	...	18	3 "
70 "	...	15	9 "
110 "	...	13	6 "
150 "	...	11	0 "
180 "	...	9	3 "
At floor line and up for 30 feet, 3 bricks length thick.			
For 40 feet after, 2 bricks thick.			
40 "	...	2	" "
40 "	...	1	11 "
30 "	...	1	1 "
		Ft. in.	
Diameter at top outside,		9	3
" "	inside,	7	9

The foundation was about 22 feet below floor line, and 8ft. 6in. of this was of concrete. The brickwork commenced on this bed, and was 27 feet 6 inches diameter. I cannot say how many boilers were used.—J. D. J., Liverpool.

[2737].—Darkening Walnut.—S. P. will find that Stephens' walnut stain, covered over lightly with a thin coat of aquafortis, will answer his purpose.—W. R. A., Uckfield.

[2739].—Steam Power for Street Tramways.—Steam has been employed to propel street carriages by several inventors. A Mr. Gough, an engineer of Manchester, ran a stage-coach thirty years ago from that town to Irlams-o'-th'-Height—the first I believe in England. Earl Cairness sometimes travels the Highlands in a steam carriage of his own invention. The difficulties in the way of a universal adoption of steam on common roads are not engineering, but legislative. To run at a speed not exceeding two miles an hour, to run only between the hours of 12 midnight and 7 morning, and to pay at every toll-bar a toll of one shilling per wheel of the engine, and any other vehicle drawn or propelled by it,—these are some of the obstacles which Parliament has put in the way of the employ of steam on common roads. I once designed a velocipede to be driven by an engine, whose tiny boiler would be heated by a paraffin lamp, but was informed by a magistrate that it would be confiscated if it ran on the public highway.—J. G. H.

Chicago is to have a vast crystal palace in which an exhibition is to be held in October, 1873. The dimensions of the building, according to plans which have been submitted, will be as follows:—Length, 600ft.; breadth, 100ft. There will be a central transept 250ft. long. The height will be 80ft., with a dome over the principal entrance more than 100ft. high. A floral garden will surround the building.

Gas consumers will do well to remember that the price of gas in London cannot be increased without the sanction of the Board of Trade, which has signified its readiness to hear representations against the proposed increase by several of the metropolitan gas companies.

Our Office Table.

TIMBER SHIP DECK-LOADS.—We have at the present moment (says the *Nautical Magazine*) statistics of upwards of 100 timber laden ships, carrying deck-loads, that have either been lost with their crews, or whose crews have suffered torments worse than death. These are British ships. Now that a great deal is said about the supply of British seamen, something might be said of the waste of British seamen. What is the use of supplying them if they are wasted afterwards? Those British shipowners who are philanthropic enough to do all they can to convert street arabs (a sad misnomer by-the-bye) into British seamen might at least be solicitous that when they are converted they should not be tortured or drowned. Now it happens that 100 British ships lost in the timber trade means 2,000 men lost, and 2,000 men, at least, in the trade means 6,000 widows and children. What are we to say to all this? If the British taxpayer is to support them, the British taxpayer, through his representative in Parliament, ought, even according to the cold-blooded doctrines of John Stuart Mill, at least to see that the "supply does not exceed the demand" even of sailors' orphans. There was once a law against deck-loads, but her Majesty's Government repealed it. It is a curious fact that the unparalleled losses of timber ships during 1872 did happen to timber ships with deck-loads. We object, on principle, to Government interference with trade and with the concerns of daily life, and wholesale compulsory inspection. It seems to us that the remedy is not difficult. First, the space occupied by these dangerous cargoes carried on deck should no longer be exempted from tonnage dues, but should pay treble dues. Secondly, seamen in Canada should have the power they have in England, viz., to refuse to proceed to sea in an unseaworthy ship, whether with a deck cargo or not, and an independent authority should decide in such cases whether the seamen are right or wrong. It is a gross injustice to compel seamen to go to sea in any unseaworthy ship.

THE UNPROFITABLENESS OF STRIKES.—Mr. Greg, in his "Political Problems," curiously illustrates and confirms the view that strikes, if at all protracted, must prove a losing game to the workpeople concerned, even when they ultimately succeed in obtaining the advance of wages contended for. As an illustration, he states that in May, 1871, the colliers in the steam coal mines in the Aberdare and Rhondda valleys, in South Wales, had a disagreement with their masters as to an advance of 5 per cent. in their wages. By the advice of the leaders of the Amalgamated Association of Miners, they turned out, and remained out twelve weeks. There was no violence, and scarcely any intimidation, the men, as a rule, behaving admirably. Ultimately the matter was settled by arbitration, the men obtaining one-half of their demand, or 2½ per cent. The number of men who voluntarily threw themselves out of work was upwards of 10,000. They sacrificed in twelve weeks £120,000 of wages. On the other hand, they received in allowances from the union funds £6,383, and from the award of the arbitrators 2½ per cent., or £250 a week. It will cost them, therefore, nine years to replace themselves in the position they held before the strike, even if the advance then extorted be maintained.

ART AND LUXURY.—Sir Arthur Helps presided on Monday night at the distribution of prizes to the successful students at the Portsmouth School of Science and Art. Replying to the arguments of those who asked how it was that the decadence of a state had generally begun when art was at its best, he maintained that the assertion implied was a total delusion. There was an enormous distinction between luxury and art. Nations had fallen, it might be, through luxury, but not through art. France had been pointed to; but while a few thousand persons were luxurious in Paris, the great body of the people were frugal and industrious, and in every way deserving of success. France had fallen, not from the rise and progress of art, but from mal-administration, mal-organisation, and mal-government.

HOUSE ACCOMMODATION IN BERLIN.—A pamphlet has been published at Leipzig on the present scarcity of household accommodation. Some of the results shown by the author, Dr. Engel, are

remarkable. Comparing, for example, Berlin in 1830 with the Prussian capital of to-day, he has found that, while the average rent of a dwelling house in the former year was 85-06 thalers, in 1872 it is 171-19 thalers, or fully double, being an increase at the rate of fully 2½ per cent. per year. The great decrease in the number of smaller and cheaper houses is very noticeable. The average yearly increase of the population of Berlin is 40,000. The erection of houses for the new comers will cost, it is estimated, 28,720,000 thalers. There ought to be plenty of work, therefore, for builders in the Prussian capital.

STRASBOURG CATHEDRAL.—The official report of M. Klotz, architect to the Cathedral of Strasbourg, states that the cost of reparations rendered necessary by the Prussian bombardment will be 598,000 francs. A quarter of a million francs is required for the stone works; new roofs, 187,000 francs; repairs to the painted windows, 143,128 francs. During the twenty-four days' bombardment, the cathedral was struck in more than 300 places; the debris amounts to more than 300 cart-loads.

THE NEW GARDEN IN LONDON-WALL.—Those of our readers who are familiar with the narrow, grimy, dark, busy, and somewhat famous thoroughfare known as "London-wall," in the heart of London, will, perhaps (says the *Gardener's Magazine*) hear with some surprise that the Cripple-gate end of the street has lately been embellished with a bit of good city garden. For many a long year past the churchyard of St. Alphage had been a dirty enclosure, neglected by clergy and laity alike, and really cared for only by the pilgrim hailing from some far-off spot, and bending his steps thither to obtain a glimpse of the last relics of the famous London wall built by the Romans, which extended from Cripple-gate to the Thames. Only a few years since there might have been seen within "Lamb's-buildings," at the extreme end of London-wall, the remains of a bastion which stood at the actual termination of the wall. At this spot stood one of the strongest of the towers by which the wall was guarded. Then the fragment in St. Alphage churchyard was hidden from public view, but now the bastion is hidden (perhaps destroyed), and the public are indulged with a free view of the other bit, which has been tastefully and skilfully incorporated with the garden. At one spot on the left, a picturesque patch of the ruin rises above the general line, and is enriched with a screen of green ivy. Along the base of the wall a "rockery" has been formed of "burrs" from the brick-kiln, the only cheap material available in London for such a purpose. The remainder of the space is occupied with clean gravel, and five beds edged with a cable moulding and planted with evergreen shrubs and pompones. A few young plane-trees give promise of agreeable shade in years to come. The style and materials adopted in the formation of this little city garden will not please all the horticultural critics, but the few who know what is possible in the city of London with regard to the characteristics of the climate, and the financial difficulties accompanying parochial affairs, will regard the effort as consistent with the public good, and as entitling to public thanks all who have been concerned in it.

A DILEMMA.—The St. Georges-in-the-East Board of Guardians, in building their new infirmary, darkened some of the windows of that portion of the workhouse which they hold on lease from the trustees of Raine's Charities at a rental of £130 per annum. The trustees complained that the guardians had damaged the reversionary interest in the property, and threatened an action for obscuring their ancient lights unless the guardians agreed to purchase the premises right out. After much negotiation, says the *Eastern Post*, the Guardians consented to pay as much in Consols as would produce the amount of the rental, and the bargain being concluded, they, however, did not hasten to complete the purchase. Eventually the trustees pressed them to do so, and after giving instructions to their solicitor to proceed with the purchase, they are somewhat surprised to find the Charity Commissioners stepping in to prevent the completion of their agreement. The Commissioners state their opinion frankly that the bargain is a bad one, and viewing it as such, in the interests of the charity they decline to give their sanction to the arrangement.

RAISING THE WASHINGTON POST-OFFICE BODILY.—An American paper states that more room is needed in the Washington Post-office, and, as a

proposition to put another storey on the top of the edifice met with opposition, the architect has decided to raise the entire building 20 feet from the foundation and make the required enlargement from the base. A New York journal hints that if the plan proves successful, all future houses under the architect's control "will be commenced at the roof and built downwards."

REPAIRING LEAKY ROOFS.—Melt together in an iron pot two parts by weight of common pitch and one part of gutta-percha. This forms a homogeneous fluid much more manageable than gutta-percha alone. To repair gutters, roofs, or other surfaces, carefully clean out of the cracks all earthy matters, slightly warm the edges with a plumber's soldering iron, then pour the cement in a fluid state upon the cracks while hot, finishing up by going over the cement with a moderately hot iron, so as to make a good connection and a smooth joint. The above, according to an American contemporary, will repair zinc, lead, or iron, and is a good cement for aquariums.

PICTURE CLEANING.—According to *Galignani*, a new process of cleaning pictures has been discovered. The great difficulty has always been to get off the old varnish, which by length of time has become almost incorporated with the colour underneath, so that any method employed to remove the upper surface is pretty certain to carry off with it the delicate lines below. Some picture dealers use corrosive substances, which make the matter worse. The new system just discovered at Amsterdam consists in simply spreading a coating of copahu balsam on the oil painting, and then keeping it face downwards over a dish of the same size filled with cold alcohol at an altitude of about three feet. The vapours of the liquid impart to the copahu a degree of semi-fluidity, in which state it amalgamates with the varnish it covers, and so admits of easy removal. Thus the original brilliancy and transparency are regained without injuring the oil painting, and when the picture is hung up in its place again two or three days after, it looks as if it had been varnished afresh. The inventors have given the public the benefit of their discovery.

SCIENTIFIC HINTS.

DAMP WALLS.—A correspondent of the *English Mechanic* says:—How stupid it is to build, as I have seen many houses built—viz., upon the turf, the joists, in many cases, upon the soil, no air-bricks for ventilation, no drainage to carry the water away that collects upon the roof, no gutter, no pipe, no water-proof course or damp-proof, in the shape of stone, slate, or good vitrified tiles. I expect the querist's is one of these. Whilst the mortar is green I have seen slates driven through with a mallet. I should advise the taking up of the floor inside, dig a drain, and put some ventilating bricks in; he might rake joints out in short lengths, and insert slates with cement, put up gutters, and convey the water from roof in a pipe some distance from the base.

GLUING WET WOOD.—According to a correspondent of the *English Mechanic*, wet wood may be glued by adopting the following plan:—If in short lengths turn a screw half-way home in the centre of the board's length and thickness, cut off head and neck of screw, making corresponding hole in fellow board, well glue the joint, and with the projecting screw as a centre rotate the fellow board until the joint is tight. Suitable screws cut at both ends can be had. I prefer about an eighth part of light-coloured paint, well mixed with the glue for wet wood and outside work.

CUTTING THICK GLASS.—To shape thick glass, says a correspondent of the *English Mechanic*:—You must cut the thick plate on the smoothest side with a "plate-glass" diamond, and then tap it under the cut with a small hammer to start it. Do not be afraid of hitting it, as it will take a few smart taps to start the cut. If you want it cut circular, you can get it cut with a "circular diamond" at almost any respectable glass warehouse for a trifle. I do not think it is possible to cut it by any other means. 1¼ in. rough plate can be cut in this way.

ANTS IN HOUSES.—The *Scientific American* says, in reply to a question as to getting rid of ants in houses:—Mix a teaspoonful of crystal of carbolic acid with an ounce of lavender water or any perfume, and sprinkle well on your shelves, and the ants will undoubtedly "skedaddle." An occasional sprinkle will keep you free from the pests. The perfume is not necessary, but is used to cover the unpleasant smell of the acid.

LEGAL INTELLIGENCE.

COURT OF BANKRUPTCY, DEC. 30.—(Before Mr. Registrar ROCHE, as Chief Judge.)—**Re J. H. P. COLSON.** The debtor, described as of Lyndhurst-grove, Camberwell, late of Gracechurch-street, surveyor and land agent, has petitioned under the liquidation clauses of the Act, with debts amounting to about £9,000, and assets, consisting principally of furniture, estimated at £100. Upon the application of Mr. Russell (Russell, Son, and Scott), the Registrar appointed a receiver of the estate, and granted an interim injunction restraining further proceedings upon a judgment of £246. 12s., recovered by the British Mutual Investment Company.

THE RAILWAY ARCH NUISANCE.—Last week, Mr. Partridge heard at the Southwark Police Court a complaint, preferred by the sanitary inspector of the parish of St. Saviour's, respecting the constant dripping of water from some of the arches of the South Eastern Railway Company, which had become an intolerable public nuisance. Mr. Shaw, the secretary of the railway company, attributed the inconvenience to the continued wet weather. The magistrate, expressing some doubt whether the matter came legitimately within the Nuisances Removal Act, adjourned the summons for a month.

COURT OF BANKRUPTCY.—LIQUIDATION CASES.—Among the petitions filed under the liquidation clauses of the Bankruptcy Act of 1869, for the week ending December 28, are the following:—**Re Joseph Read,** builder, Ealing, Middlesex. A first meeting of creditors for the election of a chairman, proof of debts by creditors, receiving a statement of the debtor's affairs, and, if necessary, appointing a receiver or trustee of the estate, and deciding whether the same shall be wound up under liquidation or bankruptcy, will be held at 33, Poultry. The proceedings are filed in the County Court of Brentwood.—**Re Silas Blackmore and George Morley,** builders and contractors, Haggerstone-road. First meeting of the creditors for similar objects at 7, Walbrook, E.C., January 7, at 2 o'clock.—**Re John Edward Dyne,** builder, Canning-road, Highbury-vale. First meeting of creditors at Sanderson's Hotel, Bevois-court, 28A, Basinghall-street. Solicitor for the debtor, Mr. H. Spencer, 155, Queen's-road, Dalston.

CHIPS.

The directors of the Great Northern Railway have appointed the eminent engineer Mr. John Fowler to succeed the late Mr. Joseph Cubitt as consulting engineer of the Great Northern system. The late Sir Joseph Cubitt was the first consulting engineer of the Great Northern, and the decease of his son and successor, Mr. Joseph Cubitt, having left the office vacant, the directors offered the appointment to Mr. Fowler, who has accepted it.

At the next meeting of the Society of Biblical Archaeology, when Mr. Gladstone is to be balloted for as a member, a paper will be read by Professor Donaldson "On the Tomb of Joseph at Shechem."

Messrs. Alexander and Henman, architects, of Stockton and Middlesborough, have been appointed to carry out the building of the Stockton Exchange.

Mr. Sidney Smirke has completed the additional story to Burlington House, which is to contain the diploma pictures, the Gibson sculpture, the library, etc. The buildings for the learned societies, on the same site, fronting Piccadilly, are rapidly approaching completion.

It is proposed to light Limehouse Church-clock (the dials of which are the largest in London except those of the great clock at the Houses of Parliament) by gas at night, at a cost of £800.

A fine series of drawings by W. Müller, comprising Lycian and Egyptian as well as English subjects, is on view at the Burlington Fine Arts Club. It will be succeeded early this month by the collection of works by the late George Mason.

The next term of the Working Men's College, Great Ormond Street, commences on Monday next, when the Dean of Westminster has promised to deliver the introductory address to the students.

A new peal of ten bells, founded by Messrs. Taylor, of Loughborough, has just been presented by Mr. R. H. Prance to the new church of St. Stephen's, Hampstead.

A wealthy Mahomedan, Khajee Abdool Gunny, has given £10,000, and his son £5,000, to carry a supply of pure water into the city of Dacca.

At a meeting of the Southport Town Council on Monday evening, the tender of Messrs. Heyward Brothers, of that town, to complete the erection of Cambridge Hall for the sum of £10,000, was accepted. The money expended over laying the foundations and other extras will thus raise the total cost to £11,942. 12s. 2d.

In 1876 an international exhibition is to be held at Philadelphia, in commemoration of the hundredth year of the independence of the United States.

One of the largest church organs in Ireland has been completed, at a cost of £1,000, in the parish church of Hollywood. The instrument is by Messrs. Forster and Andrews, of Hull.

Mr. T. O. Barlow has succeeded the late Mr. Lane as teacher of etching to the schools of the Art Department, South Kensington.

Trade News.

TENDERS.

HARTLEBURY COMMON, WORCESTERSHIRE.—For the erection of a residence at Hartlebury-common, Worcestershire. Bidlake and Fleeming, architect, Wolverhampton.

Nelson	£2550
Thompson	2325
Wood (accepted)	2297

HITCHEN.—For erection of house and premises at Hitchen, as per plans and specification prepared by Mr. Shilcock, of that town:—

Warren	£1290 0 0
Jeeves	1234 0 0
Butterfield	1150 0 0
Stapleton (accepted)	1080 0 0

MALVERN.—For the enlargement of the Church of the Holy Trinity at North Malvern:—

Mr. Geo. Warner	£840 0 0
Messrs. Wood and Sons	810 0 0
Mr. J. Davis	767 0 0
Mr. W. Porter	740 0 0
Mr. J. Everall	738 0 0

ROSENBERG, BECKENHAM.—For boundary wall and gates.—Mr. Wm. C. Banks, architect.

Grubb	£95 15 0
Cooper	88 0 0
Payne and Balding	87 0 0

BEDFORD.—For erecting villa residence for Thos. U. Turnley Esq., S. Cuthbert's, Bedford. Mr. John Usher architect. Quantities supplied.

Cunvin	£1255
Freshwater (accepted)	1238

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—ROYAL INSTITUTE OF BRITISH ARCHITECTS.—"On Arbitrations." By Mr. Banister Fletcher, Associate. 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—Paper by Professor Kerr. 7.30 p.m.

Ashton & Green, Slate, Iron, and Marble Merchants, and Quarry Agents, keep the largest and best selected stock of BANGOR, PORTMADOC, and GREEN ROOFING SLATES, Slate Slabs, and every description of Slate Goods, Marble and Enamelled, Slate Chimney-pieces, Stave Ranges, Rain-water Goods and General Castings. A & G's SPECIAL RED TILES prepared to use with the celebrated WHITLAND ABBEY GREEN SLATES. Drawings and Prices upon application.—Offices and Show-rooms, 14 and 15, Bury-street, S. Mary Axe, London, E.C. Agents for London and Country for Sale of Whitland Abbey Green Slates.

COMPETITIONS OPEN.

CARLISLE PUBLIC HALL COMPANY, January 15, 1873.—For plans for the proposed building.—Mr. C. Vynne, Hon. Sec. 1, English-street, Carlisle.

THE CARLISLE DIOCESAN CHURCH EXTENSION SOCIETY, January 31, 1873.—For plans for a mountain chapel, suitable for 100 persons. Two prizes of twenty and fifteen guineas for the best designs. This competition is open to architects residing in Cumberland, Westmoreland, and Lancashire only.—Rev. Canon Shipman, Vicarage, Aspatria, Cumberland; and Rev. Canon Stock, Rectory, Windermere.

CHESTER UNION, February 1, 1873.—For designs and estimates for a new workhouse to accommodate 600 male and female inmates, with the requisite offices, &c. Premium of £100 for the best, and £50 for the second best design.—Mr. William Keartland, Clerk to the Guardians, Chester.

THE CONFERENCE COMMITTEE ON COMPETITIONS will be glad to receive, from provincial architects, the earliest possible notice of proposed competitions, in order that the committee may, in sufficient time, transmit to the promoters of such competitions, for their guidance, copies of the regulations passed at the General Conference of 1872. Communications to be addressed to the Secretary of the Committee on Competitions, 9, Conduit-street, Hanover-square, W.

THE FROME DISTRICT AGRICULTURAL SOCIETY.—Feb. 20.—For adapting a field near Frome for the purposes of a Cheese, Corn, and Cattle Market, and for the erection of suitable buildings. Premiums of £20 and £5 for first and second best designs.—Messrs. Crutwell and Daniell, Solicitors, Frome.

THE NORTHAMPTON SCHOOL BOARD, January 27, 1873.—For designs for two new schools, with class-rooms and out-offices. One of the schools is to be built in Spring-lane, and is to accommodate 650 children; the other in Vernon-terrace, and is to accommodate 600 children. The architect whose design shall be selected will be appointed to superintend the erection of the buildings.—Mr. J. B. Hensman, Solicitor, Northampton; Offices of the Board, 6, St. Giles-street.

VIENNA, December 31.—For designs for a monument to the memory of the late Vice-Admiral Tegethoff. Prizes of £300, £200, and £100 to be awarded to the three best designs.—The Committee of the Tegethoff Monument, Vienna.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY, January 31, 1873.—For Dowston's pumps and water-closets.—Mr. F. W. Bowsell, Superintendent of Contracts, Admiralty, Whitehall, S.W.

BRITISH COLUMBIA, January 15, 1873.—For the construction of the Esquimalt Graving Dock.—Mr. G. U. Walkem, Chief Commissioner, Land and Works, Victoria, British Columbia.

CALVERLEY LOCAL BOARD, January 4, 1873.—For sewerage, levelling, channelling, and flagging a street near Clovergrave's Mill.—Mr. Thornton, Clerk to the Board, Calverley.

CATEHAM, January 9, 1873.—For the erection of additional blocks of buildings at the Asylum for Imbeciles.—Messrs. Giles & Gough, Architects, 28, Craven-street, Charing-cross.

CONGLETON, Jan. 21.—For the erection of a new Congregational church and school. Mr. W. Sugden, architect, Leek.

DULWICH.—For the erection of two-pairs of semi-detached villas.—Mr. T. Clarke, 157, Cheapside, S.E.

GRAVESEND, January 6, 1873.—For the purchase of dust, ashes, &c.—Mr. E. A. Miller, Clerk to the Improvement Commissioners, Gravesend.

GREAT WALTHAM (Essex), January 6.—For the erection of schools and residence at North End.—Mr. F. Whitmore, Architect, Duke Street, Chelmsford.

GLENMUCK, Feb. 1.—For the construction of 3000 to 4,000 yards of sunk fencing.—Mr. Milne Forrester, Glenmuick.

HALIFAX, Jan. 20.—For the erection of a villa residence.—Mr. John Hogg, architect, Hall End, Halifax.

SOWERBY BRIDGE, January 6.—For sewerage, levelling paving, flagging, and channelling Broad Street and Foun dry Street.—Mr. C. Barstow, Clerk to the Local Board, Sowerby Bridge.

ISLINGTON, January 7, 1873.—For the erection of seven houses in Riverdale Road, Highbury Vale.—Messrs. Baker and Blaker, 3, Cloak Lane, City.

TREES ESTATE, MANNINGHAM, January 13.—For the erection of ten semi-detached villas.—Messrs. Hope and Jardine, Exchange Buildings, Bradford.

HUNSLT, LEEDS, January 13.—For the erection of a Primitive Methodist Chapel (to seat 900), Schools, and two Dwelling Houses. Messrs. Kirk and Son, Architects, Dewsbury.

LONG SUTTON SCHOOL BOARD, Jan. 28.—For the erection of new school room.—J. Wright, Clerk to the Board.

MANNINGHAM, NEAR BRADFORD, December 6.—For the erection of a Primitive Methodist School and Lecture Room.—Messrs. Kirk and Son, Architects, Dewsbury.

MERTHYR TYDFIL SCHOOL BOARD, Jan. 16.—For the erection of school buildings and master's house.—C. Taylor, architect, Court-street, Merthyr.

FULNECK, NEAR LEEDS, January 7.—For the erection of a new Moravian Sunday School. Messrs. C. S. and A. J. Nelson, Architects, Albert Chambers, Park Row, Leeds.

WEST ROYD, STANNINGLEY, January 14.—For the erection of a Lodge and Boundary Walls.—Messrs. C. S. and A. J. Nelson, Architects, Albert Chambers, Park Row Leeds.

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Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tuford-street, Westminster.

BANKRUPTS.

TO SURRENDER IN LONDON.

Clamp, Thomas, Rossmore-road, East Dulwich, builder Jan. 21, at 11.

Pearce, James Thomas, Francis-road, Bermondsey, builder, Jan. 10, at 1.

SITTINGS FOR PUBLIC EXAMINATION.

Jan. 21, T. Tyers, Richmond-road, West Brompton, builder.

SCOTCH SEQUESTERATIONS.

Alexander Fraser, Glasgow, builder, Jan. 11, at 11.

PARTNERSHIPS DISSOLVED.

Slack and Grayson, Sheffield, joiners.—Fawcett, Preston, and Co., Liverpool, engineers.—Owensworth and Tapperton, Hull, stonemasons.

"REMARKABLE, VERY REMARKABLE INDEED" are the effects of LAMPOUGH'S PYRETIC SALINE in Preventing and curing Smallpox, Fevers, and Skin Diseases. Specially refreshing and invigorating during hot weather. Sold by all Chemists, and the Maker, 113, Holborn-hill, London.—[ADVT.]

THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 10, 1873.

THE PRINCIPAL COMPETITIVE DESIGNS FOR THE PROPOSED NEW CATHEDRAL AT EDINBURGH.

NOW that the heat of contest is over, it is well to take stock of the results of this memorable competition, which will not soon be forgotten. We can already ignore the transparent disguise of euphonious mottoes, and speak of the handiwork of these several gentlemen who engaged in it without hesitation. Hereafter Edinburgh Cathedral will be able to speak for itself and its distinguished architect as it will rise from his drawings revised and improved, as, without doubt, they will be.* For the present, however, we can but judge of the successful design as it was sent in with the rest, according to the terms laid down, and criticise it with due consideration of the manner in which it conformed to the rules. The first point which naturally engages our attention is how far the competitors, studiously selected in equal numbers to represent the English and Scotch nationalities, acquitted themselves in that capacity. It might appear invidious to take this view of the matter, but it was so ordained on the other, and not this side of the Border, and by the tribunal who were to retain the judgment in their own hands. Out of the building designs sent by invitation, three were supposed to be of English and three of Scotch origin, and of these, four stood out so prominently as to have rendered choice among them a matter of some difficulty, each and all presenting general characteristics and special features which would in some degree justify favouritism and partiality, if there should be disposition to indulge in such. Of these four, three were avowedly English, and one only Scotch, the other two being, though creditable to their authors, so far inferior that they may now be dismissed from further consideration. We feel however, in the interest of truth, bound to claim no small portion of the merit due to the design which was sent in by Mr. Ross, to help obtained in this metropolis, and therefore, as far as the schools of thought from which this architectural work was derived, English architects have again proved their pre-eminence.

It is true that the eminent authors of the three English designs may fairly claim to be the masters in each case of the particular school of which their drawings are so representative, and the fourth design referred to may also be classed under the same head as one of them. As far as regards the justice of the choice made by the Trustees, about which there has been some recent questioning, we are disposed to think that though there may remain differences of opinion as to the wisdom of the judgment arrived at, there are but slender grounds for gravely disputing it. As we have said, all four of the principal designers are very able, and it was only to be desired that there were four prizes instead of one to bestow. None of the competitors can be said to have seriously outstepped the limits of the terms imposed, whether as to cost or otherwise. Two—Mr. Steel and Mr. Burges—kept well within the mark. Mr. Ross, perhaps, with his three towers and spires, must have been beyond it; but it might be argued, as it was in the similar circumstances of the competition for Cork Cathedral, that these features were not necessary, and might be postponed for a future date, and Sir G. G. Scott's design certainly does not seem to be conceived in a much more costly spirit than either of the rest. From what we have been

able to gather, it was his fortuitous choice of a central tower and spire, as the predominant feature of his design, which led to its adoption. Sir G. G. Scott is wise in his generation: he knows that the uninitiated like central towers and spires, and never trouble themselves to examine whether they tend to cumbrous internal arrangements or not. Subtler questions as to style, originality, and so forth, are beyond their ken, and the reputation of the competitors themselves and, doubtless, Mr. Christian's advice were, to such a body, sufficient guarantees that in points of construction and convenience each and all might be trusted to build what would prove substantial and suitable. The problem which had to be solved was a very difficult and complicated one: to produce a cathedral, with its distinctive character and features, and appropriate appurtenances for a very limited sum, and to combine therewith the somewhat parochial treatment of the arrangements needed for the special ritual of the community for whose use it was intended. Together with these requirements, had to be kept in view the adaptation to a somewhat peculiar site, with an approach from the main thoroughfare which is in an oblique line to it, so that the principal towers and spires must necessarily be viewed from it full on their angle, which is always the least favourable point. In taking the four principal designs, as we propose to do, seriatim, we must perforce commence with that to which fortune has awarded the prize.

Sir G. G. Scott's style is so well known that most of our readers will be able to form a tolerable conception of it when we allege that his design for this Edinburgh Cathedral is one highly characteristic and fully worthy of him. It is scholarly, rhythmical, harmonious, but neither striking nor original; the detail and features are founded upon first-class Early Gothic precedents, among which English abbeys and Glasgow Cathedral have evidently been put under contribution, and only the tower and spire betray attention to a type foreign to these islands, and they have decidedly a French aspect, reminding us of nearly similar features at the Church of S. Albin, Angers. The plan, it must be confessed, is an indifferent one, and does not seem at all to grasp the Cathedral type. In it alone, of the four designs under review, is there no ambulatory carried continuously round the eastern end, and the easternmost bays of the aisles are utilised for minor purposes, as vestries, &c., in a manner somewhat undignified; and the piers requisite to support such a central tower as they have to bear must prove cumbrous obstructions in a building which is to be utilised as a parochial church, and not for such processional worship as that of olden days, for which our former cathedrals were built. A nave of five bays, and a chancel of four, with a square end, have roofs of equal height and considerable dignity, while between them rises the feature of the tower and spire which has captivated the good folk of Edinburgh, who have not even troubled themselves how any one is to get into it, or what use it is to be put to. We are rather of opinion that Sir G. G. Scott has not troubled himself much upon these points either; but if proper access has been forgotten in the hurry of competition, we doubt not that this is an oversight which can be amended. But the fact remains that the design bespeaks itself as one thought out more from the outside than from within. Of the tower and spire in themselves externally, as old French friends, we certainly are bound to speak well, though they are unquestionably too large for the building to which they are here applied, and tend to crush the rest of the design. They look as if they could hold a good peal of bells; and as to the manner in which the ringers are to get at them—why, that is their look out! The tower rises stately, with plenty of plain space high above the roofs, and then breaks into an octagonal belfry stage with a good

two-light window on each face, and a pinnacle on each angle, not rising higher than the parapet. These pinnacles, by-the-bye, block up the alternate windows, so that inevitably it will be questioned why there should be windows there at all? The reason is, however, plain, and it is this: the idea is from such lanterns as that of Coutances' Cathedral, which has both pinnacles and windows; and rightly so. Why, then, should we cavil at them here? Because at Coutances the lantern again was designed with the idea of the interior paramount; the continuity of the range of windows thence could not be broken, and light could enter them from behind the pinnacles; but it is obvious that this belfry-stage is no lantern, and the angle windows are needless; let them, then, be dispensed with. The tower will then become almost the same as that of the desecrated church at Angers, we have named, and which is about to be copied still more literally at Kensington and Plaistow by Mr. Brooks. The principal difference in this case will be that the belfry windows are two light traceried ones, instead of single lancets, and that the spire is considerably elongated. The fenestration of the rest of this building, as seen in the side elevation, is satisfactory. The clerestory of the nave is a series of two-light windows, with a quatrefoil in the heads of each—two windows to each bay. The aisle below has one simple couplet of lancets to each bay. The chancel has triplets of lancets, the central light rising higher than the side ones, and its aisle a single lancet to each compartment. The transept end has a fine arrangement of three lancet windows divided by buttresses, which, however, seem rather thrust down too much. It is surmounted by a large rose window in the gable. All these seem generally satisfactory in proportion, and yet have no great amount of character; but the side is sadly marred by intrusive flying buttresses, rising from the points of junction of the aforesaid aisles with those of the transepts, and which abut against the central tower. These, as useless and extravagances, should be omitted; the only purpose we can conceive them applied to would be for approaches for the bell-ringers, if made hollow for the purpose. The west end, with a large, traceried window, is not equal to the rest of the composition. It is fortunate that this will be wholly revised, as the addition resolved upon of western towers will need an entirely different character of façade. The Chapter House proposed by Sir Gilbert Scott is a polygonal one of a simple but good treatment, which reminds us of that at Margam abbey, though, of course, on a far smaller scale.

Mr. Street's design is thoroughly characteristic of him, and founded upon our own native style. It is, in general conception, the most original, and in point of plan and arrangement, the most suitable. We have heard it stated by a very competent authority that it was precisely that for which the site seemed fitted, and that it accorded most exactly to the particulars laid down in the testator's will; but then those particulars had been modified by the Trustees in the directions given to the competitors. On the other hand, probably in consequence of over-anxiety to keep within the limit of the sum named, and which we have said Mr. Street evidently managed to have done, the entire scheme falls short of the appropriate character and dignity of a cathedral type. The Church is more a first-class parochial one with a single western tower, a wide nave of six bays—the easternmost of which is inclined towards the narrower chancel, as in the Church at Oxford by the same architect; a fine southern porch is advanced beyond the westernmost bay of the south aisle to the nave. There is a transept with a central low lantern tower, as to a Cistercian abbey, which is not attractively treated outside, and we think that this fact tended seriously to the non-acceptance of this admirable design. It has no parapet, nor even any projecting cornice to speak of, and the junction of the tower with

* Already it has been determined to render it more complete by the addition of western towers, at a further cost of £10,000.

the stunted spire is consequently poor and abrupt. The chancel is of four bays, with rectangular end, but the easternmost bay is appropriated as passage or retro-choir behind the advanced reredos, and thus a conspicuous fault in Sir G. G. Scott's plan is avoided. The church has evidently been rightly designed with a primary view to internal effect and accommodation, the latter of which is perfect. A cloister on the north side is a useful and picturesque additional feature in Mr. Street's plan, and gives access to a rectangular synod hall, serving as chapter house; a half-octagonal baptistry on the north side opposite the porch is a good feature. The clerestory of the nave is peculiar, and far from pleasing. It resembles that of the Church of Notre Dame at Dijon in being a continuous range of triplets of lancet openings set so close as almost to form one arcade. The clerestory of the chancel is far better. The western tower and spire, though able, are hardly quite satisfactory, from the main pinnacles appearing as if they had slipped downwards, and wanted lifting. Altogether the exterior lacks somewhat of beauty, as well as being intentionally severe, and is not equal in merit to the interior. Nevertheless, had the prize fallen to this design, the result would, in our opinion, have been more consistent with the views of the profession, who are not so likely to be led by appearances as the good folk of Edinburgh. The illustrations of Mr. Street's fine drawings which, by his courtesy, we are enabled to present to our subscribers with the present number of our journal, cannot fail to be highly appreciated and deeply studied. We hope, on future occasions, to be able to do equal justice to the drawings of the other three able designs above described.

THE WORKMAN'S SHARE IN ARCHITECTURE.—III.*

WHAT IT MIGHT BE.

IN approaching this third and final division of our subject, we do not forget that we are turning from matters of fact to matters of theory and speculation. "We know what we are, but know not what we may be," and while we may readily ascertain what is the workman's share in the architecture of to-day, and make sure, within moderate limits, what must have been his share in the architecture of the past, matters are different when we try to estimate his position in the architecture of the future. We have no ready-made theory, neat and complete, such as those by which popular magazine-writers penetrate the mysteries alike of ages gone by and ages to come: we can only make a few guesses and suggest a few experiments.

Every one is agreed that in the great architectural works of the Middle Ages individual workmen designed for themselves far more than they are in the habit of doing now. Even then, *every* workman did not and could not have designed for himself—for the power of original design is comparatively rare—and for one man who possesses it in any marked degree, there are twenty in whom it is practically wanting. Still, further, the workmen who could design had necessarily to do so within rigid limits. Their first and most important duty was to take their part in the general scheme: to carry out the ruling idea of the master mason: to build, not the bits of architecture that they might individually chance to have a fancy for, but those sections of the cathedral or abbey or town-hall which fell to their lot. This cathedral or abbey or town-hall, in its plan and arrangement, its grouping and general composition, was designed, just as such a thing would be now, by an architect; and so far the workmen carried out, just as workmen still do, the design which the architect had decided on. Up to this point, the principal difference between modern and Mediaeval practice was, that in the latter the architect passed his time at his

buildings instead of at his office—an important difference, which deserves all possible consideration, but which may be better considered apart from our present subject. As far, however, as the workman was concerned, he had no more to do with general design in the Middle Ages—at least, in first-class work—than he has now. The first requisite of general design is unity, and the only way of gaining unity is to have one composer. When, however, we come to minor details, the case is different. In filling up the grand outline supplied by the chief designers, there is room for the thoughts of numberless minds, provided only that these thoughts are such, and so expressed, as to harmonise with the great thought which must dominate over them all. To supply all the minutiae of a single building, if it be a large one, is almost enough to drain one man's imagination dry: to supply them all in as many large buildings as some architects now are concerned with every year, is more than the greatest genius could be expected to accomplish; and hence it is, for the most part, that modern works, as compared with ancient ones, are deficient in interest, life, and variety. Still, further, when we come to purely decorative details—such as sculpture or painting—or even to carved or coloured ornament, experience shows that they cannot be satisfactorily produced at second-hand. A wall may be built, or an arch-moulding worked, or a window-tracery put together from drawings, and quite successfully; for all these things, being done by rule and compasses, can be copied accurately by the use of those instruments. But a sketch, even of the simplest leaf ornament, cannot be copied accurately by any mechanical aids: it cannot be made the best of by any one who has not a clear conception of it in his own mind, who has not seen it in his own imagination, and who does not know where every curve and dimple must be placed to produce the effect he aims at. If the architect sees all this in making his drawing, he cannot communicate his own internal vision to the carvers. All he can do is to put a faint reflection of it on paper, of which the carver transfers a still fainter reflection to stone; and so it comes to pass that in decorative matters especially this civilised age finds itself beaten—not merely by the Gothic periods, but even by the half-barbarous Pre-Gothic and Post-Classic ones.

The general conclusion, then, is that we want decorative workmen who can design their own details; painters and carvers, particularly, who can invent for themselves. The first difficulty that occurs is this: it is absolutely indispensable that they should design in the style of the building they are employed on, or they will be doing it far more harm than good: but there are a dozen styles or varieties of style now practised, and it will take a man's whole life properly to master one. The only course we can see is for each decorative workman to choose his style and stick to it, and work only for those who practise it. Such workmen some of our leading architects have been fortunate enough to find, or wise enough to train, but, unhappily, they still are rare. The decorative Jack-of-all-trades goes the round of our offices, and boasts himself equally at home in Greek, Gothic, or Renaissance. His unhappy employers find the boast is not unreasonable, and the impartial feebleness with which he works for them all makes it hard to discover whether he has a preference for any. It is not to this soulless creature of circumstances that we must look to put new life and spirit into our buildings: we want men with a will and a way of their own, who will choose their own course and persevere in it. Even as a matter of money and employment, we are sure that the decided line would prove the safer one—at least for any one who had not quite mistaken his vocation. The way to rise to eminence is to follow one's own perceptions of what is best—one's own consciousness of what is practicable; not to run nervously here and

there and everywhere, vainly trying to please all the world. Really to understand one style, however, would take a great deal more time and study than to pick up a smattering of half-a-dozen styles; while really to design in it—instead of repeating, as most carvers now repeat, a few stock patterns by the mile, would take a great deal of thought and experiment and observation beside. The carver, for instance, who should aspire to do for 19th century architecture what his predecessors did for the 13th, would find it necessary to gain all the insight he could into their manner of working—and at least as much insight as they had into the manner in which Nature works. All this would require much time and much labour, though labour of a sort that no man with enthusiasm and ability would shrink from; but still it must and ought ultimately to be recompensed. We should get a higher class of work than now, and should be willing, it is to be hoped, to pay a higher price for it. Mr. Ruskin somewhere says that if he were Chancellor of the Exchequer he would, in the interest of painters, put a tax of a guinea on every cake of colours. In the interest of architects he might, at the same time, put a similar tax on every foot of foliated cornice, and on every carved boss and capital. Anything would be welcome that would lessen the general efflorescence of ornament which disfigures so many new buildings, and, doubly welcome, if it would elevate the character of the little ornament that might remain. The more thorough training of our decorative artists might be expected to do both at once. Carving would cost more, and would be used more sparingly: but what was left would be so improved in character that the loss would be a wonderful gain. Carvers, instead of trying to mangle the greatest possible quantity of freestone in the shortest time, would endeavour to excel each other in the freshness and thoroughness of their work, and would find, in reputation and remuneration alike, that half is sometimes more than the whole. We are persuaded that the question of pay has much to do with the difficulty of obtaining really artistic workmen. The first desideratum of course is to pick out men of talent and capacity—rare everywhere, but discoverable, doubtless, in one grade of society as much as in another. The next thing is to give them, or to help them to give themselves, a thorough and efficient training; and it is here that their want of means makes itself felt. It is not in their power to give up the years that are necessary for their art-education: they must live, and their only way to live is to do such work as they can get, however immature their powers, and however imperfect their education. Something in the nature of a scholarship, or a travelling studentship, tenable for three or four years, might do much to develop the growth of abilities which are now stunted by untoward circumstances. The Royal Academy is perhaps not yet sufficiently Gothified to admit that the workman has any share in architecture at all, or it could easily add such a studentship to its existing ones: but there are other public bodies from whom more is to be expected, and we should gladly hear that any of them had taken the matter into serious consideration.

NOTES ON STONEWORK.—II.

GRANITE.

TO follow the subject of the workable stone beds from the point at which we left it, viz., at the bottom of the Wealden formation, and following the same order as before, the first beds of the Great Oolitic formation are those of Portland. It is indeed the first great workable freestone that we arrive at in geological order downwards. Those hitherto mentioned, viz., the Suffolk crag, and the calcareous sandstones known as the Kentish rag, although worked to a considerable extent, especially the latter, in the neighbourhood of Maidstone, Godstone, and other places in

* See the BUILDING NEWS of November 1st and November 22nd, 1872.

Kent, are not great formations like some of those we shall have to mention. There is workable stone found in the Hastings sand, in the lower part of the Wealden formation, that we have not yet mentioned—the Tunbridge Wells sandstone, quarried at Calverley, near Tunbridge Wells. It is fine-grained, with a slightly calcareous cement, and of a variegated brown colour. It weighs about 118lbs. to the cubic foot. There are three beds, the upper one being about 2ft. thick, the middle one about 3ft., and the lower quite a thin bed.

The Sussex and the Purbeck beds are more of the character of marble, so that really the first great stone formation we come to is that of Portland. It is an oolitic limestone, and has peculiar properties; but before going into particulars of the qualities of the Portland beds, it may be better to take a rapid and general view of the whole series of oolitic strata of which they form the uppermost member. They are divided from those below by the Kimmeridge clay. Under this is the Coralline oolite, but its range is not extensive, and where it does occur it does not afford a good building-stone.

Below the Coralline oolite lies the Great or Bath oolite, separated from it by the Oxford clay. These strata furnish the Bath stone, so much used in architectural work (perhaps more so formerly than now, owing to the negligence of quarrymen in sending out bad stone along with the good). Below the great Bath oolite is the Inferior oolite, separated from the beds above by the Stonesfield slate and beds of clay. Under the whole Oolitic formation are the lias beds, which furnish the excellent lime for hydraulic works; but as they do not furnish a good building-stone, we may pass them by and proceed to the next formation—the Triassic, or new red sandstone, which, on the continent of Europe, consists of three distinct beds, the upper (Keuper), the middle (Muschelkalk), and lower (Bunter) sandstone; but in England the middle member is not formed, and the Keuper and the Bunter formations join, and it is not easy in some parts of the formation to distinguish where the one begins and the other ends.

The next in order is the Permian, or magnesian limestone. In England it is sufficiently distinctive of this formation to call it the Magnesian Limestone; but inasmuch as it is largely developed in the district of Perm, in Russia, and inasmuch as its constituent particles vary in various places, it is thought better to give it the name of the place where it is the more fully developed. It furnishes excellent building-stone, to be more particularly referred to hereafter. Below these beds are those of the great Carboniferous system (*L. carbo*, coal, and *L. ferro*, I bear), first of which are the upper or true coal measures, then the millstone grit, and under these the carboniferous or mountain limestone, which rests upon strata called the Lower coal-measures.

Below all these is the old red sandstone, or Devonian system, below which are the slate rocks called by Sir Roderick Murchison the Silurian system, because of their being largely developed in Wales, or rather that part of Wales inhabited by the ancient *Silures*. And now nothing separates all these sedimentary rocks from the original igneous rocks (such as granite) but those peculiarly-formed rocks called metamorphic, consisting of clay-slate, mica schist, quartz rock, and gneiss. Having arrived at what may be called the original foundation rock, we propose to return in geological order upwards, and make a few observations on those strata from which we derive useful stones, and to see then how they are worked and set.

We have preferred to pass thus rapidly through the strata composing what is sometimes called the crust of the earth, and to begin any particular description of stonework with granite, because it is probable that from this rock the formation of the sedimentary strata began. These, on being formed, gave or permitted life to vegetables and animals

which have themselves contributed largely to the formation of succeeding strata.

It is beyond our intention to speculate on the origin of this primary rock. We are content to take it as we find it, and to confine our wonder to those phenomena which we see have succeeded its formation, and there is enough in these to satisfy any ordinary mortal. It has been very truly said of the late Mr. Rankine, Professor of Civil Engineering in the University of Glasgow, that he was eminently a safe man, and that no pupil of his is at all likely to have to unlearn anything he ever learnt from him. The acquaintance of the present writer with the late Professor is only through his books. In so far as these go, and so far as he is acquainted with them, he fully agrees with that remark. There can hardly be a doubt that the safety of Mr. Rankine's teaching came of his modesty, which itself came of his earnest study of the mysteries of nature.

Granite, as we have said before, consists of an almost indestructible mineral called quartz; of felspar, which is very destructible as to its form; and of mica, which is easily shifted from place to place. It is easy for any one to satisfy himself of this. As to quartz, nearly all sand consists of it: it is one of the hardest minerals known, and the chemist calls it nearly a pure silica; felspar, he says, is composed of silica, alumina, and potash; and mica of silica, magnesia, potash, lime, and peroxide of iron.

Now, take the chemical characteristics of clay, and they are found to be chiefly silicate of alumina, but usually containing also silica, iron, and lime, with traces of manganese, potash, soda, magnesia, and carbon. If we consider the form in which granite occurs, we shall see that it is, like other rocks, exposed to the weathering and wasting effects of the atmosphere, and that the particles worn away are washed down by rains. In his "Advanced Textbook of Geology" Mr. Page says:—"Rocks of igneous origin present themselves in the crust of the earth either as disrupting, interstratified, or overlying masses. Thus when igneous matter forces its way through the stratified rocks, and fills up the rents and fissures, it is termed disrupting," as at A,

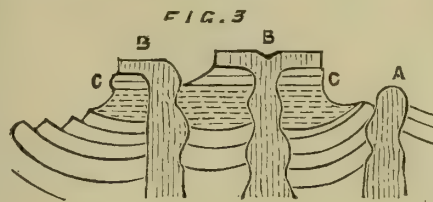


Fig. 3. When, having passed through the strata, it spreads over their surface in sheet-like masses, as at B B, it is then said to be overlying; and when these discharges have taken place at the bottom of the sea, and have been in turn covered over by new deposits of sediment, they then appear as interstratified with the true sedimentary rocks, as at C C. In true sedimentary rocks the component particles are all more or less water-worn and rounded; and true aqueous clays and muds are all more or less plastic; and seeing the similarity of the components of these to those of the original igneous rocks, we are warranted in supposing them to have been thence derived by actions of air and water similar to those now in force. There may have been a difference in the intensity of the actions, but in kind they were probably the same as they are now. What, then, are we to worship Pluto as the originator of all we see in the sedimentary rocks? No! He is powerful, but the most fallible and erratic of created beings; and, except the useful granites he has sent up to us, his chief work appears to have been to lay the foundation upon which other forces have acted and built. Granite has a crystalline granular texture, is highly silicated, the proportion of silica, varying from 65 to 81·7

per cent., according to Professor Hull. The different minerals of which it is formed may generally be distinguished by the eye, and are so arranged that the felspar and flakes of mica are imbedded in the free silica (quartz). From microscopic examination by Mr. Sorby and others, it has been ascertained that the quartz of granite contains minute cells, partially filled with water, and it has been inferred that during its formation steam was present, under great pressure and a high temperature. Mr. Hull points out that there are several variations in the composition of granite from the primary one of quartz, felspar, and mica. Sometimes it has a rich pink, or flesh-colour, as in the case of the porphyritic granites of Galway, Shap Fell in Cumberland, and Syene in Upper Egypt; but perhaps the most generally admired of the varieties of granite are those which, like the Peterhead stone, are of a rich pink colour, arising from the predominance of rose-coloured felspar. In foliated granite, or gneiss, the minerals are sometimes arranged in parallel layers or leaves. This structure is observable in the granite of Donegal and Galway. As to the geological age of granite, it is now known, says Mr. Hull, that it has been formed at several geological periods. Thus the granite of Cornwall and Devon is more recent than the Carboniferous period, and others more recent still. We suppose, however, that this means not that granite is not the oldest formation, but that eruptions of the same substance have occurred at various times, and some of them comparatively recent.

QUANTITIES.—II.

EXCAVATOR.

COMMENCE with the excavation of the surface, where necessary, as for basement or sunk storeys, taking the net dimensions of length, breadth, and depth. This is described as "Digging and throwing out." Where the excavation does not exceed 6ft. in depth, state, if wheeled above 20yds., how far, and if carted away, it is advisable also to state the distance; though this is seldom done, the cost varying according to the distance. Give the nature of the soil.

TRENCHES must be measured and kept separate from the general excavation, and described as "Digging to trenches, part filled-in and rammed," the filling-in and ramming taking place after the foundations are in. Some surveyors, however, make a separate item of these latter. Where there is no concrete, an allowance of 6in. on either side of the bottom course of footings is made to give the bricklayers room to work in; but where concrete is provided to be used in foundations, allow for only the width of the concrete.

Thus, where bottom of footing is three bricks, or 2ft. 3in. wide, and no concrete under, the width taken for excavation would be 3ft. 3in.

When the excavation is deep, and the soil loose, it will require to be strutted, to prevent the ground from falling in. This is measured at per yard run (see Table I.), giving the depth and width of the trench, and is described as "Strutting and planking to perpendicular excavation."

Where piling is used, you will have to state the number of the piles, with the length in feet and scantling of each. Then measure the quantity of planking required to be spiked to the fan of the piles. For the labour of driving, take the number, and state the distance each is driven into the ground; also number the riving, pointing, and shoeing, giving the weight of the ironwork.

In measuring clay puddling over vaults, arches, &c., take the length by the width, and describe the thickness.

In measuring trenches for drains, &c., state the average depth, and the size of the drain.

When you are taking wells and cesspools, you will have to state the depth and nature of soil, because as the depth becomes greater, the price per yard will proportionally increase.

Where the wells are steined, they are usually numbered, and described as "Digging and steining to well," including all gear, tackle, and other materials necessary for its execution, stating the depth and the mean diameter (that is, in clear of the steining), and the class of steining required, whether dry or otherwise.

Remember that curbs and after fittings, as pumps and apparatus, are to be taken in addition to the foregoing.

In measuring concrete foundations, the net dimensions are to be taken, and the description given of its composition and the method of throwing in, whether from a stage or otherwise, which will be found in the specification.

Concrete of a less thickness than 12in., or where under pavings, &c., is taken at per yard superficial (see Table I.), stating the thickness and description as before; but if under paving, it must be so stated, as there will be extra labour in levelling the whole surface to receive the paving.

Where it is filled-in over arches, it is measured at per yard cube, but it must be described as filling-in to spandrels of arches, as the case may be; and also state whether lifted above the ground and the height, as extra labour will be incurred thereby.

As stated last week, I now proceed to give, in tabular form, the mode of measuring the several items in this trade. To economise space as much as possible, I make each table answer two purposes, namely, it gives the order of taking the trade, and also the method of measurement. It will be found very useful as a reference, to see that all the items of the trade are taken, so that nothing may be omitted.

TABLE I.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement.

DESCRIPTION OF WORK.	HOW MEASURED.
Digging and throwing out	At per yard cube.
" wheeling and spreading	"
" and carting away	"
" to trenches part	"
" filled in and rammed	"
" to wells and cess-pools	"
Concrete in foundations	"
Clay puddling	At per yard super.
Concrete under 12in. thick	"
Trenches for drains	At per yard run.
Strutting and planking to sides of perpendicular excavation	"
Steining to wells	At per number.

ABSTRACTING.—In abstracting excavator's work, very little or no instruction is necessary, the number of items being so limited. Care must be taken to keep the different works separate; a column or two being allotted to each, according to the size and nature of the job.

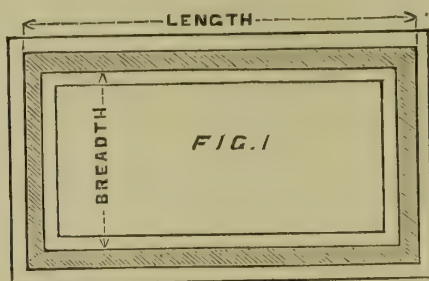
In **BILLING** always take the "cubes" first, secondly the "supers," thirdly the "runs," and lastly the "numbers."*

BRICKLAYER.

Brickwork is most usually valued at per rod of 272 superficial feet, and $1\frac{1}{2}$ brick or 13½in. thick, all work, of whatever thickness, being reduced to this standard. Should the work, however, be under this thickness, it must be kept separate from the general work, and described according to its nature; also where the joints have to be struck on both sides, as, for example, in boundary walls.

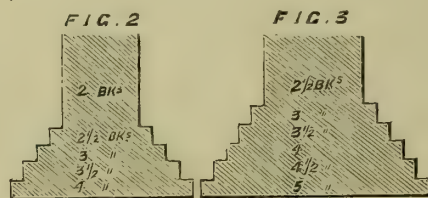
In measuring, take the length by the height, and describe the thickness. The several thicknesses are reduced to the standard in the abstract, as will be shown hereafter. Where the building is rectangular,

take the external face of two walls, and the internal face of the other two, for the length thus,—



Some surveyors keep these dimensions for the concrete, footings, and even digging, as in the latter cases the altered lengths, when added together, amount to the same thing, the average being the same.

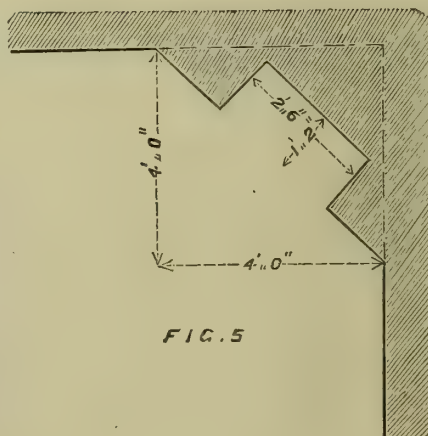
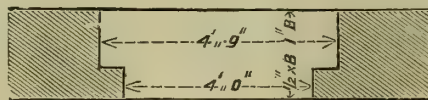
Commence with the foundations, taking from the base to the top for the height of the footings, and average them for the thickness. In the two following examples



the average would be respectively $3\frac{1}{4}$ bricks and $2\frac{1}{2}$ bricks. Taking the former, and supposing the wall to be 50ft. long, we should have

50-0	50-0	$3\frac{1}{4}$ Brick Footing.
1-0		

After the footings, take the walls up to under-side of ground floor joists, and so on, floor by floor, or as high as the wall continues of the same thickness, taking care to make the several additions and deductions as they occur.



A little care is necessary when making deductions. In deducting openings to windows or doors, two dimensions will be necessary, the

deduction for the $\frac{1}{2}$ brick being less than that for the 1 brick, thus, supposing the height to be 6ft. 0in.

6-0	24-0	$\frac{1}{2}$ B. ddt.	6-0
4-0			$4\frac{1}{2}$ upper reveal.
6-4½	30-2	1 B. ddt.	6-4½
4-9			

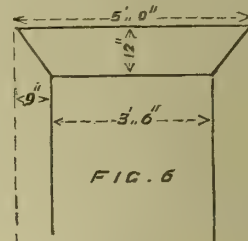
And in the case of windows, should there be any deduction for window brick, it will have to be taken in addition to the foregoing.

No deduction is made for window sills, or strings under 6in. in height—nor for any wood-work under that depth; and where wall plate are placed above the walls, 2in. is added to the wall, and charged as brick wall to pay for the cost of bedding. The same circles and semicircles are indicated as such in the dimension book, and the diameter figured inside: thus where the item is a cube, the depth or height is placed under: thus

5-0		
2-6		
10-0	19-7	cube brickwork to circular chimney.

Chimney-breasts and flues are measured similarly to the other work, taking first the footings, and so on, floor by floor, stating the thickness beyond the wall, and deducting only for the openings for fire-places, the flues being measured in, and afterwards numbered for "coring" and "pargetting."

It is also advisable at the time of measuring the chimney breasts to take the trimmers, which are measured and valued by the foot superficial, taking the length by the breadth, and described as "Half brick trimmer in cement," the centring being measured at the same time, and afterwards abstracted in the Carpenter. Take also the wrought-iron chimney bars to carry arch over opening at per foot run, according to specification, generally 18in. longer than the opening. This is after-



wards abstracted in the Smith's bill, and valued at per weight. Angle chimneys (fig. 5.) are measured as solid, and afterwards reduced to ordinary standard; thus, presuming the height to be 12ft., we should have

$\frac{1}{2}$ 12-0		
4-0		
4-0	96-0	Cube brickwork in angle breast
2-6	8-9	$1\frac{1}{2}$ brick ddt. opening.
3-6		

Ovens and coppers are measured as solid brickwork, deductions being made for the ash-holes.

Firebricks and lumps are charged as 'extra.'

When the brickwork is faced with a superior class brick to the general work, this is charged as "extra only" to the brickwork, and measured and valued at per foot superficial as "extra only" to picked stock facing, white Suffolk facing, or as the case may be, including pointing; and if the reveals to windows and doors be not plastered, they will have to be added and included in the facing; also add as much of the return walls as show the facing bricks. Make all the deductions as for ordinary brickwork, including the arches, which are charged separately.

Pointing is measured sometimes by the foot super. and sometimes by the yard, or square of

* The order in which the various articles are placed in the Table it is advisable to follow in respect to this Trade and all the trades that follow.

100 feet. The former, however, is the more ordinary way of measuring it, and we think the best, and have therefore so placed it in Table 2.

Cuttings are measured at per foot super, when over 6in. wide, under that, at per foot run. It will also be necessary to state the nature of the cutting, whether rough cutting as over relieving arches, and where not seen. State if fair cutting, cutting to skewbacks, &c. &c. Bird's mouth cuttings and cutting to squint quoins are measured at per foot run, and described according to the nature of the work, whether "rough" or "fair."

EDINBURGH.

(FROM OUR OWN CORRESPONDENT.)

IT is often said that the architecture of Edinburgh is not worthy of the picturesque advantages which nature has bestowed. The genius of architectural design ought to find encouragement, if anywhere, in Auld Reekie, the ancient capital of Scotland—and the modern Athens as the head-quarters of national culture. It must, I fear, be admitted, that the New Town (which by the way is growing old) presents but little picturesque variety; and its principal thoroughfare, where variety of shops is rampant, is the poorest specimen of our street architecture. Still, in respect of many of the streets of this portion of the city, Edinburgh is rather harshly judged. Very possibly the weather, or the sombre solitude of some of our finest Places or Terraces, or the state of the critic's digestion, may have done much to depreciate the influence of what is really chaste and elegant in our architecture. It is something to be able to say that we are mending our manners in this respect. A brief glance at the great additions to and alterations upon the architecture of the city will show that we are paying more attention to the artistic design of our architecture.

The extension of the city has been constant for some years. The demand for accommodation of every kind which still exists is owing to other causes than the growth of our commercial enterprise. Edinburgh, as a residence, has many advantages in which she is without a rival. These have been much augmented lately by the cheap educational system of the Merchant Company's Schools, and the facilities afforded for securing all the amenities of suburban dwellings. There is no more pleasing evidence of the general prosperity than the number of substantial houses erected by the building clubs of artisans. Many blocks of "flats" have been lately raised. Many lines of streets, on the double-cottage system (the latest having the luxury of oriel windows and plots of garden ground), may be seen in the outskirts of the town. Against this, however, we have to set the difficulties arising from fluctuating prices, and the prevalence of strikes, and the folly of the working classes in impoverishing their own resources when they might be making hay, according to the proverb; and the fact that the Excise returns for the past year indicate that the increasing profits of labour find their way, not only into the building clubs and savings banks, but also into that Paradise of Fools, the beer or whiskey shop.

The BUILDING NEWS has from time to time noticed the more important works in progress during the past year, and which, with many others, indicate a busy year to come. Of the general features of the architectural changes which are going on a brief notice may be interesting.

Our street architecture to the West, in the beauty of its material and perfection of its polished ashlar, will bear comparison with any. The stone is principally from Dalmeny, and is warmer in tone, more uniform in colour, and less crystalline in texture than the Craigleith. The style is much the same as that of its older neighbour, but not so massive in its elegance, even

where the houses are equally commodious. The open porch, pilasters, heavy entablatures, and eaves cornice balconies of the earlier style, have disappeared, and the oriel window may be said to be a characteristic feature. In many instances, this is repeated in every tenement, and where there is some breadth of frontage and moderate height of elevation the effect is not displeasing. In other instances (not in this quarter) where the frontage is narrow and the flats are many, the effect of this treatment is painfully monotonous—objectionable not merely on the ground of taste, but on other grounds as well. It is not desirable in every case to find yourself in such close perspective to neighbours on either side.

Another characteristic of much of the architecture recently completed or in progress is the extent to which the "Scotch" style is being adopted in other portions of the city. This is the style in which Mr. Bryce, R.A. has long been *facile princeps*, and for which he has done so much. The success with which it was carried out in Cockburn-street, by Messrs. Peddie and Kinnear, gave additional impulse to the movement in its favour. We have several examples of Mr. Bryce's treatment of the style in some buildings forming the new access to the High-street, and belonging to the Bank of Scotland. This block of lofty tenements presents a very picturesque and stately group from every point. The same style, but with characteristic features of variety in the details, has been selected for the new street in Forrest-road, designed by Mr. Hay. It may be seen also in many suburban villas and in isolated specimens in older streets. Sometimes (as in a block now building in Leith-walk) it is carried out in its integrity, and we find the old roll and chamfers of the Scotch archway superseding the painted iron lintel of the shop.

The same style has been selected for the newly-constructed street of the Improvement Trust. Some grumbles were heard at first at the extravagance of giving even this degree of ornamental character, to streets in the poorest parts of the city. But the ornamentation is by no means extravagant, and it is poor economy to grudge our fellow-citizens of this quarter the elevating influences of looking out upon a better architecture than they have been accustomed to.

Under this Trust, two streets have been constructed and two others are in course of progress. During the past year the foundations of Jeffrey-street, opposite the Post-office, have been laid on lofty arches of massive masonry. The new Trinity College Church forms a conspicuous object amid the *debris* (now well cleared away) after twenty years' conflict for existence and a site; for it has at last been built with a moiety of the sum extorted for that purpose from the railway. The barbarous treatment which this fine relic of our Scottish Gothic received, and the fierce disputes which arose over its remains, form a dark chapter of our civic history. There was no honourable plea for spoliation. The funds for hospital purposes would have remained as before, although the entire sum, £17,000, had been devoted to the purpose for which it was expressly asked and given. In the new church we have the results of a legal victory, of which, if corporate bodies had a conscience, the victors ought to be heartily ashamed as a piece of heartless desecration.

The new church is an attempt at a compromise, and open to criticism in the effort made to retain a mere rag or remnant of the original fabric; there is nothing in the new to recall the proportions of the old but a window and doorway in the front. The side lights are short lancets with equilateral arch heads, disposed so as to light the area and galleries of the interior. The junction of the old with the new is at the south end. It is not very happily accomplished, as the galleries will project beyond and invade the sanctity of the clustered piers on either side. The old work, which includes the oriel, will serve as a sub-

sidary chapel and vestry, and is of great value as a fair specimen of the character of the original.

With all these (perhaps unavoidable) defects, the architectural effect of the new edifice must not be judged of by present appearances; as when Jeffrey-street is finished, the front only will appear.

We are trying, however, to make amends for our errors in our treatment of Trinity College Church by our restoration of S. Giles, of which there will be more to say when the work is further on.

The Waverley Bridge will soon be opened for traffic, and promises to be more ornamental than anything yet done towards the completion of the station itself. A large portion of the shed is nearly completed. The roof bears no evidence of the study of either grace or economy in the construction. A much better specimen of the simple elegance often resulting from the economy of engineering skill will be found in the segmental roof of the new drill-hall in Forrest-road, designed by Mr. Bond.

The decision in favour of Sir G. Scott's design for the Cathedral here is raising a storm, and will doubtless add another conspicuous chapter to the history of the mismanagement which seems inseparable from competitions of any consequence. There was a flood of newspaper criticism on the designs when they were opened to the public, and there has been a plentiful crop of correspondence since. One disappointed partisan of Mr. Street pours out the vials of his wrath in the *Church Times* on the architecture of Edinburgh, its Presbyterian grocers and paper-makers, and the trustees generally as "men without the slightest taste or knowledge of the subject." In this sweeping censure, however, he includes the Lord Justice Clerk, the Bishop ("who has erred," he says, "*more episcoporum*"), and our late-lamented citizen Dean Ramsay. With their able assistance, and Mr. Christian's advice as to cost and architectural merit, we can hardly think that the trustees could go far astray.

The BUILDING NEWS reproduces a letter from a partisan of Mr. Ross, who complains that Sir G. Scott has been allowed to steal his Western Towers, and has got £10,000 to build them. This letter, however, was speedily disposed of by another revealing the circumstance that the design of Mr. Ross would cost nearly twice as much as that of Sir G. Scott.

And now the controversy has entered on another phase, and we have Mr. Street himself complaining in the *Courant* of injustice, and his un-Christian treatment by the judges. They have allowed (he says) another design which exceeded the allotted sum to supersede his own, which was within the mark; and they have refused to abide by the report of Mr. Christian, whose report he calls upon that gentleman to publish, as evidence of his having been entitled to walk the course.

I may say that the exhibition of the designs was a privilege which all architectural students would appreciate. The 'prentice hand was too apparent in all the Scotch designs, not excepting Mr. Ross, to leave a doubt as to the fact that Scotland would not carry off the prize. Of all the drawings, those by Mr. Street were unquestionably first in artistic execution and perfection of detail. No better examples of the perfection of architectural drawing ever hung on the walls of our Academy. The plan, too, was more full of interesting matter of study than any of the others, having been evidently designed to meet all the possible contingencies of the cathedral service. This circumstance alone made his design a favourite with many of the clergy and architectural students. But it is fair to add that the contraction of the last bays of the nave to meet the narrow dimensions of the tower greatly marred the beauty of his interior, and the exterior had nothing of ornamental character but the simple lines of its construction. If Mr. Street, by adhering to conditions as to cost, conscientiously re-

frained from giving this element of popularity to his design, he is not to blame; and we can only regret the more that whilst Sir Gilbert Scott has been allowed £10,000 for greater ornament, Mr. Street has not been suffered to leave his mark upon our architecture.

The design of Mr. Burges, simply on account of its not less perfect but more graceful architecture, was, I think, the best, if it had not exceeded the cost (as is alleged). The perspective of the interior was too highly coloured, and the confusion of varied tints made it appear less than it would otherwise have done. The slated spires, too, are an innovation in our northern latitudes, and the simple waggon-roof made many object to the design as wanting cathedral dignity, but it really defied the criticism of those who were in favour of any of its rivals.

A larger sum should have been set apart for the designs, and the resolution made to build in instalments, as our forefathers were wont to do. Had this been done, we should not have been perplexed by designs strong in some features of their excellence and weak in others—satisfactory, as far as practical uses were concerned, but barren of that efflorescent grace which a study even of our abbey churches here led us to expect in a cathedral. The trustees, however, deserved all sympathy, as having had a most difficult duty to perform; and, if they have erred, the citizens of Edinburgh can only hope that their decision may have a happier issue than some parties have anticipated.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary general meeting of this Institute on Monday evening last, Mr. John Gibson, Vice-President, occupied the chair. Mr. H. E. Kendall, of Dean-street, W., late a Fellow of the Institute, was elected by acclamation an Hon. Member; and the following gentlemen were ballotted for and duly elected, viz.:—Mr. F. R. N. Haswell, of North Shields, as Fellow; and Mr. S. Slingsby Stallwood, of Folkestone, as Associate. The Chairman said it was with very great regret that he had to announce the decease of three eminent members of the profession—viz., Mr. Banks, of the firm of Banks and Barry; Mr. Slater, of the firm of Slater and Carpenter; and Mr. R. Palmer Brown.

Professor KERR thought that a word ought to be uttered on this occasion in memory of the three gentlemen deceased. It was seldom that any society like that Institute had to notice the decease of three men of such sterling worth. Mr. Banks was known to every one as one of the most hard-working and practical man of eminence and distinction in the profession, and his loss would be regretted by all. Mr. Slater was highly distinguished as an architect, and he was universally esteemed as a man—not only by his clients, but by his fellow professionals, and by all with whom he came in contact. Mr. Palmer Brown was known as a gentleman of accomplishments and high position in his profession. All three were artists and men of business of the first rank, and the profession could ill afford to lose so many such men on one occasion. He was very sure that there was no gentleman present who would not wish to be understood as joining sincerely in an expression of regret at the decease of so many eminent members of the profession.

The Chairman then called upon Mr. BANISTER FLETCHER, Associate, to read a paper on

ARBITRATIONS.

The author said he brought this subject forward for four reasons: Firstly, because the subject had not, to the best of his belief, been previously brought before the Institute; secondly, because the profession had not given and did not give sufficient attention to mastering the technical difficulties connected with arbitrations; thirdly, with the view of pointing out how to avoid pitfalls; and fourthly, because he desired that the legal profession should not continue to deride the awards of "lay" arbitrators, as they were so fond of doing, asserting that such awards could always be upset. The extent to which arbitrations were sanctioned by Parliament was very great, and included the inclosing of commons, allotment of lands, the determining compensation for rights of

common, the setting out public roads, the commuting tithes, the defining boundaries. Further, where any lands were authorised to be taken for undertakings of a public nature, the person having the land for sale might claim to have the amount adjusted by this mode; also the compensation due by reason of interests in land being injuriously affected by the works. They might also apply to the compensation to be paid for land authorised to be taken under the provisions of any Act for creating markets, harbours, docks, piers, water-works, town improvements, cemeteries, drainage works, railway companies' disputes, the amount of compensation due from railway companies in respect of railways authorised to be abandoned. Nearly every matter in this long list belonged to the profession of the architect and surveyor, and could be best determined by members of the profession; and yet a member of the legal profession was usually chosen! Arbitrations would probably be more and more adopted, and this was an additional reason why the subject should engage the attention of the architect. A leading authority on the subject had remarked "The value of arbitrations as the best mode of administering justice in a large class of cases, in which neither the prospects of a Court of Common Law nor the decrees of Chancery can give complete relief, is now more fully than ever recognised by the legislature and the public." It was in the recent Acts that clauses as to arbitrations were more often inserted. One important one was the Local Government Act, 1858, by which any injury done by the local boards in constructing their works was to be so decided. As to private disputes, the range of arbitration was wide enough. A wise limitation of the power of the arbitrators was that where the subject matter of reference was clearly illegal, the award could not be sustained. The objections to arbitration were four in number: Firstly—the great delay arising from the desire to accommodate everybody; Secondly—the employment of counsel; Thirdly—irregularity of procedure, in which both parties concurred until one thought he suffered, and then complained; Fourthly—the necessity of having three arbitrators, which added to the expense and to the difficulty of fixing meetings, and in the end had little, if any, advantage over the single arbitrator. If three arbitrators were desirable, they should represent different professions; in architects' cases, two surveyors and lawyer for umpire had, in the author's experience, worked well. To remedy the great and almost intolerable delay frequently attending an arbitration, the matter should be required to be conducted strictly, and the reference should proceed from day to day just as the trial did. The first thing that an arbitrator had to do was to consider the "submission," as it was the foundation of all his proceedings. It was not absolutely necessary, but where it was possible it was desirable, to have the submission in writing, and in one document signed by both parties, as, if it could be shown that the parties intended to refer different matters, the award would be invalid. There was much technicality to be observed. For instance, where there was an arbitrator appointed on each side, no such appointment was complete until it had been notified to the other side. Again, the law held that where an umpire was to be appointed before proceeding, until the umpire was appointed arbitrators could not act. It was wise, directly an arbitrator was appointed, and knew who was appointed on the other side, to arrange an early meeting and to give notice to each party of the day, time, and place. If a party to a reference became bankrupt, the reference was at an end in most cases, if the other side chose to revoke. A lady marrying during the reference revoked the submission, though she and her husband were liable to an action, unless they continued the reference. Death, in most cases, revoked the appointment. Either party might revoke the authority of the arbitrator, but only with the consent of the Court. An arbitrator formerly used his own discretion as to allowing evidence to be given before him; now he had no such discretion; he was bound to receive evidence if either party wished it. Mr. Fletcher next proceeded to explain what was meant by "a reference on the usual terms," as these were the terms which the arbitrator nearly always abided by. Those terms were that the arbitrator should decide for the plaintiff or defendant; if plaintiff, then assess the amount of the damages (which, however, could not exceed the amount claimed). The cost of the cause followed his decision. He might

award the costs of the reference in any way he pleased. He had unlimited time for making the award (although, in practice, it was usual to fix the time, giving the power to arbitrator to enlarge the time if he considered it necessary.) The death of either party did not affect his authority. He had power to amend the record. All evidence must be taken on oath. The parties must produce all documents relating to the matters in question. The parties were bound to obey his award; not to bring any action or other legal proceedings respecting the matters referred, either against the arbitrator or each other. They consented, further, that if either of them wilfully prevented the arbitrator making his award, he would pay such costs to the other as the Court should think fit. That if either party disputed the validity of the award, the Court might refer the matters, or any of them, back to the arbitrator to reconsider. Lastly, they consented that the order itself might be made a rule of Court (by which the parties were bound by all the provisions of the Common Law Procedure Act, 1854. This Act gave either party power to compel the other to name arbitrator, &c.). With such ample powers the arbitrator would seem to be hedged in on every side, so that no opportunity could occur which could stultify his labour. Yet such was not the case. Instances were not uncommon of awards being set aside. It was the accusation of the legal profession that scarcely any awards, save those made by members of their own profession, ever stood. One pitfall might be indicated. It would appear that it was necessary (unless there was a special clause inserted in the submission that it should be sufficient for the arbitrator to find in the cause generally for the defendant or plaintiff, unless either party should request him to decide some particular issues) for the arbitrator to decide on each issue in the cause to render his award binding. The other matters that might set aside an award were: if it could be proved it had been obtained by fraud; if it could be shown it had been drawn up by mistake; where a third party, who, although he had agreed to join in a submission to arbitration, refused to proceed with the reference; proof of undue pressure. Powerful as the Courts were to upset or set aside awards, they had little or no power to amend an agreement of reference, even though it was only desired that it should be made to accord with the original intentions of the parties. Such matters as clerical errors, or an immaterial variance in an order of reference, they could alone vary. Certain interests disqualified an arbitrator, but it was held that they must comprise something unknown to the other parties; for instance, an architect, though employed by his client to superintend a builder in building a house for him, might be an arbitrator between his client and the builder, even although his remuneration were a commission on the amount of the building charge. The Courts required the arbitrator to be absolutely impartial, and should refrain from using any expressions towards either party which indicated a strong bias or prejudice in his mind, or showed that he was actuated by any hostile feeling. There must not be an arrangement with any of the parties to the reference, such as the purchase of their unascertained claims; and it was wise either to deliver a detailed bill of charges before receiving payment, as if this was not done, it might render an award open to be set aside; and it was wise not to receive any payment until award was made and published. The arbitrator having sworn the witness, he would be, if fresh to the matter, bothered as to what was evidence, what could be admitted, and what could not; what questions were proper, and what were inadmissible. The plaintiff or claimant opened his case, and it was his duty to prove it as strictly, and in the same manner before the arbitrators, as he would have to do where he conducting his case in a court of law, unless "by arrangement," when many matters were taken as proved, or with very slight proof and irregular evidence admitted. Still, where the parties were what was called "hostile," and would admit nothing, the law courts must be the guide of the arbitrators, and the popular idea that strict evidence was not required must be disregarded. It should be borne in mind that the improper rejection of evidence tendered by either party would set aside an award, and, further, that with what the law called a "lay" arbitrator improper admission of evidence would have the same effect. If, however, the arbitrator belonged to the legal profession, this would not have such effect. Was

this fair? The lawyers contended that architects and surveyors were not so well qualified to understand evidence as they were whose daily pursuit of their profession brought them into contact with witnesses. But it was not in every case that the issues raised were questions of evidence; on the contrary, in most cases, at least of those arbitrations under the Acts of Parliament alluded to, the question was a practical or scientific one, and not a legal one. One of the most important rules was that the best evidence must be given, and until that was exhausted, what was termed secondary evidence could not be given. This rule excluded hearsay evidence. A copy of a letter or other document could not be read until it had been proved that the original had been lost or destroyed; but if proper steps were taken to procure the production of the original, a copy might sometimes be used. A reply to a letter was not evidence until the letter in reply to which it was written had been proved. Handwriting might be proved by comparison. Plans should be proved by the person making them, and should be made from actual surveys. Deeds thirty years old needed no proof of their execution if they apparently came from a proper custodian of them; and those of less antiquity might now be proved by calling any witness who was acquainted with the signatures. A deed was not evidence unless it was properly stamped, so that some knowledge of the Stamp Laws was necessary. Entries in books kept by a person could not be used by him to prove his case; but his adversary might use them against him. A difficulty most frequently arising was to decide upon the form of the question to be put to a witness, it being a rule that the party calling a witness must not ask him what was termed a "leading" question (*i.e.*, a question which indicated the answer that was required), nor (unless the witness was "hostile") could the party calling him examine him, except as to such matters as were direct evidence upon the issues raised, nor ask him questions tending to contradict the evidence he had given. On the other hand, the adverse party could cross-examine a witness for any length of time, and could also examine him and call other evidence to prove that his evidence was untrue. The umpire must not be selected by lot or "tossing-up"; this was illegal. The arbitrators' fees should not be large—or the arbitrators would be liable to an action to recover what might be considered as excessive charges. This was the law, although arbitrators were unable to legally recover their fees as arbitrators unless they had—what they rarely had—an express promise to pay, and then only from the person so promising. Directly the award was made, the arbitrators should send notice thereof to each party, stating where the award could be obtained on payment of the fees, mentioning the amount. The award must be made within the time to which the arbitrators were limited. In conclusion, Mr. Fletcher adduced additional arguments in support of his contention that all references on architectural or surveying matters should be to the architect and surveyor.

DISCUSSION.

PROFESSOR KERR, in moving a vote of thanks to Mr. Banister Fletcher for his able paper on this most important question, said the question whether the artist should separate himself from the practical man might be one of considerable importance at the present moment, or it might be one of no importance at all; but certainly if the practical man were to separate himself from the practical architect before the public, he thought it would be very much to the disadvantage of the profession, and if there was one subject more than another in which an architect of any standing in a place like London required to be thoroughly practical, it was in regard to the administration of his business,—in law. When they were told that the lawyers made a habit of discrediting their efforts to do justice between man and man, it was but another evidence of the extreme carelessness which was necessary to understand and interpret the law correctly. The difference between references in the architect and surveyor's field of labour and that of the lawyer was this, as it seemed to him:—When the issue was one which involved a strict inquiry into what were called points of law, then, of course, the reference was a proper one to go to a lawyer; but if the issue were one which was purely a question for intelligent decision respecting professional business, then, he contended, that it ought to go to the architect or surveyor. If there was any possibility of a false issue being raised, if there

was any possibility of both parties being disgusted with the whole proceeding, the lawyers would do it. (Hear, hear, and laughter.) He had had a great deal to do with lawyers, and he said [that they knew nothing whatever of architects' and surveyors' practice, from the judge upon the bench to the barrister before him, and from the cleverest barrister in Court down to the youngest solicitor on the rolls. He cited an amusing case, in support of these remarks, in which a very eminent lawyer was arbitrator, and who did not know the difference between a door and its lock. He knew many instances quite as bad as this of the entire ignorance of the legal mind in respect of the practical details of an architect's business, and therefore he thoroughly supported what Mr. Fletcher had said as to the desirability of referring, straightforwardly and simply, to the practical decision of a practical architect or surveyor, whatever question of difference might unfortunately arise between man and man upon any practical subject; if a point of law was involved so much the worse; but let the point of law be got rid of first, and then carry the real point of difference to the decision of a really practical man. The benefit of having a practical architect or surveyor to decide such matters was that the lawyer, by his own account, must judge according to the evidence, and went into the case without any knowledge at all of the subject—he (the Professor) also contended that the lawyer came out of it without any knowledge. (Laughter.) The lawyer, in effect, said:—"I am dependent upon you for all the facts; it is for you to lay the facts before me in your own way." "But," said the architect or surveyor, or—at least, if he did not say it, it was virtually implied—"I don't want you to lay before me all these rules of practice and custom, and so on. All these I know. I will save you the trouble of dealing with all these preliminary matters: lay before me the matter in dispute, and I will apply those rules to them impartially as between man and man." On the other hand, however, the disfavour with which arbitrations were regarded by many persons besides lawyers was due, not merely to the fact that they were frequently set aside by courts of law, and that there was the element of uncertainty attending them, but to the unfortunate habit which arbitrators had of splitting the difference. No practice could be more sublimely impartial than this; in fact, it was known to be adopted by juries even when human life was at stake, but the practice was, nevertheless, highly exasperating to a man who felt that he was in the right. He knew it was extremely difficult to avoid splitting the difference in most cases, for this reason, that even without the aid of lawyers, the litigants themselves were each apt to say in his own mind, "I shall be sure to get much less than I ask, or shall have to pay much more than I want to pay, and therefore let me put my case a little in the extreme; the other side is sure to do the same, and between the two I dare say I shall get what I want." To ask the litigants to be perfectly frank and conscientious was utterly useless. When two men were in dispute, each would always "do the best he could for himself," as the phrase went. In such cases, and where the arbitrator had, after sifting the matter, decided to "split the difference," it should be remembered that the litigants had themselves already split the difference. Although architects' awards might frequently be capable of being upset, it was, in reality, seldom the case that they were upset. As a rule, a lawyer would advise his client not to attempt to upset the award of a responsible architect or surveyor. This was highly creditable to the architectural profession, and proved that it was undeniably an honest profession. Even the lawyers acknowledged this, and although it should be found that an architect's award had been incorrectly given, they always advised their client to submit rather than incur the odium of upsetting the award of an arbitrator admittedly honest. (Applause.)

Mr. THOMAS MORRIS thought that every architect and professional man ought to remember that he incurred a very heavy responsibility indeed when he provoked arbitration, on account of the enormous cost which frequently attended the arbitration of even the most simple case. They had better "split the difference" twice over if they could thus bring the arbitration to a close. The whole process of arbitration was very expensive, and the expenses were continually accruing. This did not occur by taking the case before a jury, and such cases were not so interminable when they were brought before the proper legal tribunals. Each party came into court with his

mind made up as to the best method of putting his case, and the matter was properly put before the court. Barristers were sometimes apt, perhaps, to give more emphasis, and to speak longer than the subject seemed to demand, but they made the jury perfectly understand their respective cases. In a court, too, they had the guidance of an impartial and experienced man of law—the judge. Of course, he agreed with Mr. Fletcher that when arbitrations on architectural matters were unavoidable, the professional architect would be a better arbitrator than a lawyer. He contended, however, that every architect, before he pledged himself or his client to an arbitration at all, should consider the heavy responsibility he incurred. He feared that in the new code of rules, drawn up under the auspices of the Institute, between the architects and the builders, the arbitration clause would work with the greatest severity upon the client, and that the builder would be more ready to stand upon his rights, to have every little question conceded or arbitrated upon, and this must be at the expense of the client.

Mr. ENLOART thought that Mr. Fletcher had probably made some little mistake in the position he would assume as arbitrator or umpire, inasmuch as all the legal work was left to men who were properly qualified for it. He deprecated any trenching upon the grounds of the lawyers as injudicious, but he also thought that the lawyers should not take work for which they were not competent. There was no question but that any technical matter must of necessity be better considered by, and a better judgment obtained from, a man who was well and thoroughly acquainted with all the technicalities relating to the question before him. He could bear out what Professor Kerr had said as to the ignorance of lawyers of the details of the architectural profession. He had seen men sitting in judgment on matters of which they knew nothing. He thought, however, that Mr. Fletcher ought to allow his award to be drawn, and his movements guided, by legal aid. As a matter of fact, he believed that nine out of ten of such references were referred to "lay" arbitrators. All the great railway cases, Thames Embankment cases, &c., were so referred, and it was the invariable custom so to deal with such cases.

Mr. JENNINGS believed that in a large majority of the cases upon which architects and surveyors were called upon to arbitrate, a want of legal knowledge was of no importance at all.

Mr. SAUNDERS said that of necessity Mr. Fletcher's paper touched very lightly on the broad question of arbitrations, and had only laid down certain lines for the conduct of professional men in relation to the same. In the course of a lengthy and forcible speech, the speaker urged the necessity of architects and surveyors having some tribunal of their own to which such questions could be referred. The suggestion had before been made, but allowed to drop; but if the Institute would take it up and carry it through, it would do more to enhance the interests of the profession than it had ever done. The judge or arbitrator should be a leading practical architect, thoroughly qualified for his post. He should have a legal adviser to decide points of law, and his salary should be at least equal to that of a *puisne* judge. Certain well-qualified architects should be recognised as entitled to plead or practice in the court. By this means the architectural and building trades would get their disputes settled cheaply and quickly.

Mr. ROGER SMITH, Mr. OLIVER, and Mr. ROUMIEU having made a few remarks, it was resolved to refer the subject mooted by Mr. Saunders to the consideration of the Council; and the vote of thanks having been accorded to Mr. Fletcher, that gentleman said a few words in reply, and the meeting terminated.

SCOTCH SLATES.—Slate quarrying has been commenced on a somewhat extensive scale at Onich, N.B. Some fine seams, varying from 5 to 15 feet, have been bored through horizontally, and from the nature of the surface tunnelling, there is every indication that the depth of seam lies much under the sea-line. Test-boring goes on over the North Ballachulish portion of the estate at different points, while other tunnels are to be sunk at Corrychorichan, five miles from Fort William. The quality of the slate found is stated to be equal to Welsh in durability, and the working of these quarries will, it is expected, greatly augment the trade and revenue of the Caledonian Canal.

SASH FASTENERS AND SASH STOPS.

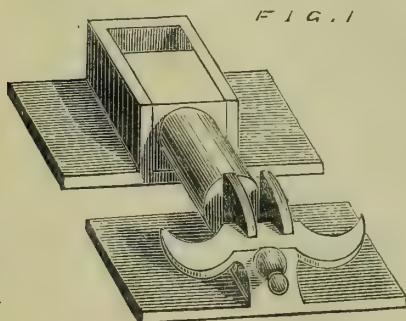
VAST is the amount of inventive talent and ingenuity that has been brought to bear on sash fasteners, and if the reader will carefully follow the explanations of the various inventions it is proposed to give, he cannot fail to acquire much knowledge of mechanics, in addition to the information he will acquire on this special subject. To enable the reader to understand the subject fully, it will be necessary to state the difficulty that has to be surmounted; which is, that the ordinary sash fastener in general use can easily be opened from the outside with a knife, without any violence or force whatever; this is so well known to be the fact, that I pass on to the remedy. The remedy is a sash fastener which shall be of that shape or configuration that it can easily be seen whether it is shut while a person is standing in almost any part of the room. It must not be possible for thieves to open it from the outside by the use of a knife or other instrument that can be carried in the pocket. It must be remembered, however, that the knife is the more likely instrument to have to guard against, because every thief probably carries one in his pocket. Few dare, or do, carry any other instruments; because, if caught, it would almost insure his conviction.

With regard to the present position of this question, it is only necessary to remind our readers that about 12 months' since Colonel Henderson issued, and had distributed from house to house, a circular calling attention, amongst other matters, to the insecurity of the sash fastener in general use, and recommending another shape of fastener, accompanied by a drawing to illustrate the fastener which he considered would prevent the use of the knife; and further, though it was not a patent article, and could therefore be obtained at most shops, one shop only was named. The result was, as might have been expected, the trade generally were justly irritated at a preference being shown, and some, in addition, said they had a further grievance, as they were selling the same thing at a less price than it could be obtained for at the shop the Chief Commissioner recommended. We pass by without further comment all this, and come to the important point, namely—it was shown that the fastener recommended was not secure; in fact, was but little better than the fastener it was intended to supersede. It was, when this was explained to Colonel Henderson, that he desired to obtain reliable information, and in the result a report has been furnished to him, which, however, has not yet been published.

Having regard to its being a subject in which the architect and the builder are specially interested, and in the further desire that the many robberies—such, for example, as the recent robberies at Earl Russell's and the Lord Mayor's—may be prevented, it is intended to examine the best of the many inventions which are proposed to remedy the evil.

First, then, we illustrate

LINGHAM'S PATENT SASH FASTENER.

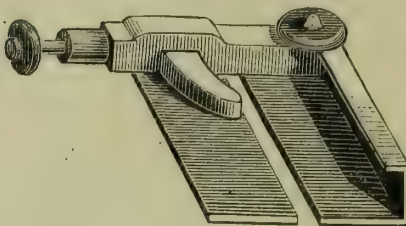


This fastener has two springs. It is clever and answers well. It is opened by drawing the shaft towards the person and then throwing it up. The

objections to it are: 1st—That it is awkward in use. 2ndly—That the action is quite different to the common sash fastener, and therefore it would take time before the public would favour it. 3rdly—Also the sashes must be well closed, or it will not be possible to effectually use it.

SECURE SCREW SASH FASTENER.

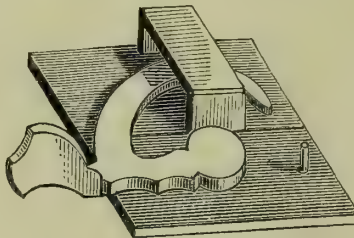
FIG. 2



This certainly would be the most secure sash fastener, if one only could ensure that one's servants would turn the screw portion of the fastener. The objections are: 1st—That you cannot tell without trying the screw fastener whether it be screwed tightly (or home) or not; 2nd—The extra trouble of screwing and unscrewing; 3rd—As this fastener involves extra trouble, it is almost certain that it will not be securely fastened. While, therefore, the inmates think they have additional security, they, on most occasions, will not have any.*

AUBIN'S SASH FASTENER.

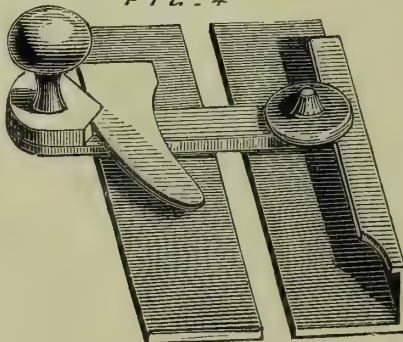
FIG. 3



Has much merit. It pulls the sashes together perfectly; so preventing any rattling of the sashes during high winds. The objection is the uncertainty as to the sash being closed; so that though the fastener may be shut, the window may not be secured, because the bar may have passed over, and not into the staple. Probably many would contend that this objection acquires even additional force from the fact that the windows are so usually closed at dusk, just when it is difficult to see the result of closing the fastener.

POWIS, JAMES, AND CO.'S, PATENT SASH FASTENER.

FIG. 4



The action of this fastener is by turning the knob from left to right. This releases the V piece, and enables the bar to open in the usual way.

* I have thought a spiral spring might with advantage be substituted for the screw. It would prevent the possibility of being left unfastened, while it would give almost as much security. Even with this alteration, however, to open the fastener would require two motions of the hand.

Its security is undoubted, as it will be seen it requires two motions in different directions before it can be opened: and no instrument from the outside could, I think, make the knob revolve, and at the same time force the bar in the required direction. It is so good an invention that one regrets it has objections that will prevent its general use. They are (1) It is so exactly like the present sash fastener, that the operator is almost certain to forget to turn the knob, before pushing it in the usual direction; (2) having to turn the knob on way, and push the reverse, is most uncomfortable in use—at least, so I find it. (3) It has two springs, and while I do not in some cases consider this an objection (though of course in comparing the merits, other points being *pari passu*, the decision must be given in favour of the simpler as the simpler) in all sash fasteners, I think it one here, because there is so much work on this second spring in connection with the knob.

Next week I shall consider other sash fasteners, and if there is any new invention with which I am unacquainted, I shall be pleased to receive an account thereof, with the date of the registration of the patent. B. F.

ARCHÆOLOGICAL.

ANTIQUARIAN RELICS AT SALISBURY.—The Friary at Salisbury has become a source of attraction to antiquarians, on account of discoveries made in the course of excavations for building purposes. Mr. J. W. Lovibond, of St. Ann-street, having become the owner of a portion of the site in the rear of his premises, caused the earth to be removed to a depth which exposed to view the foundation of a building originally devoted to the monastic observances of the Minor or Grey Friars. It has been ascertained that the building was erected in 1240, and raised in 1580. Several samples of variegated tiles were found in an excellent state of preservation, as also the remains of earthenware articles for domestic use and of peculiar device. The foundation is of massive construction, and supported by a large layer of chalk and flint, supposed to have been removed from the ancient city at Old Castle, or Old Sarum. Close to the walls, on either side were found several human remains, those on the inside being packed in tiers, indicating the removal of bones from the ancient place of interment, while beyond the boundary the skeleton of females were detected.

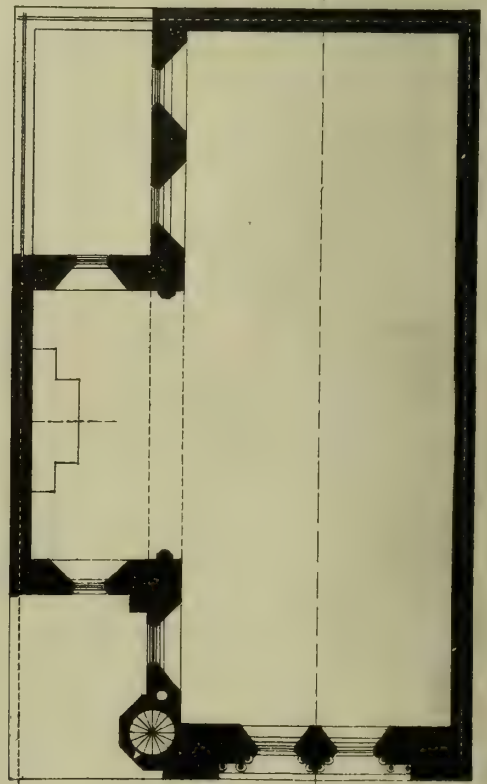
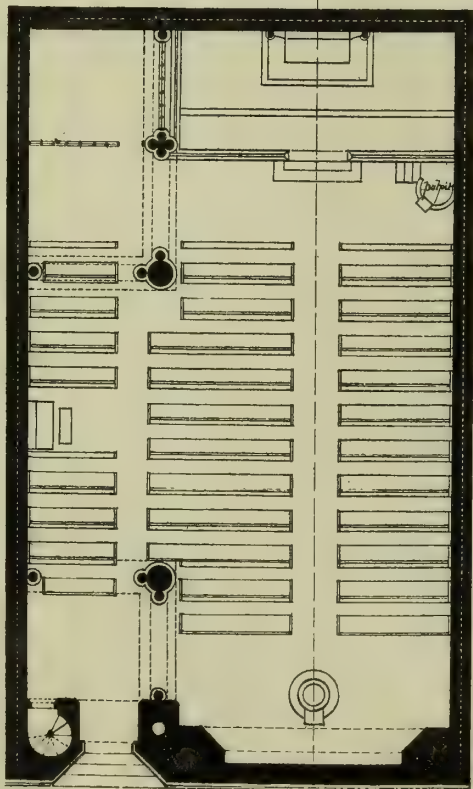
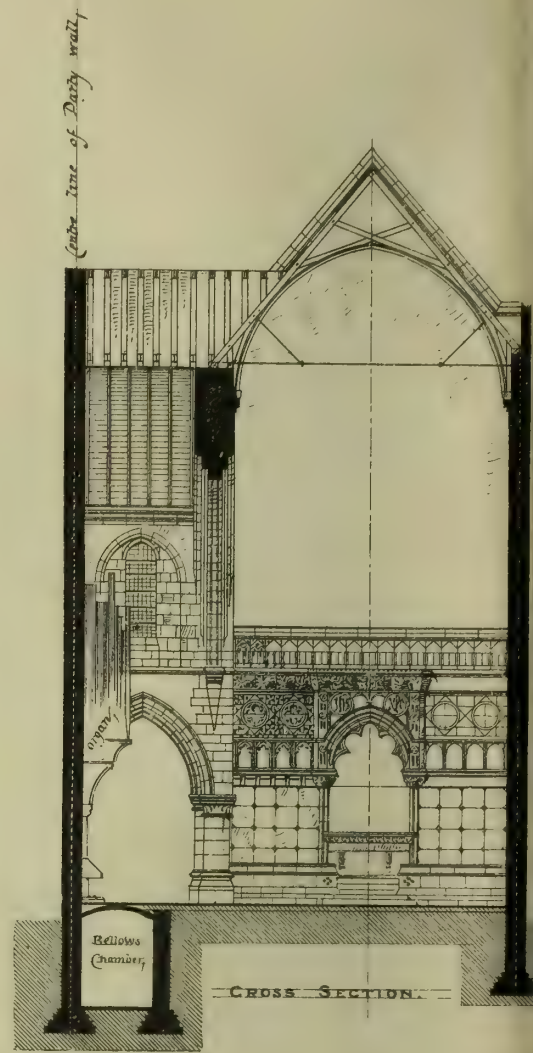
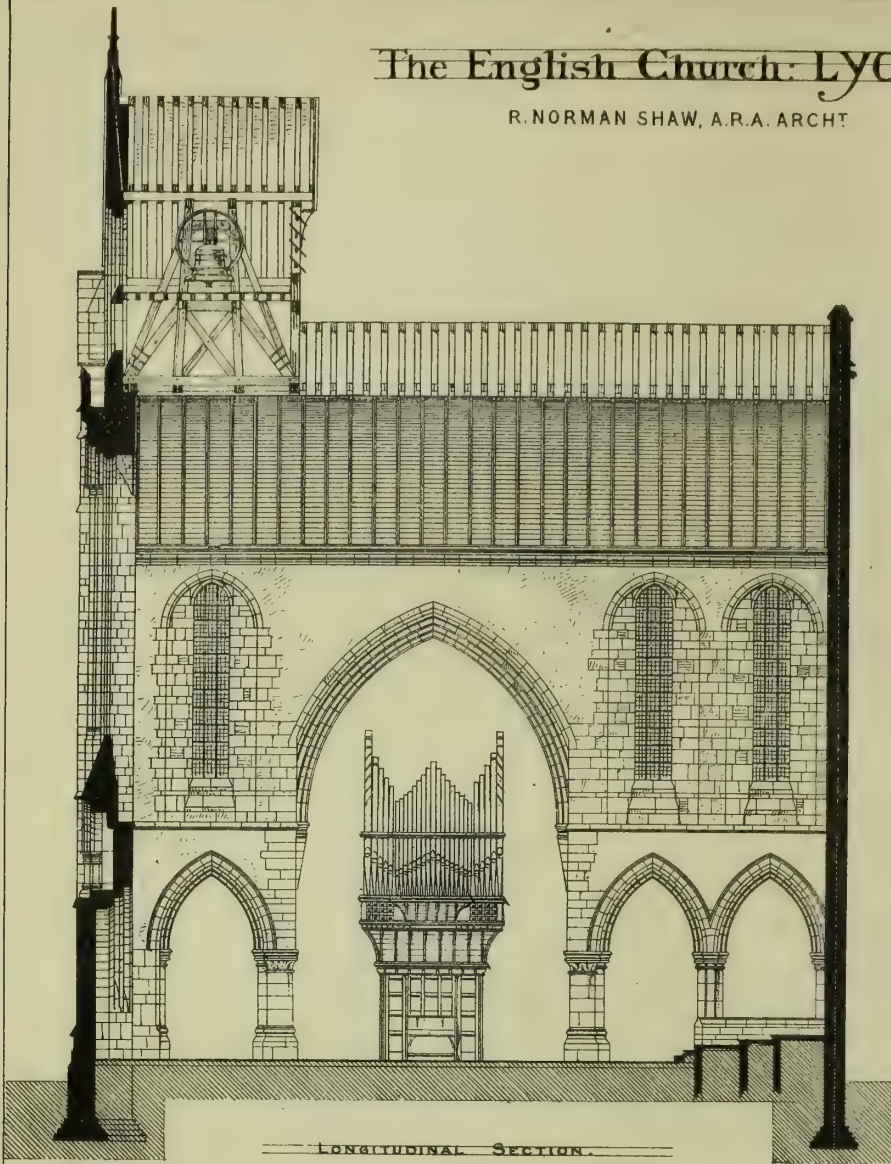
INTERESTING DISCOVERY IN POSEN.—A vast field of urns and paludean habitations has been discovered near Lussow, Posen, by a ploughman tilling the gentle slope towards the Lussow Lake, and who found that his deep share often met with firmly embedded obstacles. After a thorough search made by the landlord, it was found that the subsoil of not less than 10 acres of land formed one immense urn field. The urns stand in rows, each row 7 ft. apart from the next, and the calculated number about 10,000 urns. They are in size from 3 ft. to 1 ft. in diameter, and all of them are made of black, unglazed, micaceous clay. The ornaments on them consist of unexplained lines scratched on the body. They contained decayed bone or ashes in such large quantities that it was at once used for manure. There were also vestiges of burning-places. The landlord, M. Boas, at once conceived the idea of letting off the water of the lake, and to his delight, as the level subsided, about 80 piles, of from 8 in. to 10 in. diameter, were seen to emerge above the water. The communication between this lacustrine habitation and the land seems to have been established by a bridge laid over a line of piles connecting the main group with the shores of the Lussow lake.

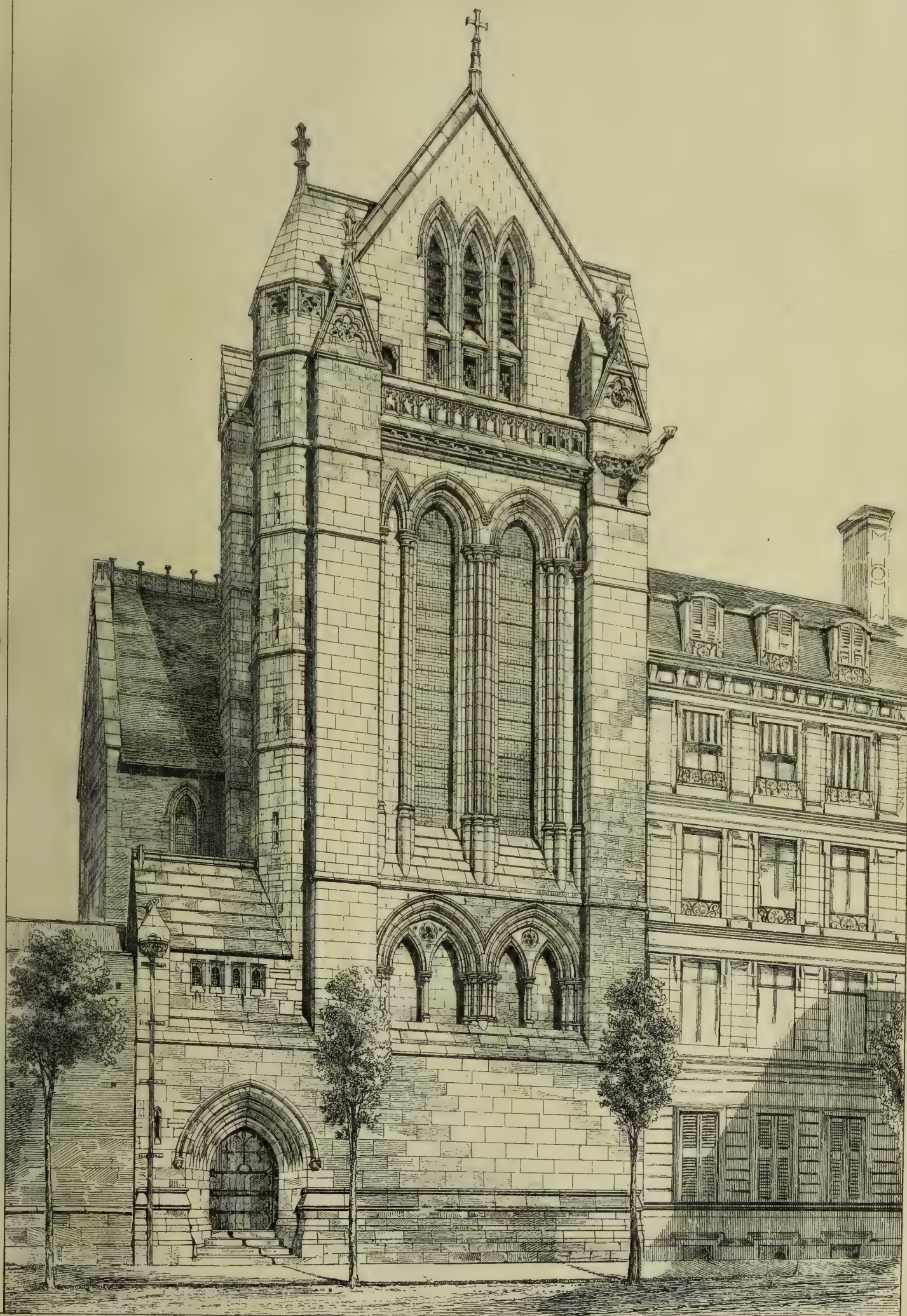
DISCOVERY IN THE FORUM, ROME.—The Roman edition of the *Swiss Times* reports that a discovery has just been made upon the Forum which will not only interest all archaeological students, but all classical scholars throughout the world. It is the remains of the pedestal of the colossal equestrian bronze statue of Domitian, which, according to the well-known lines of Statius, was situated in the middle of the Forum.

A memorial tablet has just been affixed to the chancel walls of the parish church of Boston, in memory of the late Professor Conington. The centre of the memorial represents the Resurrection, and at the corners are figures of the four Evangelists.

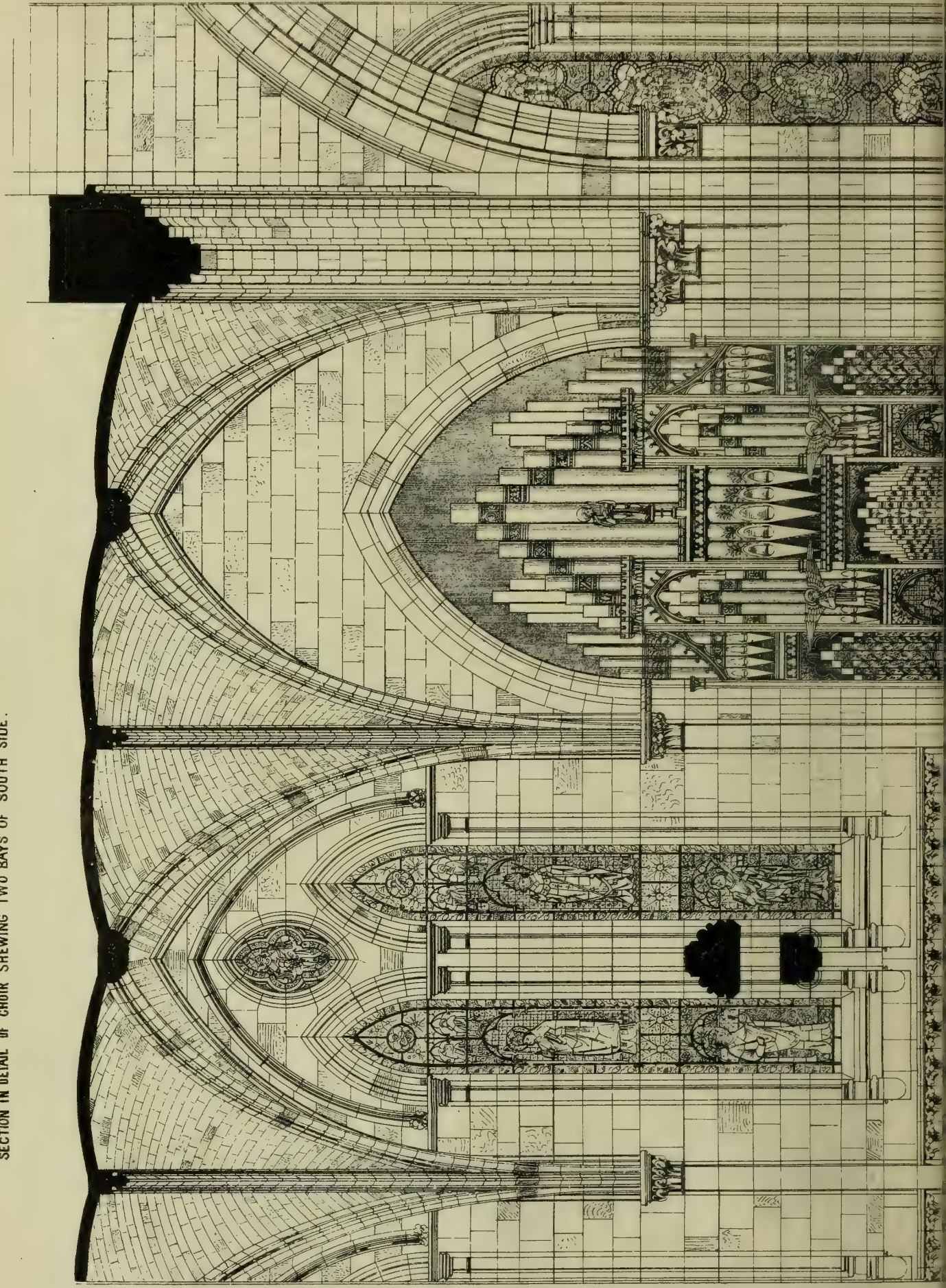
The English Church LYONS.

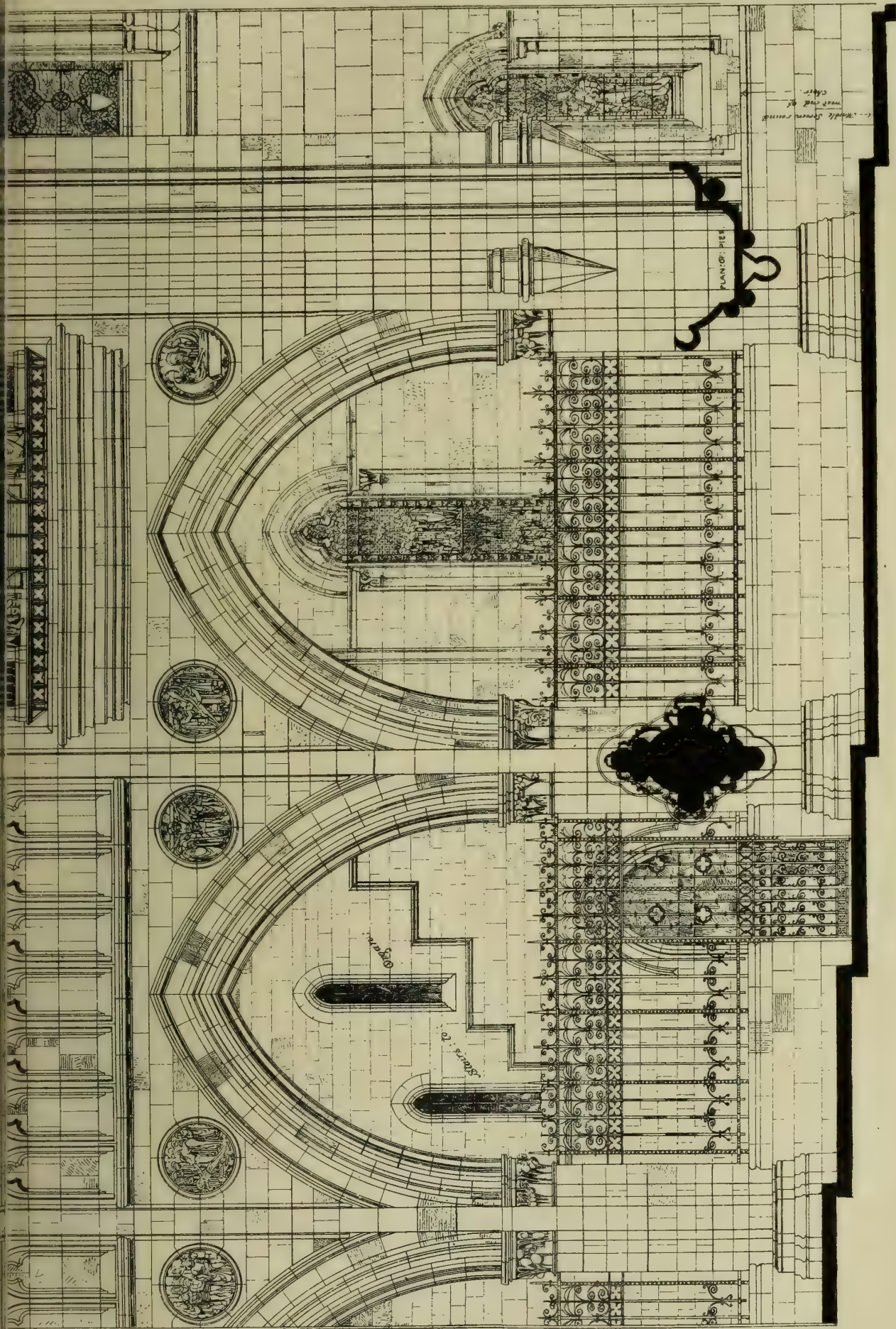
R. NORMAN SHAW, A.R.A. ARCHT





SECTION IN DETAIL OF CHOIR SHEWING TWO BAYS OF SOUTH SIDE.





Thos. Ross Archt.



DESIGN FOR THE CATHEDRAL CHURCH OF ST. MARY, EDINBURGH.
 GEORGE EDMUND STREET, R.A.—ARCHT.
 Photo-lithographed & Printed by James Harman, 51, Gray's Inn Road W.C.

EXAMPLES OF GROINED VAULTING.

(Continued from p. 23.)

EXAMPLE I.

THE first example selected for illustration is a square porch, covered by a Gothic groined vault (the South Hall Street entrance to the Manchester Assize Courts.) Fig. 12 shows an inverted plan of the vault in which *aa* are the wall ribs, forming pointed arches on the four sides of the porch; *c*, the diagonal rib spanning the vault from corner to corner; *b b*, intermediate ribs springing betwixt the diagonal and wall ribs; the whole of these ribs springing from the caps of shafts in the angles of the vault, and crossing or abutting the ridge ribs *dd* at their upper ends, the spaces betwixt the ribs being filled in with bands of stone in two colours, as will be afterwards described. Figs. 15 & 16 show the sections of the ribs *a*, *b*, *c*, (one fourth full size), with the corresponding centre lines on each rib, the wall ribs being a little more than half the thickness of the others, the centre line being a little clear of the wall. As that portion of the ribs below the surface of the vaulting is the rib proper, it will be the only part referred to in the following particulars, the upper portion being left on for the purpose of giving additional strength, and to form a key to the filling in.

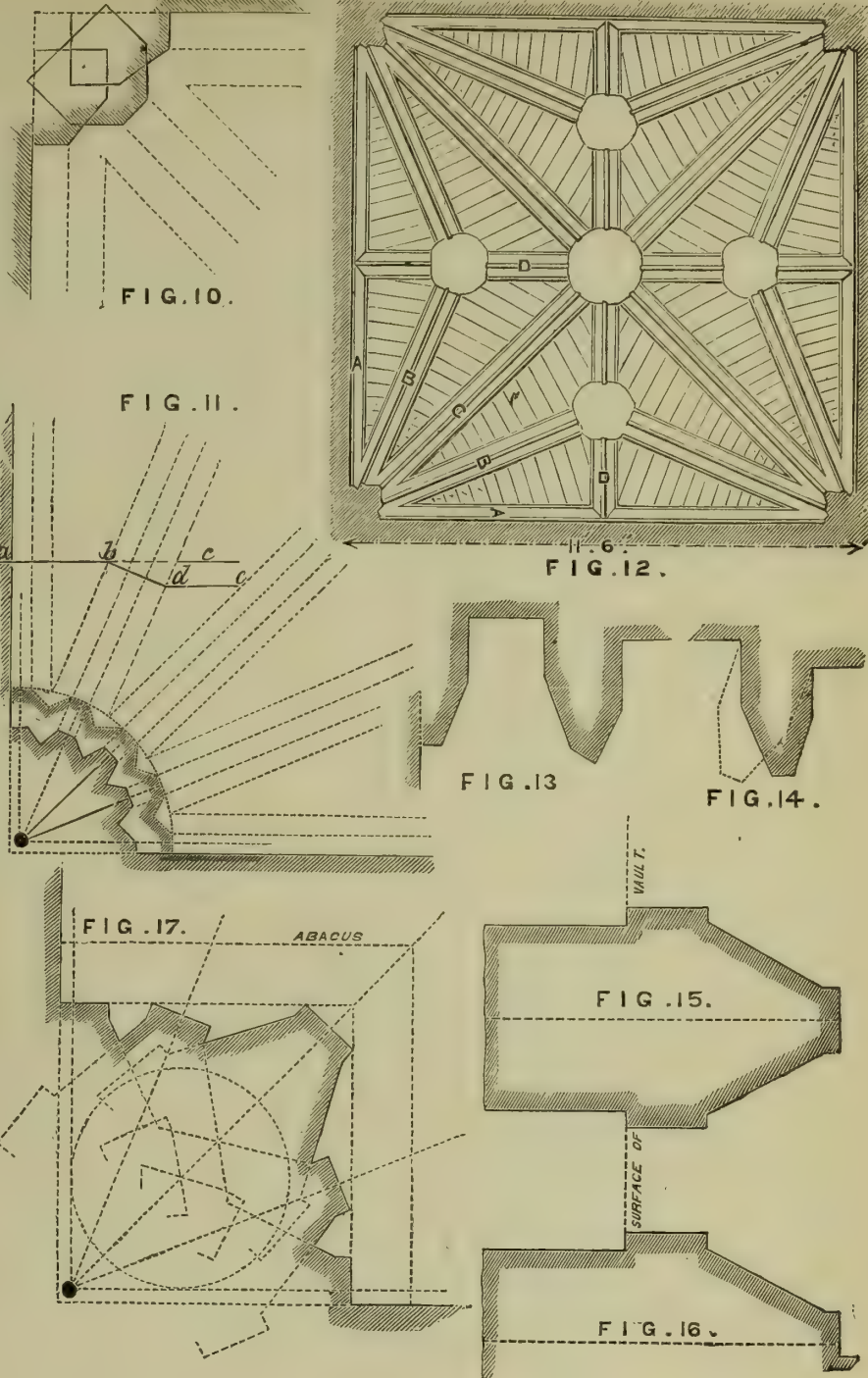
In making the working drawings, it is first of all necessary to set out the plan of the springer. To do this, first draw a plan of the centre lines of the ribs, beginning with those of the wall ribs at their proper distance from the wall lines according to the section Fig. 16, see Fig. 17, in which *o* is the point where the centre lines of the wall ribs meet, and from which those of the other ribs radiate, forming equal angles thereat on the plan. Now if we apply the sections of the ribs on these lines so that their nosings or middle fillets are at equal distance from the point *o*, as shown by the circular dotted lines in Fig. 11, it will be evident that the ribs in such a case, if struck out with the same length of radius, springing as they do from the same level, and radiating at equal angles as they rise, that they would also leave each other at the same level where they become completely separated, and consequently would mitre truly from their springing to their separation. But if the nosings of the ribs are placed at unequal distances, from the point from which they radiate as in Fig. 17, then the case becomes altered as regards the rise and separation of the ribs in the height of the springer stones; and I believe it is entirely a matter of taste or design as to how the plan of the ribs is arranged on the bed of the springer. In this example it will be observed that the ribs are arranged so that the nosings touch a straight line drawn parallel to the edges of the square abacus upon which the springer rests, forming on the whole a square, and, of course, are at unequal distances from the point *o*. The dotted lines show the manner in which the sectional forms are applied on the centre lines, partially overlapping one another, and leaving the parts not dotted free of each other, thereby forming the outline, or plan of the springer bed shown by the shaded lines.

Fig. 18 shows a plan of one quarter of the vault, and the elevation of the ribs, &c., &c. Having laid down the plan of springer in the angle, as in Fig. 17, and completed the centre lines for the ribs and ridges on the plan, we next proceed to find the shapes or elevations of the ribs. The elevation of the wall rib is generally given by the form of some arch or opening in the walls below, and as it is the one which chiefly regulates the forms of the others, we draw it the first. (In drawing these, it is a good plan to make use of the centre lines on the plan as base lines for the elevation.) Point No. 1 is the centre from which the elevation of the wall rib is struck, this point being the centre for an arch in the wall below the vault. Having drawn this elevation, first, the soffit line from the nosing of the rib, and then the lines for the other members at their respective distances from the same. The next thing to be determined is the section of the ridge rib; this will develop itself by the intersection of the lines in the elevation of the wall ribs with the corresponding widths of the ridge when applied on each of the vertical centre line, and this section is somewhat different in depth from that of the other ribs so as to intersect properly with the wall ribs, the upper portion being made to form a key to the filling in. Before proceeding with the elevations of the other ribs it is necessary to know if the ridges are to be kept level (this being a matter of design); in this example they are shown to be level, so that however the

ribs may rise from the springers, they must come to one level at their upper ends. Then again as the feet of the ribs stand at varying distances from the point from which they radiate, it will be evident that if they were each struck with the same length of radius they would separate at different levels, that is to say, the intermediate rib, for instance, standing out further from the point *o*, Fig. 17, than the wall rib, the top edge of it on the side next to the wall rib would leave that rib at some point not corresponding with it, but perhaps half-way down the side of the rib, and the diagonal rib for the like reason would leave the intermediate rib in a similar irregular manner, and the filling in, or plain surface betwixt the ribs, would at these places become very much twisted; but this may be avoided by altering the radius with which each particular rib is struck out, at least as far as to the points of separation; for instance, by using a longer radius to the intermediate rib, the top edge may be got to the same level as the top edge of the wall rib where they separate, and so on with the diagonal rib. The problem now is to draw the elevations of the other ribs in such a manner that they shall commence as shown on the springer bed, shall become fully developed, and leave the solid springer at one level, and shall rise to the same height where they join the ridges.

To draw the elevation of the intermediate rib Fig. 18, as before, use the centre line of the rib on plan as a base line for the elevation, and from the point where it intersects the centre line of the ridge, erect a perpendicular as a centre line for the elevation, and on this set up the height from the base line to the soffit of the ridge equal to the height of the same in the elevation of the wall rib, and set out the width of the nosing of the ridge rib. Next find the point in the elevation of the wall rib where it becomes fully developed and separates from the springer stones; this will be the point in the upper edge of the rib vertically over the point where the ribs separate on the plan; that is, the point *e*. Draw the line *ef* perpendicular to the base line, the point *f* where this perpendicular intersects the top line of the rib is the point of separation, or where the wall rib becomes fully developed from the springer. Through the same point *e* draw the line *gh* perpendicular to the base line of the intermediate rib, and make *gh* equal to *ff*, then *h* will be the point in the elevation of the intermediate rib where it is to become fully developed and separated from the wall rib, the point *h* being at the same level as *f*, so that we have now to draw the elevation in such a manner that the back or top edge of the rib shall pass through the point

PLATE 2.



h, and that the soffit line or nosing of the rib shall commence from where shown on the springer plan, and terminate with the nosing on the soffit of the ridge. To do this, first describe a circle from the point *h*, with a radius equal to the depth of the rib; it will then be evident that the soffit line of rib must commence where shown on the springer plan, must touch the circle described from the point *h*, and terminate at the nosing of the ridge, and it would be an easy matter to do this by the problem in geometry where three points are given to find a centre for a curve to pass through them; but it would be quite a chance if the centre when thus found should happen to be on the base line, and if it did not so happen, the rib would not rise from the springer in a proper manner (if below the line, it would make the curve segmental; if above the line, the curve would be horse-shoed), so that it is necessary to find a centre somewhere on the base line from which the curve of the rib may be struck so as to touch the circle *h*, and then if necessary to change the centre for the rest of the curve, in order to bring it to the right place at the top, taking care when changing the centre, to do it in such a manner that the curve may not be crippled. Let No. 2 be a centre from which the part of the curve from the springing to the circle *h* may be struck. Continue the curve forward from the same centre as shown by the dotted line, so as to see whether it would come above or below the ridge. In this case it becomes above it; we have then to shorten the radius to bring it down to the proper place. Thus, having drawn the curve as far as the point of separation, or as far as may be required with the first radius, say to the point (which is in this example kept a little below the J point of separation on account of the arrangement of the joints in the springer, as will be afterwards explained), then draw the line 2 *j*, and as the radius is to be shorter we find a centre (by trial) on the line 2 *j*, from which the rest of the curve may be drawn so as to bring it to the ridge as required.

(To be continued.)

THE TEMPLE OF BAILOOR.

THE Temple of Bailoor (says Captain Lyon, in a lecture delivered before the Society of Arts), is one of the most beautiful, if not the most beautiful temple in Mysore, perhaps in all India. Every part of it is quite different, and everything is very minute. It is more like the Jain Temple, and was built by a race of kings who had been Jains, but were converted to the worship of Shiva, and the temple partakes a great deal of the old religion. The small frames, with the figures inside, are cut out of solid stone in complete relief, and with nothing to support them but the base on which they stand. Behind them is another complete row of figures. They are so arranged that the hands touch the frames and the feet the bottom on which they stand. Unfortunately, the whole is covered with whitewash, which is constantly renewed, and for the carving to be seen as it ought, the whitewash must be removed. At the same time, however, it preserves it. The white mass below is in reality another wreath or roll of figures, one more beautiful than the other. All the figures are in complete relief, and pierced right through. The holes are in solid blocks of stone, three inches thick, pierced right through to give light to the interior. It is said that the interior is most wonderfully carved, but no other temple in India is carved in the inside of the sanctum. They are all perfectly plain, the whole of the decoration being lavished on the outside. One of the peculiarities of this temple is, that the east and west sides are perfectly dissimilar, and unlike any other we have seen. Five little shrines form the west side. Underneath, along the lower part, are elephants; above them are the emblems of the kings who reigned and built it. Inside is a small image of the god, and the opening is for the priest to enter and anoint that image. The whole carving, both of this and every other part, more resembles ivory than anything else, and if one does not handle it, so exquisitely is it chiselled, it is scarcely possible to believe that it is not wood, so wonderfully small and delicate is the carving. The natives always put the elephant at bottom, next to him that nondescript animal which is always considered next in strength, and then the other animals rising in strength according to their idea, whether they are able to support the incumbent weight or not.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE ENGLISH CHURCH IN LYONS.

Of which we give illustrations, has been in the course of erection for about four years, the work from many causes having been much interrupted and delayed; but it has been recently completed, and is to be consecrated early next month. It is situated on the Quai d'Albret, in the southern district of the city, and occupies a fine position, but surrounded on three sides by very high modern houses, the party walls of which are shared by the church. The ground area is divided into a nave, with small aisles on the north side, and a shallow transept, the object of this arrangement being to get a lofty clerestory from which to light and air the church, so as not to be entirely dependent on the west windows. The west front is carried to a considerable height, in order, as far as possible, to hold its own against the lofty houses adjoining, and this gives the exterior somewhat of a Continental character. The upper portion is used as a belfry, as shown in the section. The whole of the building is of stone, the exterior being of the fine hard local stone, the interior of a softer quality, somewhat akin to Bath. The details throughout, such as caps, bases, and mouldings, have purely an English character.

The roofs are boarded to a curve, and are slightly stained. The pulpit and font are of stone, with marble shafts. A low stone screen divides the sacristy from the nave, and a lofty reredos, shown in the section, covers the lower part of the east wall. Of course there can be no east window, but it is proposed to cover the upper part shortly with paintings. There is a good organ in the transept by Bryceson Brothers, of London.

The church is well warmed by a hot-air apparatus of French construction. The work has been entirely carried out by French contractors, from the designs of Mr. R. Norman Shaw, A.R.A.

DESIGN FOR CATHEDRAL, EDINBURGH.

With this impression of the BUILDING NEWS we give a double page perspective view of Mr. Street's noble design for this cathedral, and also a double page section in detail of choir, showing two bays of south side. Next week, we hope to give Mr. Street's elevation, and plan for the same building. We cannot do better now than give in full Mr. Street's report, which is as follows:—

To the Trustees for the erection of the proposed Cathedral Church of St. Mary, at Edinburgh:—

Gentlemen,—In addition to the drawings necessary for the illustration of their designs, you have asked the competing architects to give some written explanations of their schemes. In doing this, I must be allowed first of all to express my strong sense of the great importance of the work, and to assure you that I have spared no pains to make such a design as would justify you in including me among the small number of architects to whom you have applied. It is, perhaps, the best opportunity that will have been given to us in my time to show whether or no we can now hope to rival or approach the skill which was shown in the middle ages by the architects of our cathedrals and greater churches, and for myself, I appreciate fully the importance of the occasion. Without further preface, I proceed to offer a few remarks on various points.

1st. *As to style*.—I assume almost as a matter of course that all the designs will be in some variety of Pointed architecture. But it is not so certain that the variety of the style selected will be the same. Of late years in England there has been only too great a desire to engraft novelties from abroad on the style as we see it developed in our old buildings. Yet the result has seldom, if ever, been satisfactory. The reason is not far to seek. In every country, as time wore on, local developments are seen in architecture, for which there was almost always a reason in the materials which are available, in the influence of the climate, in the peculiarities of the ritual, in the traditions and habits of the people. Hence it is very rarely that an exotic in art is ever at home in the land to which it is transferred; and I am confident that the truest wisdom in the case before us will be, as far as possible, to guide ourselves by your national traditions and examples, which fortunately are neither few nor unimportant.

This position is at least as true in regard to the arrangement of the ground plan as of any other portion of the building. And I hold that it would be, for instance, a grave error to imitate the distinctly French example of a choir finished with an apse, and its surrounding chapels in a country where, among all the best ancient examples, there is not one single instance of its adoption, and when the arrangement itself is (so say the least) quite useless for, if not indeed inconsistent, with the requirements of the Scotch Episcopal services.

In my design, both in plan and detail, I have therefore most studiously kept in view the importance of adhering as closely as possible without servility to the best natural architectural traditions and examples, and I will, with your permission, say a few words as to what these are.

Long and careful study of Mediæval buildings in Scotland leads me to certain very distinct conclusions. It will be found that from the end of the twelfth to the end of the fourteenth century (which is the period during which we all now maintain the Gothic style to have been at its best), all the existing examples are the work of men who were in close and intimate connection with, if indeed they were not often the very same men as, the architects of the buildings in England, north of the Trent. There is a broad distinction between the work of English architects, north and south of the Trent; and though it is easy to point to a number of curious coincidences in design between buildings in the North of England and others in Scotland, it is not, I believe, possible to point to a single example of the same connection with the works of architects south of the Trent. This position might be illustrated at length, but in this place it will be sufficient to ask any one to compare the transepts of Hexham with the transepts of Pluscardine Abbey, near Elgin; or again, to go from Lanercost in Cumberland to Dryburgh Abbey. In each case they will see the same hands at work on both sides of the Border. And we might therefore, without disregarding Scotch traditions, safely join a study of the abbeys and cathedrals of the North of England to that of the generally ruined, but still most interesting abbeys and cathedrals of Scotland.

It was not until after the closing of the fourteenth century, and during the decadence of Gothic architecture, that any French influence was seen in Scotch buildings; and though we owe to that influence a style of domestic buildings which is at once the most picturesque and the most vigorous of its period, we owe no thanks to it for any of the effects which it produced on ecclesiastical buildings.

In truth, in choosing to limit my studies for this work to the Scotch churches of the thirteenth century, I am running no risk; for I believe that it would be difficult to find buildings more pure in detail, more graceful in design, or more suited to our wants in their comparatively modest scale, in any part of Europe.

The country which can boast of such examples as Glasgow, St. Andrew's, Dunblane, and Elgin Cathedrals, or the Abbeys of Pluscardine, Sweetheart, and Dundrennan, Melrose, Dryburgh, and Holyrood, has no need that her architects should leave their own country in search of what is most appropriate and most beautiful. All these buildings, with one exception, are of very nearly the same date—the first half of the thirteenth century—and it is in the style of this period, accordingly, that I have made my design.

With the one exception of Glasgow Cathedral, they are all very simple in their details, and I need hardly point out to you that the funds at your disposal will not suffice for a large and stately church, and at the same time for one whose design is full of rich, curious, and elaborate details.

2. *As to the Plan*.—My plan is upon the usual cathedral scheme of a cross church. The choir of moderate length, so as to afford proper accommodation for clergy and choristers only. The nave and transepts of ample dimensions to accommodate the numbers required. The choir furnished with aisles for the convenience of passing all round it, and of seeing and hearing well in all parts. And the exterior marked as a cathedral by its central lantern (open from the floor inside) and for the adornment of the city by its lofty western tower.

For the accommodation of the worshippers in the best way, I have made my nave unusually wide and spacious. All its occupants will be

within view of the altar, pulpit, and choir, and its length is such as to allow of the preacher and the choir being heard to the fullest extent.

I have provided a chapel opening on the east side of the south transept for use for occasional or daily services, or for early communions, when the congregation is small, and the proper choir may seem inconveniently large. The organist is so placed between this chapel and the choir that he can attend equally to services held in either place, and the organ—opening as it does both to the choir and the south transept—will be heard equally well all over the church. And here it may be well to observe that the position for the organ has not been chosen without care or experience on the subject.

I believe that nothing is more certain than that a church organ should be well raised above the choir and the floor, and that the chamber in which it is placed should be of sufficient size and finally vaulted in stone, so as to prevent the existence of any recesses above the instrument, and so as to throw out the whole of the sound from the organ chamber into the church. If the chamber which I have designed is required for an enormous instrument, it may with the greatest ease be exactly doubled in size by carrying it the whole length from north to south of the south transept, instead of only half the length, as shown on my plan. And its height may also easily be increased, and, as will be seen by reference to the elevations, these alterations would be made with only very slight modifications of any part of the design, and with no damage in any way to its effect. All this is matter of detail, which would

in the end of necessity have to be settled in consultation with the organ-builder, and when one knows the exact size of the instrument to be provided for.

The arrangement of the choir will, I believe, be found to be very convenient. There is room for 40 clergy and choir men in its stalls. The stalls for the clergy are brought forward under the lantern so that their occupants may be well seen and heard, and with the result that the choristers will occupy the western bay of the choir below the organ, and where they will be best heard by the congregation. East of the stalls there are gates on either side into the choir aisles, so that communicants after kneeling at the altar rail will be able to return into the nave without passing or interfering with those who are still coming up to the altar. The altar is brought forward from the east wall and placed under a pointed canopy—at once the most graceful and most ancient arrangement, and particularly suitable for a Scotch church, where everything centres round one altar. The space or passage behind the altar will add much to the perspective, and is consistent with all the traditions of British cathedrals. This bay is narrower than the other bays of the choir, and here I have followed the example of the nearest English Cathedral—Carlisle—where precisely the same arrangement of a narrow eastern bay still exists. It is practically convenient too, as giving a passage-way all round the choir, and also as affording a most suitable place for a niche for the reservation of the sacrament required by the Scotch Episcopal Church, and which can nowhere be so well or so consistently placed as below the altar itself, and yet not so prominently placed as to involve or invite practices which the Church does not contemplate.

The vestries for the clergy and choir are separate, and placed one above the other on the north side of the choir; the clergy vestry communicating directly with the north aisle and with the Synod House; and they are of ample size. The arrangement of the aisle all round the choir will give easy means of communication from the vestries to the altar in the choir or to the altar in the chapel opening out of the transept.

I have made the principal entrances to the church near the west end; but it would be easy to add another either in the south aisle of the choir, or into the south transept. The former would be the most convenient, and its insertion would not involve any alteration in the seating or other arrangements of the church. But as far as possible, it is always well in a large church to keep the entrances at the back of the congregation, both on account of good order and for the sake of warmth.

You have asked us to consider whether Coates' House might be preserved in connection with the new cathedral. On this point I feel strongly that there can be no question whatever. All our old cathedrals and abbeys were joined on to and hemmed in by surrounding and dependent build-

ings. Their architects felt, no doubt, that their work gained in interest, in picturesqueness, and in scale by such an arrangement. A great church put down by itself on a square plot of ground never looks very pleasant. There is a cold, bare formality about it which is disagreeable, and the retention of Coates' House would most completely save the proposed cathedral from this calamitous effect. My plan shows how, by means of a cloister, this house might be connected with the Synod House and with the cathedral, in so convenient a way as to make its position the very best for the residence of the dean or bishop.

The house itself is a picturesque landmark, which one would be sorry to lose in Edinburgh; and though I have not examined its interior, I presume that by some enlargement, alterations, and repairs, its characteristic features might be retained, and it might at the same time be made a fit residence for the Bishop of Edinburgh. The synod hall, in my plan, occupies the place usually taken by the chapter house on the east of the cloister. It is conveniently approached from the transept under cover, and yet sufficiently removed from the church to make it a perfectly proper place for meetings for debate. Its immediate connection with the clergy-vestry might be found, I think, a great convenience. I have provided a distinct baptistry for the font opposite the south doorway. This is a picturesque as well as a convenient arrangement.

I have sent a plan to show how the seats might be arranged to accommodate the required number of persons. But it will be seen that I propose to provide a large number of seats or chairs, and not on fixed benches. I feel that in a cathedral one wants to know that those who build are not thinking wholly and entirely of simple utility. "High heaven disdains the lore, of nicely calculated less and more," and some sacrifice of space for the sake of effect is not only justifiable, but necessary if the effect is to be good. Such spaces as I have left unoccupied in the choir and its aisles are of vast importance to the general effect, and ought on no account to be dispensed with; and on the same principle the smaller number of fixed seats and the greater the space occupied by movable chairs (which, when not required can be easily stowed away), the nobler and more cathedral-like will be the effect of the interior. All this is matter of arrangement, which must be settled finally by the architect and the authorities of the church, but it may be accepted that the fewer the fixed seats the better will be the result from an architectural point of view.

I have provided a vaulted gallery in the western tower. This might on occasion be used for congregational purposes, and it might also be used for a great organ, independent of the organ in the choir, if it is decided to have one.

Provision is made in the western tower for a clock chamber, a belfry, and a bellringers' floor. Staircases and passages in the walls give access, in the way common in old churches, to all parts of the building at various levels. This is a very important provision in such a building, as giving easy access to all parts without ladders, which will be a great convenience for ventilation and for small repairs.

3. Structural Arrangements.—A few words will explain all that is necessary on this head. I propose to build the church with walls faced inside and out with wrought-stone, and I should wish to use for this work stone from the Plean or Dalmeny quarries, the colour of which is extremely good, whilst its suitability for the atmosphere of Edinburgh has been well proved. I propose to cover the whole eastern part of the church, transepts, choir, with aisles and side chapel, with stone-vaulted roofs. The tower and the north and south aisles of the nave will be all vaulted in stone. The advantages of stone vaults are numerous, and there is no mode so good of certainly regulating the temperature as by their adoption, the inside and outside air being thoroughly separated. Vaulted buildings are consequently cool in summer and warm in winter. In the nave, owing to the great width which I have adopted for the convenience to the congregation, it will not be possible to put a stone vault, and I propose, therefore, in order to keep due harmony between the roofs throughout, to cover it with a wooden vault. This was a common mediæval arrangement, and I may instance, as an example treated very much as I propose to treat this, the transept of York Minster. Wooden vaulted ceilings are still to be seen in the choir of Winchester Cathedral, the choir of St. Alban's Abbey Church, the Cloisters of Lincoln, and many

other old buildings in England, whilst in Scotland it is probable, at least, that Elgin Cathedral was so covered in part.

I have mentioned the width of the nave in my design, and it may be noticed that at the east end next the lantern this width is contracted. This width is contracted for a very practical reason, to give the necessary support to the arches and vault of the central lantern. There are many ancient examples of the same sort of narrowing of the building for the sake of convenience at the east, and it will be sufficient to mention one—viz., Canterbury Cathedral, where every one will remember the very marked character of the arrangement.

4. Acoustics.—It is somewhat difficult to deal with this portion of the subject anonymously. One evidence of success is worth a thousand essays on the means of obtaining it. I may say, however, that I depend upon the vaulting of my choir and transepts for throwing the sound well out into the church, and on the form and material of my nave roof for resonance. I believe that the cells in the nave ceiling, the arches in the nave walls, and the passages and recesses in the thickness of the walls, would entirely prevent any echo, and that with the pulpit and choir seats and organ placed where I have put them, every one could hear well, and music in particular would be certain to be effective.

5 Cost.—On this point I have been most careful not to exceed the limit set. I have made a careful calculation of the cost, founded upon my knowledge of the cost of corresponding buildings, and am satisfied that the work as drawn by me will be completed for the sum you have named. But I am content to leave this question to you, as you have agreed to take professional opinions on it, and my own anonymous evidence cannot be of much value. In conclusion, whilst I must apologise for writing at so much length, I hope I have not said more than necessary to explain the views with which I have gone into this work. To me it has been a real pleasure to work out the scheme to a certain extent completely on paper; but if I am so fortunate as to be deemed worthy of carrying it out in reality, I venture to say that no one would do so with more enthusiasm or more zeal, and that with my own hand every detail and every part should be designed and drawn, so as to make the whole work as harmonious, as uniform, and as artistic in its character as it is in my power to make it.

VALUE OF BUILDING LAND IN LONDON.—The value of building land in the City and Mayfair is illustrated by two recent sales. A piece of ground, 30 feet by 18 ft., in a narrow street abutting on Cheapside, so situate that any building placed upon it can be lighted only from the front, has been let for nearly £160 per annum. A small bijou residence in Seamore-place, held on lease (thirty years unexpired) at £8 per annum, and stabling held for eighteen years at £30 per annum, have been sold for £15,800.

THE HOOSAC TUNNEL.—The boring of the Hoosac Tunnel in Massachusetts is a work of American engineering which is of almost as much magnitude and difficulty as the Mont Cenis Tunnel. The Hoosac Mountain is a barrier to direct railway traffic in the State, its two summits being 1,400 ft. and 17,000 ft. above the grade of the proposed railway. The tunnel, when completed, will be 4.66 miles long, and work upon it was begun in 1855, but was not vigorously pushed until 1863. The tunnel is bored from the east and west ends, and also from a central shaft, parties working both ways. This enabled four boring parties to be constantly at work. The mountain is composed mainly of mica slate. On the 12th of December, by a series of successful blasts, the heading from the east end and the heading from the central shaft met, communication being opened between them, an event which caused quite a jubilee among the workmen. The engineers who had been working so many years entirely by calculation, discovered that they had worked almost with entire accuracy, the two cuttings not varying a foot either in grade or in line. A very strong air current passes from the east end into the central shaft, greatly aiding ventilation, while the slope of the tunnel carries off all the water from the shaft, so that the ponderous pumps heretofore worked there are no longer needed. A considerable portion of the tunnel is yet to be bored westward from the shaft, but the expectation is that this will be completed so that the entire tunnel will be ready for the railway in October, 1873. This tunnel is a State undertaking, paid for by the Massachusetts Treasury.

Building Intelligence.

CHURCHES AND CHAPELS.

DULWICH.—The new Baptist Chapel in Lordship-lane, Dulwich, was opened last week. The exterior is plainly built in yellow bricks, sparingly relieved with red bricks, and the windows are Gothic in character. Internally the arrangements are simple and commodious. There is one gallery at the end nearest the principal entrance, and accommodation is afforded for about 400 people. The pulpit is an adaptation of the platform, which has become so popular in Dissenting places of worship. Behind the chapel are commodious and well-appointed vestries, while underneath the whole building are two lofty and capacious school-rooms. The architect is Mr. Battley, of Old Kent-road, and he is also the builder, his tender having been the lowest. The total cost was £1,983.

GRAVESEND.—The foundation-stone of a new tower to the Roman Catholic Church of S. John the Evangelist, Gravesend, was laid on the 27th ult. The tower will be 100ft high, and will complete the exterior of the church. The architect is Mr. Goldie, and the new tower will be similar in character to the tower of the pro-Cathedral, York. The cost will be about £1,700.

LEWISHAM.—A reredos of Caen stone has been erected in this church. The design comprises a centre portion of three chastely-moulded arcades, embracing the width of the altar-table, with pinnaced supports, richly crocketed on either side, containing four niches for the reception of figures of the Evangelists, which it is proposed to carve in statuary marble, and insert, when the funds permit. The middle compartment of the arcade is deeply recessed and a statuary Calvary cross on a gold ground placed therein, and above it is erected a light and elaborate tabernacle canopy, supported on four polished Peterhead shafts, with the angels Michael and Gabriel supported on pinnacles on either side. In the panels of the side compartments are carved, on a richly diapered ground, the symbols of the Agnus Dei and the Pelican, and in the spandrels the Dove and the Alpha and Omega. The whole is profusely carved, and has been carefully studied throughout with a view to its emblematical teaching. The work has been executed by Mr. George Whittingham, of Edward-street, Kennington Park-road, from designs by the architect of the church, Mr. W. C. Banks, of Gracechurch-street, who has also designed a scheme for filling the whole of the traceried windows with stained glass.

OCKLEY.—The new church of S. John the Evangelist, Ockley, has been consecrated. The architect was Mr. G. R. Clarke, of Bedford Row. The edifice consists of a nave, 53ft. long and 24ft. wide, with a north porch and chancel, 24ft. 6in. long and 18ft. wide, with a vestry on the north, and an organ-chamber on the south side, forming a cross in plan. Two hundred and twenty persons can be seated. The walls are of brickwork, worked fair inside and out, 12ft to the springing of the roof to the nave, and 15ft. in the chancel. The windows, crossings, &c., are of Bath stone. The general character is Early English. There is no chancel arch, in the ordinary sense of the term, but brick piers and stone corbels receive an ornamental roof principal, which supplies the place of one. The flooring is of Godwin's Lugwardine tiles. The work has been executed by Mr. John Ansell, of Ockley, builder, at a cost of about £900. All fittings and expenses included, the total cost of the undertaking will be nearly £1,200.

OLDHAM.—The new church of S. Martin, Oldham was consecrated on the Feast of the Epiphany. The plans are by Messrs. Price and Linklater, Manchester, and the whole of the work has been carried out under their superintendence by Mr. James Herd, builder, of Clarence-street, Cheetham. The church consists of a nave 30ft. wide, and aisles and chancel. The nave arcade consists of four bays, with coupled lofty trefoil-headed lights in the clerestory. The church contains 531 seats, of which 211 are appropriated and 320 are free. The cost, exclusive of the site, is about £3,000. The front next German-street and the tower are of pierpoint walling, with stone dressings and window and door tracery.

MARCH.—Progress is being made in restoring and altering S. Wendreda's Church, March. The

removal of the north gallery reveals the stone pillars which support the building, and the window at the west end, formerly hidden by the gallery staircase, is now exposed to view. Some of the pews have been taken down, and open benches substituted in their stead. A new pavement of Minton's tiles is to supersede the present flooring of flagstone, the south gallery removed, and the chancel taken down and rebuilt. Various other changes, embracing a new ringing-floor for the belfry, a new door for the principal entrance, a new pulpit, reredos, and altar, are also in contemplation. The plans and specifications are to be prepared by Mr. William Smith, architect, London. The estimated cost of the work is £4,400.

SALISBURY DIOCESAN CHURCH BUILDING ASSOCIATION.—The first quarterly meeting for the present year was held on Thursday week. There were five applications for grants on the list, but in two of the cases—S. Mary, Marlborough, Wilts, and Ashmore, Dorset—the papers were not sufficiently forward to admit of their being considered. In the case of West Harnham, in the archdeaconry of Sarum, a grant of £50 was made on the understanding that the plans submitted were carried out. The total cost of the restoration was estimated at £1,100. The next application considered was one from the Rector of Tokenham Week, in the archdeaconry of Wilts. It was for aid towards the restoration of the parish church. The committee voted a grant of £60 to aid the undertaking. The last case gone into was an application from the Rev. H. M. Moseley for assistance towards the extension and improvement of the accommodation in Holt Church. The total expense being £250, the committee made a grant of £20. The works having been completed and certified, the amounts promised in the following cases were ordered to be paid. Christchurch, Warminster, Wilts; Potterne, Wilts; Pertwood, Wilts; Chute, Wilts; and Wooton Fitzpaine, Dorset.

STOWELL MEMORIAL CHURCH, SALFORD.—A reredos from the design of Mr. John Lowe, architect, Manchester, has been erected in this church. It is of varied stone enriched with marble, and extends the whole width of the chancel. The lower portion is of Darley Dale stone and the upper of Caen. This upper portion consists of five gabletted panels, the three central being so combined as to form a centre-piece. The panel shafts are of red granite, relieving the white Caen, and supporting pointed arches, having also carved caps. In the centre of each panel is a raised field with carved emblems (e.g., wheat, vine, passion-flower, &c.), and bearing appropriate inscriptions. The tympanum of each gable is a diapered surface of Styperson stone, in the centre of which is a circular panel of Caen stone enriched with various coloured marbles. Crocketed pinnacles separate the gables (which are also crocketed) and all terminate in carved finials. The whole is the gift of a lady, in memory of two friends of the late Canon Stowell. The builders were Messrs. Ellis and Hinchliffe, Manchester.

WOODHOUSE.—The Church of S. Mark, Woodhouse, Yorkshire, which was re-opened on Sunday, has undergone considerable alterations. The ground floor has been entirely replanned, the old high-backed pews having been replaced with open deal benches. A spacious chancel has been formed by raising the floor of the two easternmost bays and filling in between the columns with wooden screens. The floor of the chancel, or sacarium, is laid with tiling. The steps to the altar are of white Sicilian marble, with red marble risers. The walls and roofs have been cleaned down and painted in oil-colour. The spandrels of the walls over the chancel arches have a scroll-work pattern stencilled on a grey ground, with medallions representing the Four Greater Prophets. The east wall has been decorated so as to harmonise with the chancel window (which represents the Ascension). The reredos is divided into three panels, each containing a picture in oil-colours, the three symbolising the three dispensations—viz., the Patriarchal the Mosaic, and Christian. The panels to the left of the reredos will shortly be filled in with subjects representing the Miracles. A new oak pulpit and altar have also been supplied (the wood of the pulpit being more than 500 years old). The whole of the decorations have been carried out by Messrs. Powell Brothers, of Park-place, Leeds. The contractors for the wood seating are Messrs. Shires and Son, of Chapel-town. The pulpit and chancel screen are the workmanship of Mr.

James Wood, of S. Columba-street, Leeds. The gilding and varnishing has been done by Messrs. Frederick Jackson and Co., Wellington-street, Leeds. The work has been carried out under the superintendence of Messrs. Adams and Kelly, architects, of 27, Park-square, Leeds.

YORK.—The church of S. Martin, York, was re-opened on Sunday last, after restoration. The building has been entirely reset, a new organ erected, a reredos executed by Mr. Ruddock, of London, and several windows filled with stained glass. The sacarium has been divided from the north and south aisles by oaken screens resting on stone foundations. Mr. Newstead was the architect, and the work was done by local contractors.

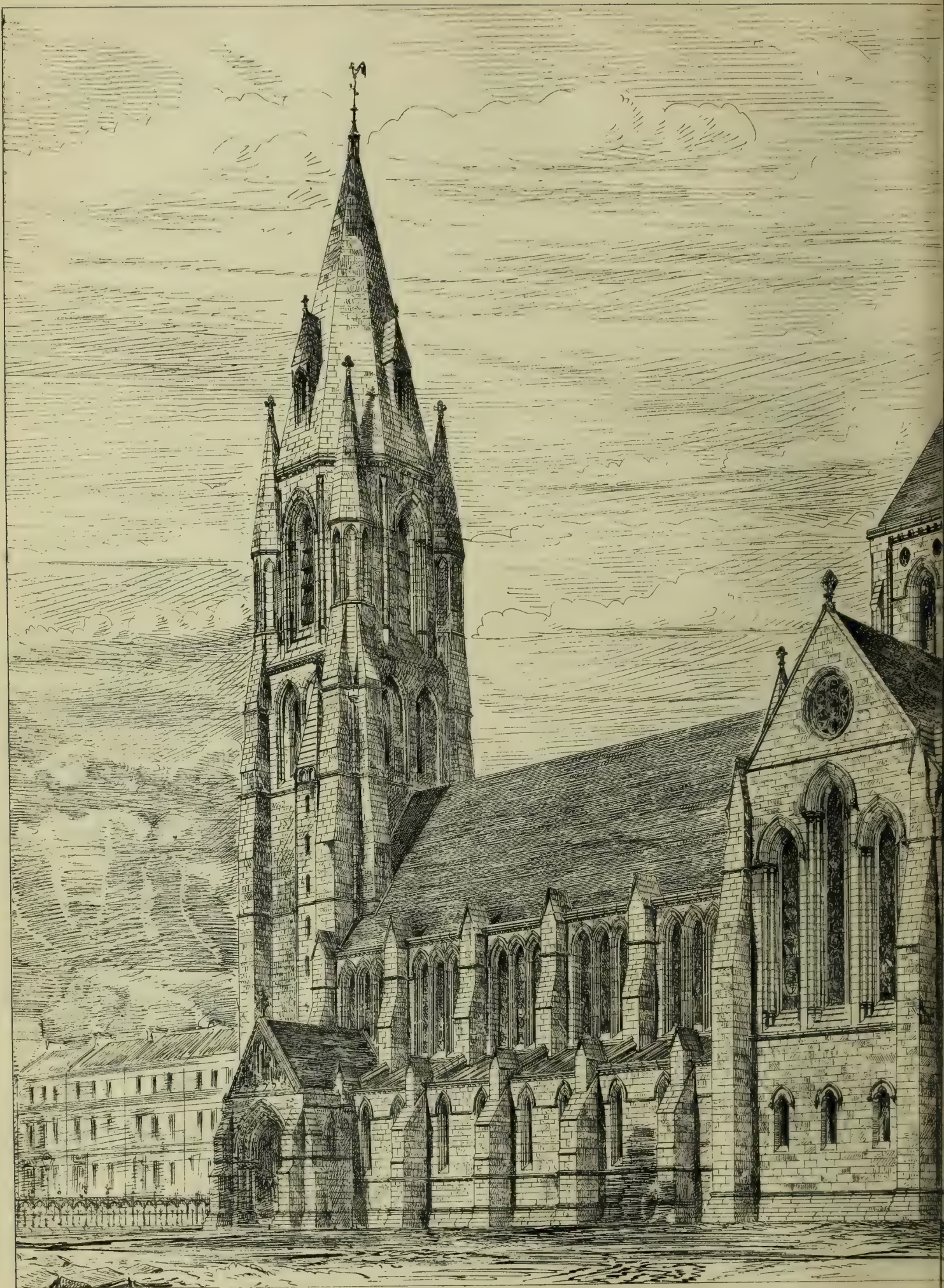
BUILDINGS.

ASHTON COURT, NEAR BRISTOL.—Considerable alterations, improvements, and additions, have been effected at this place—the princely seat of Sir Greville Smyth. The western wing has been rearranged, but the principal part of the works have been concentrated in the central portion of the building. This part has been raised considerably and in a great measure re-built, as is surmounted by two octagonal towers which rise to the height of 72 feet. A clock has also been fixed upon the inner front facing the courtyard, an altitude of 56 feet. Between the two towers on the front elevation, and upon the crowstep, carved the crest of the noble owner—a large eagle with a griffin's head. There is a covered passage running the length of the south side of the courtyard, which opens out into the court by a series of arcading of five bays. The capitals and corbels of these are carefully carved, birds and animals being largely used amongst the ornaments. The style of work, like the rest of the building, is Tudor, and Bath stone of the Box Ground variety has been used throughout. Mr. B. Ferrey, F.S.A., of Charing Cross, London, is the architect. The contractors for the whole of the works are Messrs. Herbert and Frederick Burridge, of Exmouth between one and two hundred men having been employed during the whole course of the work. The carving has been executed by Mr. Harbison, of Exeter. Mr. Thomas Cloutman was the clerk of works. Mr. James Symons was the foreman, and he was assisted in those duties during the latter part of the works by Mr. James Baker, who recently concluded his engagement as foreman of the extensive works of Lord Poltimor mansion, near Exeter, and who was foreman prior to that at the large church of Otterton, Devon; both jobs for the same contractors and under the same architect, Mr. B. Ferrey.

SCHOOLS.

MANCHESTER.—New schools in connection with the Stowell Memorial church were opened at Manchester on Thursday week. The building consists of two schoolrooms, one being 60ft. by 30ft., the smaller 59½ft. by 20ft., with a classroom 18ft. by 20ft. The buildings are of brick, faced with white headers and relieved with stone and stone brick dressings. The total cost, including boundary walls, is £2,290; and the works have been executed by Mr. G. Napier, builder, Huddersfield, under the superintendence of the architect, Mr. John Lowe.

THE CITY OF ST. LOUIS.—While New York is limited to a barren rocky island, Philadelphia to a low ridge between the Delaware and Schuylkill rivers, Washington City to a sterile, uninteresting region; Chicago to a low swampy prairie beyond; Cincinnati to a small circuit surrounded by steep rocky hills—St. Louis has the most natural contour of surface elevation of residence streets—deep clay on the limestone for brick cellars, sewerage, foundations; quarries of building rock in parts of the city; wells of pure water in the clays in many parts of the city, natural sewers, and dome-shaped hills for waterworks, essentially combining all the material resources for a great city. London and Paris are built upon Tertiary basins, where the soil is thin, the rocks generally too soft for good building material. Grand Avenue is twelve miles long, running parallel with the river, and forming a great roadway from the north to the south end of the city, and in the opinion of a correspondent, is destined in the future, with its fair grounds, great parks, cathedrals, churches, waterworks and private residences, to be the boulevard of the Western Continent.



DESIGN FOR THE CATHEDRAL
GEORGE EDMUND ST

JAN. 10. 1873.

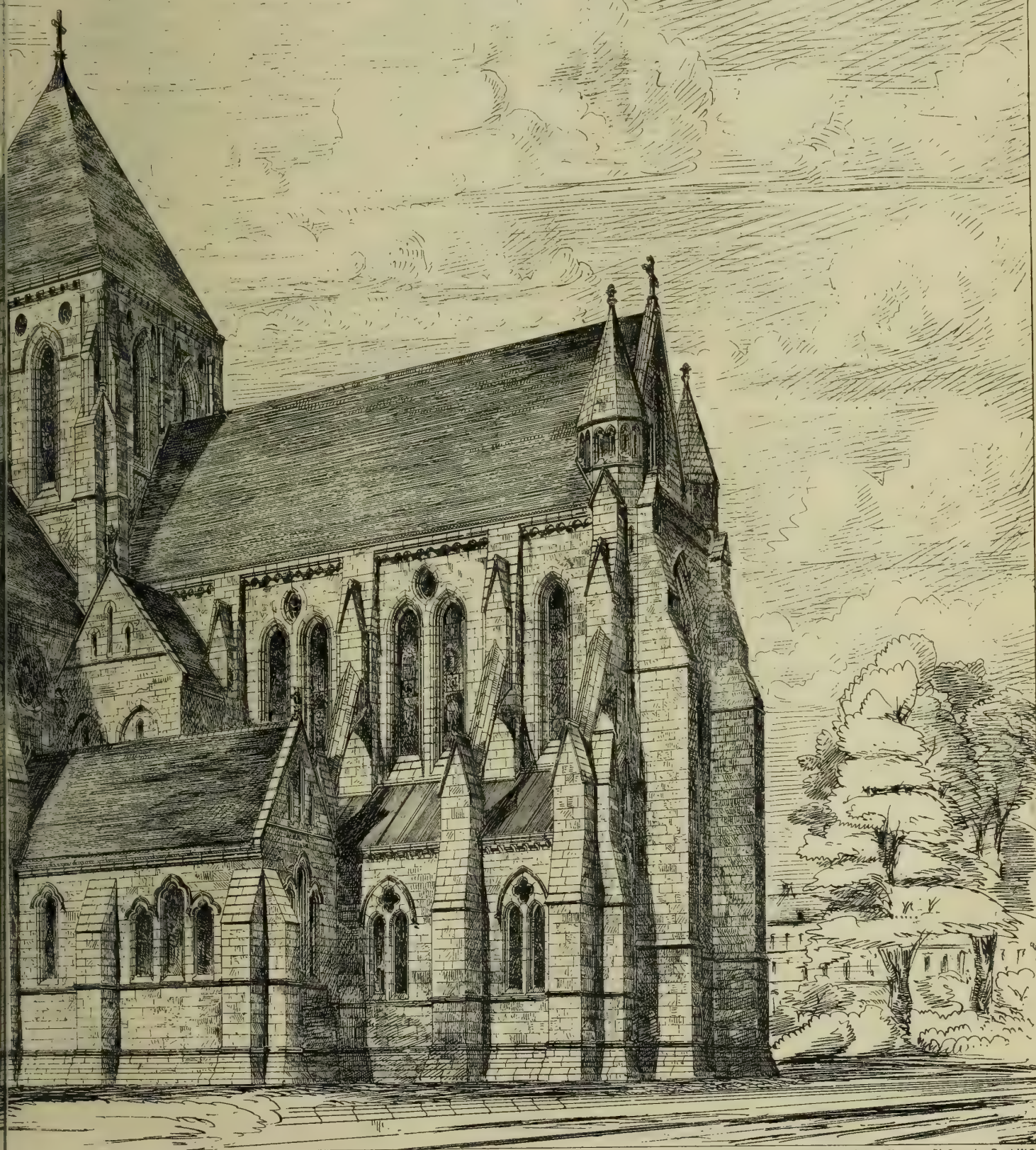


Photo-Lithographed & Printed by James Akerman, 51 Grays Inn Road W.C.

CHURCH OF ST. MARY, EDINBURGH.

MEET, R.A.—ARCHT.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for "Situations Wanted" are inserted at a charge of one shilling for the first twenty-four words, and sixpence for every succeeding eight words.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—J. O. C. and Co.—National Land Co., Limited—W. S.—W. H.—R. Y. T.—R. S. and Co.—T. T.—W. J. N.—W. B. and Co.—Secretary American Society of Civil Engineers.—L. and N.—W. S.—W. G. G. K.—W. and Sons.—R. O. M.—T. H. M.—H. L.—J. M. H.—W. P.—R. S. and Co.—G. S. A.—A. S. and Co.—J. B.—R. S. and Co.—G. M.—E. and S.—H. and Co.—J. G.—S. and S.—J. E. S.—P. H. and G. N.—P. A.—A. W.—J. T.—E. D.—J. F.—R. O.—G. and A. G.—E. K.—R. C. D.—S. and S.—R. K.—W. F. D. Dr. McC.

SCHOOL PLANNING COMPETITION.—Competitors may rely on the decision of the arbitrators, with full report, appearing in our next number.

AN ARCHITECT'S ASSISTANT.—We really see no good in writing such letters about the down-trodden character of architects' assistants. If they are to be benefited, it is not by hard words. Why not call some of the assistants together to talk over the matter?

J. W. T.—Thanks for such a hearty expression of approval and suggestions. We should be glad to receive suggestions for the improvement of the paper from any quarter.

E. THOMAS.—The quarterly number will only be larger in the number of its advertisements. It might with more propriety, perhaps, be called "the Advertisers' number."

BRIGHTON.—You did not send name and address.

Correspondence.

THE EDINBURGH CATHEDRAL COMPETITION.*

To the Editor of the BUILDING NEWS.

SIR,—As one of the architects invited to compete, I visited Edinburgh a year ago. I was asked to see the Bishop of Edinburgh on the subject, and I had what I thought was a most satisfactory interview with him. The result of our conversation was that I took it for granted that the trustees would not think of attempting to make a decision themselves, but would appoint either a professional architect to settle the question, or a small committee of non-professional but skilled judges of design. For myself, I certainly much preferred the first tribunal; but I competed solely because I believed that one or the other would be adopted.

If I had supposed that the trustees of Miss Walker's will were to be the judges, as I am not a madman, I should not have thought twice before refusing to compete. These trustees are I know not how many, but I was informed that they were for the most part *ex officio*, and consequently without the slightest pretence to have necessarily any artistic knowledge or culture whatever, and by a curious arrangement, to a considerable extent, if not mainly, Presbyterians, and therefore obviously unfit to form any trustworthy opinion as to the sort of building which would be most suitable for the use of the Episcopal Church of Scotland, and likely to be

somewhat prejudiced against any plan which might be really well arranged for services of which they had no knowledge, and for which they could have no sympathy.

In the first conditions sent to the architects who competed (and which had first of all been sent to each of us for revision) it was stated that the cost of the building was not to exceed £45,000, and that "Before deciding on the design to be adopted, the trustees will submit one or more of the designs they consider to be in other respects more suitable to a qualified surveyor, that he may make an independent estimate of the cost, in order to satisfy themselves that the design can be carried out for the above sum." The inference was obvious, that no design would be accepted which failed to satisfy this most proper condition.

The limit of cost was extended, some two or three months later, to £65,000; and when it was so extended I had already made my designs for the smaller sum, and had to begin my work again. I did this without grumbling, believing that I was engaged in an honest competition, and without any suspicion that in truth I was engaged in a mere lottery, and with no security for an equitable result.

The designs were sent in on August 1, and the first thing heard was that one of the architects had broken the conditions, which stipulated that "only" certain drawings should be made, by sending in two designs, and that the trustees had fairly enough insisted on one of them being withdrawn, though, when the competitors were all anonymous, it is difficult to know how they knew which of the architects had transgressed the instructions in this way.

Towards the latter part of August, whilst I was travelling in Carinthia, I received a letter from one of my clerks, saying that rumours were afloat that there was an intention on the part of the trustees to select a design without the intervention of any skilled person or persons, and that, with Mr. Burges's consent, Sir G. G. Scott had written to the trustees protesting against any such course, suggesting the immediate nomination of some eminent ecclesiastical architect for the purpose, and mentioning the name of Mr. Ewan Christian as one whose judgment and impartiality would, no doubt, be acquiesced in by all the competitors.

From the circumstance of my being in a very out-of-the-way part of Germany, I had no opportunity of joining in this respect, but I need hardly say that I was perfectly satisfied with what had been done by Sir G. G. Scott.

As soon as the decision was announced, I asked the Secretary of the Trustees for a copy of Mr. Christian's report. In reply to me that gentleman stated that Mr. Christian's report was obtained for their "private consideration," and was "marked by them" (not by Mr. Christian) "as confidential." He went on to say that "the case of the cathedral is entirely of a private nature," and that the trustees refused to publish, or to let me see, Mr. Christian's report.

The only conclusion that I can draw from this refusal is that the trustees, having decided in opposition to Mr. Christian's advice, are afraid to allow his report to be seen, and pretend to consider that the bequest of a quarter of a million of money, partly for the endowment of Scotch Episcopal clergy, and partly for the erection of a cathedral in the capital of Scotland, is so "private" a business as to justify what every disinterested person must allow to be a most unfair and uncourteous treatment of the competing architects.

It so happens that I do know, from the very best authority, some of the features of Mr. Christian's report. I know, first, that he made the estimates of cost, which we were promised should be made, and that the following was the result. My own design was reported to be one which could be executed for £65,000 Mr. Burges' design was but little more costly; and the other four designs all exceeded the amount named—to what extent I do not know, save that about the most costly of all was that of Mr. Ross, of Inverness, which was estimated at £130,000, being exactly double the amount named. And it is illustrative of the spirit in which the trustees acted, that with this estimate before them they are said to have absolutely deliberated at last as to whether this design or Sir G. G. Scott's should be accepted! I know also that Mr. Christian was of opinion that I was the only architect who had complied with all the requirements. And I am led to believe consequently that mine was the design which he recommended for adoption.

I have said enough, I think, to justify the appeal which I here publicly make to Mr. Christian to publish his report. He owes it, I think, to his own reputation to let us know whether he did or did not advise the trustees to select Sir G. G. Scott's design. No one can object less than I do to Sir G. G. Scott having any work to do which his very many admirers like to entrust to him. I owe him too much in many ways to wish him anything but good; and I have no wish to interfere with his work at Edinburgh any more than elsewhere. But this work might have been given to him without the waste of time and skill of other men, of which I and Mr. Burges in particular, have, as we are at present informed, a fair right to complain.

For myself, I will say that I hold very strongly that when competitions are managed as they usually are, architects have only themselves to blame if the results are not satisfactory. They ought to refuse to compete unless they have some assurance that a proper tribunal is to be named to decide on the merits of the designs. But I confess it never occurred to me as being possible that any trustees or committee would act in the way in which these cathedral trustees have acted. And were I in Mr. Christian's place, or acting under similar circumstances, I should feel it to be necessary to let the fact be known clearly if I was in no way responsible for their action.

An artist's reputation is everything to him; and if it is to be understood that in competing under what appear to be very fair and strict conditions, an architect may safely ignore the conditions, and trust to the ignorance, caprice, or prejudice of a committee, no architect who has any reputation to lose will ever venture on a competition. The occasions on which I have done so have been very few, and those of a public and important character, and I have always acquiesced patiently in the finality of a decision when it has been once given by a fair tribunal. But I have been tempted for the last time. For if in the case of so important a building, where so much caution was shown in drawing up the conditions, and where so eminent a professional referee was called in, both the conditions and the referee's report are treated as so much waste-paper, it is to be feared that no precautions which architects can devise will give any reasonable certainty of a fair result.

I think, Sir, that after what I have said your readers will join with me in wishing that Mr. Christian should publish his report, as being the most effectual way of preventing the recurrence of such a mode of dealing with competitors in any future competition.—Your obedient Servant,

GEORGE EDMUND STREET.

Dec. 30, 1872.

GRANITE BUILDINGS.

SIR,—The object of the letter on the above subject which you were good enough to insert in your issue of the 22nd of November was to propose the use of some better material as a facing for London buildings of the first class. The necessity for some change in our procedure as architects was shown by ample reference to existing freestone buildings in a state of decay. An interesting correspondence has ensued on a different issue, however—viz., fireproof construction—the facts and conclusions of the letter remaining unquestioned.

In the proposal I ventured to make, it was sufficient for me, in this point of view, to know that Scotch granite is as fireproof as Portland or other limestones or sandstones, if used as a thin casing to a thick external brick wall. It did not require the fires of London, Boston, and Chicago to prove that all materials, except brick, must sooner or later give way to intense heat. As architects, all we can do in construction is to apply each material so that it shall do its work better than any other would do it. Wood is very combustible, and cast iron and lead are soon melted; but they will always remain useful building materials, nevertheless. Polished granite has the supreme and unique advantage over the freestones of resisting the effects of the London atmosphere. Unlike them, it is neither disintegrated by chemical or mechanical action, nor blackened by the everlasting cloud of unconsumed carbon which hangs over the city.

Next to polished granite, I quite agree with Mr. Sorby and Mr. Trickett in all they say about sandstone; but the excellence of sandstone arises from its close affinity with granite. Craigleith

* Mr. Street, in a note, says that the above letter was copied to be sent us for insertion last week, but his clerk omitted to send it.—[Ed.]

stone, for instance, contains 98 per cent. of silica, and only one per cent. of carbonate of lime, the remainder consisting of bituminous substances and mica. Unfortunately, it blackens in town like the rest, owing to the planes of bedding absorbing the moist air. Nevertheless, I could find plenty of sandstone that would not bear Mr. Trickett's test of fire, and I am at a loss to understand how he is to prove Portland stone to be the "most desirable for building," when he admits that it would be calcined by fire. And in the walk he offers to take, what would he be able to say to his companion in favour of the material of Temple Bar, the Strand front of Somerset House, the old parts of the Temple Church, and the lower portions of St. Paul's—all grimy and decaying, and contrasting painfully with the present but (alas!) evanescent beauty of the new stonework of the Telegraph Office at St. Martin's-le-Grand. How different the effect, or rather want of effect, on polished granite, which, so far as the atmosphere is concerned, would be unchanged 100 years hence. A building treated as I propose with the different colours, like the Taj at Agra, and the Musjid at Delhi, could not be "dull," as Mr. Hicks seems to think; and the details of these Oriental buildings sufficiently show that there would be ample scope for any amount of artistic treatment.

I think we shall all feel indebted to Mr. Hicks for his information about the Cornish elvan as a fireproof material. It is, however, a granite, minus its least important element—mica.

I am, Sir, &c.,

H. TRAVIS.

Upper Sydenham.

THE "RESTORATION" OF CHESTER CATHEDRAL.

SIR,—I feel that I should be wanting in duty to my native city, as an artist and an admirer of her quaint and picturesque beauties, were I to let the opportunity slip of expressing the pleasure which I experienced in reading the letter of Mr. Samuel Huggins in the *BUILDING NEWS* of the 27th ult., and my full agreement with his sentiments on the result of the restoration of Chester Cathedral, which fully bears out all that he has advanced against restorations generally, in your journal and elsewhere. In this, I am well assured, I do not stand alone among the inhabitants of the diocese.

This judicious appeal of so well-known an architectural writer has made me hope that all is not lost yet; but certainly, the utter ruin of our grand mediæval monuments seemed so inevitable, and the absence of all protest against their demolition was, to say the least, so ominous, that I had well nigh despaired of even their partial preservation.

As to Chester Cathedral, I can frankly state, as an eye-witness, that it has been restored out of existence—there is now literally no such structure. There is, indeed, a modern Gothic church, built by Sir Gilbert Scott, which occupies the old site, and bears, as if in mockery, the old name; but its Mediæval predecessor, whose solemn beauty so harmonised with the quaint picturesqueness of the city (and whose antiquity and historic associations constituted it her tutelary genius, is gone for ever. I will venture to say that the Prussians and the Communists have inflicted far less injury on any of the great architectural monuments which experienced the effects of their artillery or their petroleum than the ill-directed zeal of the restorer has caused to the venerable pile in question. The former bombarded Strasbourg, but still its cathedral, though injured, remains; and after all the ravages of the latter, we can still see Notre-Dame and the Tuileries. But when any devoted minster is doomed to this ghastly process of restoration, its fate is sealed: the operator's main object seems to be first, to make the building fit for nothing by chiselling away its entire surface, so that a restoration of some sort becomes necessary, and then, like a boa-constrictor that has covered some mutilated carcase with its slime, he gorges the victim whole. Thus where the reckless soldier or the maniacal revolutionists simply damages, the barbaric restorer utterly destroys.

The Cathedral of St. Werburgh was to the City of Chester her main feature, and her principal charm, and its loss entails in a great degree the loss of her individuality. Certainly she has beauties still left: the "ancient hallowed Dee" yet flows past her venerable walls; her Rows are still intact (for how long Heaven above

knows), and around her still linger the quaint picturesque beauties of another age. But are these sufficient to comfort her for the loss of that stately pile, reared centuries ago by the Royal and saintly Werburga, which has looked down lovingly on so many succeeding generations, and was already venerable with age when the Plantagenets ruled England; and which, having been respected during all the feuds and turmoils of the middle ages, and spared even by Cromwell's Parliamentary army, has only survived to be ruthlessly desolated by Dean Howson and Sir Gilbert Scott? Its cloister, it is true, is still mainly untouched, and perhaps will remain so; though to expect even this, while it is at the mercy of those who have so flagrantly outraged taste and reason, is in the language of an eloquent writer "to hope against all hope."

I believe there are those among us who are not so tainted with the utilitarian and business-like spirit of the age but that they delight to gaze upon spots like this, where nature has invested art with more varied charms, and which time has hallowed with its most poetic associations; but whither shall they wander if, forsooth, the fiat of a dean and chapter can rob them of an intellectual pleasure, which is inalienably their own? The architect, the artist, the man of taste generally, are all deeply injured by this wholesale spoliation. It is a cruel wrong done to them, and they are justified in using—nay bound to use—every available means to place limits once and for all to the mischievous power of those who are causing a ruin which is all the more lamentable because it is irreparable. One reason why it is irreparable is that the enthusiastic and earnest feelings which prompted, and the untiring energy and devotion which carried out the erection of these superb buildings were exceptional, and therefore not likely to be paralleled in our days. Besides, we know too well that the mantle of those whose genius conceived and perfected these varied beauties has not fallen upon any modern shoulders.

But can we for a moment suppose that those who are depriving us of them ever reflect upon all this, even admitting that they know it? It is Sir Isaac Newton, who apostrophising his little dog that had caused the destruction of some invaluable manuscripts, said, "Diamond! Diamond! you little know the injury you have done me." But certainly, judging from appearances, the Dean and Chapter of Chester, though including amongst them a writer of the calibre of Canon Kingsley, seem to realise in no greater degree than the philosopher's dog the mischief they have done.

It appears that the Dean of Chester, Dr. Howson, intends, in the course of the year, describing, in the columns of the *Art Journal*, some of the picturesque views on the Dee. Now this to me is rather an anomalous—indeed, a farcical proceeding on the part of a gentleman who has wantonly caused the ruination of so grand a feature in many of the views on the river as the Cathedral undoubtedly was, and who has consequently displayed a want of appreciation of the picturesque that is almost incredible. Indeed it gives to this intention of his the appearance of a painful joke.

But, to return to Mr. Huggins's letter, I can heartily endorse his description of the change which has been effected by the restoration mania in Chester. Those who have admired the pictures of Prout, and others of a similar class, can understand what a mine of beauty there is in buildings like these, where the hand of Time has bestowed the tenderest harmonies of colour, and has lent to what was originally art alone so many of the charms of nature.

It is as an artist that I protest against their demolition, for these wondrous piles are often so merged into the natural scenery which surrounds them that they form a necessary portion of the landscape; and their destruction or restoration (which is the same thing) involves the ruin, for pictorial purposes, of all that had hitherto been pleasing to the eye, when viewed in connection with them.—I am, Sir, &c.

AN ARTIST.

THE OWNERSHIP OF DRAWINGS.

SIR,—Will you permit me to say that I, in common with the majority of the profession, deny the analogy drawn by Mr. Roger Smith, as between the drawings of the architect and the deeds of the solicitor. In my opinion, there is not the slightest comparison between them. The drawings are simply a means to an end—the deeds

are a record of the end itself. There is a consideration, however, which I have never yet seen advanced, in favour of my view, which ought, I think, to convince any impartial person. It is this—If drawings do not belong to an architect, by what right does he cause or permit them to be published, so as to make them a common property?—I am, Sir, &c., E. G.

THE "BUILDING NEWS" AND ITS ILLUSTRATIONS.

SIR,—I think your subscribers generally will see with great satisfaction the large increase just made in the number of your illustrations. Without underrating the value of written descriptions, there can be no doubt that in an art which, like architecture, deals wholly with visible forms, two or three lines by way of sketch are often better than pages of verbal explanation. I am perhaps not alone in believing that modern architecture would be better than it is if those who concern themselves with it wrote less and drew more. It is a curious and suggestive fact that scarcely one of the many critics who, in the last twenty years, have each laid down their own infallible set of rules for our guidance, has ever given a drawing of any kind to show those rules reduced to practice. Their theories, put into words, sound plausible and impressive to the last degree: but beyond words they have never yet gone, and their own authors have never ventured to apply them, even on paper, to architectural design. One may be pardoned for suspecting that they would not stand the test: that these theories of art are like Colman's leaden razors—only "made to sell"—and that this is why their vendors are so forward to boast of their virtues, and so backward in putting them to proof. If these speculative gentlemen could happily be denied for a little while the use of letter-press, and could be forced to avail themselves of lithography instead, the public would very soon get the measure of their capacity. A little bit of good architecture is worth more than any amount of talk about æsthetical principles, and I am sure you are proceeding in the right direction by giving us more of the former and, if possible, less than we have already had of the latter. I am not arguing against practical papers on any subject—constructive or decorative. Of these we shall be thankful for an unlimited number, either to describe what has been, or to suggest what may be done. Possibly we may hope that now there is so much more space available for illustrations, such papers may be accompanied more frequently by diagrams, which often increase their worth tenfold. Apart from this, however, there can be no doubt that abundance of subjects can be found—it matters not whether new or old, so long as they are good. Good specimens of planning, of construction, of architecture proper, or of decorative detail, will all be welcome: anything, in short, which, according to the common phrase, "has something in it" and which is not like the windy eloquence of our *a priori* friends—a mere incompressible mass of "smoke and blue vapour."—I am, Sir, &c. C.

"GOSSIP FROM GLASGOW" AND THE UNION STREET LAMP POSTS.

SIR,—I read the remarks of your Glasgow correspondent at p. 495-6, vol. xxii, but in so far as these treat upon the half-dozen new lamp-posts in Union-street, I cannot altogether agree with him. For street lamp-posts so far as I remember, their style is original, but as a model pattern for the erection of street lamp-posts at the outer edge of our pavements, I humbly consider there is great room for improvement. As a street lamp-post, I object to this one on account of the great thickness of the pedestal and the height to which said thickness is carried, viz., about 8ft. or so, thereby obstructing the view. At p. 496 we read:—"The pedestal is proportioned to the tripod, and the tripod to the lamp." Now, as it appears to me, these proportions are at least somehow rather curious. Why, the pedestal might serve as a pillar for a small cathedral, let alone serving only to support a tripod and its superincumbent small pear-shaped glass globe. It runs in my head that I have seen some beautiful specimens of pedestals supporting tripods and lamps, but in place of the centre of such being thicker than a man's body, they were only about the thickness of one's arm. I do not object to a breadth of 1ft. 6in. or so being carried up to a height of about 3ft. 6in., but to carry it up to a height above the level of the eye is in my opinion wrong. The diameter of no street lamp-post erected at the edge of our pavements ought to be more than about 6in., at a height of about 4ft. 6in. from the ground. I admit that the architect has made his lamp-posts so very massive because they are "a carefully-studied adjunct to the building," but I ask why could he not make his building independent of such objectionable lamp-posts? Or if the two were to be expressly connected in viewing the elevation, why not take everything into consideration and make the two together altogether suitable to the locality? I think the architect could do better. Were the lamp-posts also to serve as gate-posts, then their size, &c. would be all right. The style of the building to which these lamp-posts serve as adjuncts

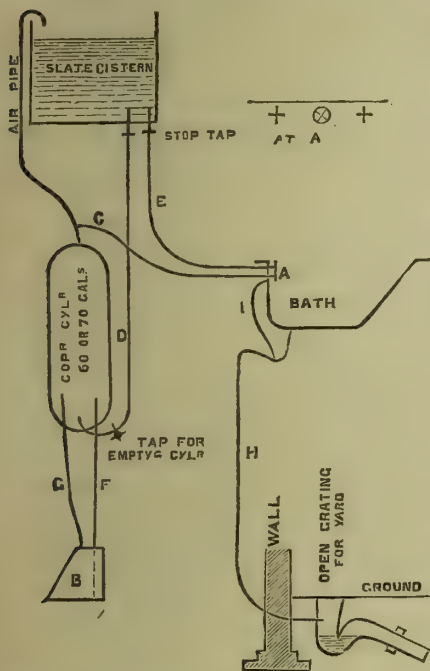
appears to me to be an adaptation of the old Assyrian or Porsopolitan type. Reviewing the elevation *per se*, it appears heavy at the top and slim at the bottom, but this slimmness in the lower part is in great measure counteracted by the lamp-posts when the building is viewed a little way off. That, however, taking the whole matter into consideration, appears to me to be something like robbing Peter to pay Paul.—I am, Sir, &c., EXCELSIOR.

FITTING UP BATHS.

SIR,—Your contributor of the article on plumbing in your last week's issue would, I think, do well to visit the neighbourhood of Manchester, where he would find hundreds of baths fitted up in a very simple and inexpensive way.

Wooden baths or baths lined with lead are here a thing of the past.

Iron baths (painted, japanned, galvanised, or enamelled), or the Stourbridge baths, which are fine clay enamelled inside, are very much more preferred, being more cleanly and not liable to get out of order. No lead safes are required, and all the fittings to them are made thoroughly water-tight by means of flanges and back nuts or fly burrs. The fitting up of baths, &c., with



many architects and plumbers has been sadly too complicated, and the annoyance and expense incurred has deterred many people from having them fixed. I may say that many water companies would not allow a bath to be fitted as shown in Fig. 135, neither should I recommend it. It is always the best to have the taps and plugs, &c., in both baths and wash basins, &c., where they can be always seen and got at without any pulling to pieces of woodwork, &c. I herewith send you pen and ink sketch of the simplest way of fitting up a house with hot and cold water for bath and other purposes. C Pipe for hot water to bath, and anywhere else it may be required; D supply pipe to cylinder; E cold supply to bath and anywhere else it may be required; F and G circulating pipes from boiler to cylinder; H waste pipe from bath; I, overflow from bath.

Never let a waste pipe from a bath, or slopstone, or lavatory, &c., have direct communication with a main drain. Always guide them to a gully trap, with an open grating on the top. Never let a waste pipe from bath, &c., be soldered to a soil pipe, as the sudden changes caused by the hot water from the baths, &c., will break the joints in course of time.—I am, Sir, &c., H. K. Altrincham.

COMPETITION FOR STATUE, FOUNTAINS, LAMPS, &c., DERBY.

SIR,—The drawings for above competition were sent in nearly three months ago. If any competitor has heard anything concerning it, would he kindly communicate the result through the medium of this paper? It is quite time it was settled.—I am, Sir, &c., ANXIOUS COMPETITOR. Jan. 8, 1873.

COVERING THE ROOFS OF HOUSES WITH CEMENT.

SIR,—I think the suggestion at p. 25 would prove an expensive experiment, and anything but an improvement. In a short time I fear the cement would begin to crack, and upon being repaired the roof would have an exceedingly patchy appearance. The "careless plumber" may have his faults, but upon trial I greatly fear the cement-layer would soon prove that he was not faultless either.—I am, Sir, &c., PLUMBUS.

QUANTITIES.

SIR,—I have read the article on "Quantities" by "B. F." in your last issue with pleasure, the subject being of great importance to the profession, particularly to younger members. I trust your contributor will go fully into the various trades, especially masonry, that being generally but slightly touched on in "works on quantities." I had hoped to have found that Dobson's and Tarn's work (recently published) would have fully gone into

the different kinds of labours to be taken on stone work, masonry being the most complicated. Again, take earthenware drains for instance, how is a student to know what is required when a 6in. pipe enters a 9in? He is at a loss what to take, and turns over the leaves for information on the point in vain. (A diminishing socket is necessary.) Again it is stated that earthenware drains are measured per foot run, numbering all junctions, &c. This is very vague. It should be stated that these are numbered as "extra only," the length containing the junction being measured in with the rest.

In reference to iron work, not a word is mentioned as to rivetting girders, stanchions, &c., in position. This being extra labour, of course, bears a better price.—I am, Sir, &c., A STUDENT.

SIR,—Mr. Fletcher's article in last week's BUILDING NEWS on the above subject contained an illustration of the form used for a dimension book, and the items of brickwork were rendered incomplete by his not stating whether the work was built in mortar or cement; and were abstracting the items such question would naturally arise. If the articles you are about to publish on the subject of Quantities are to be of real value, they must not only be practical but pre-eminently technical.—I am, Sir, &c., W. W.

"THE PROPOSED KNOX MEMORIAL AND 'THE HEART OF MID-LOTHIAN'."

SIR,—I observe in a recent number of the BUILDING NEWS a letter under this heading in which the writer says: "Surely, no huge tower, however grand, on any site could vie with an artistic memorial gem of Mediaeval design placed near St. Giles's in the shape of a bronze canopied statue of Knox on a pedestal of granite," &c. When it is remembered that in Scotland no man did so much as John Knox to overturn that system with which "Mediaeval design" is most intimately associated, it will appear how wholly inappropriate must be a Mediaeval style in any monument in Edinburgh worthy of the great Reformer. The proposal may be ironical, but if so, the irony is inartistically concealed.—I am, &c., L. M.

"RUSKIN."

SIR,—Your correspondent is, do doubt, correct in his mode of dividing this name. We find the word "Rus," in the following towns, &c., "Ruston," "Ruskinton," "Rusper," and "Ruskey," and with slight modification in "Roos," "Ros," "Roscarberry," "Roscommon," "Rossett," "Roslin," "Rhosymedre," "Rhosybol," "Rhosytrall," "Rhoscrowther," &c. "Rhôs" is an ancient British word, and means a large, swampy meadow, a moist or moorish heath—a tract of peat, moss, or heath land. Associated with the diminutive "kin," it would imply a small meadow, moor, heath, or tract of land, and would be equivalent to the names "Smallheath" or "Smalley," and closely associated with that of "Felkin," small field.

We do not find "Rud" (red or reddish brown), as in "Rudkin" to have been corrupted to "Rus." We can trace it to "Rad," "Ret," and "Rat," as in "Radford," "Retford" (red way or road), and "Ratcliff" (Redcliff). As "Rudkin," it would be applicable to a child possessing red hair, or a ruddy complexion.

The name under notice is drawn from the simplest and purest source, and is of undoubted antiquity.—I am, Sir, &c., W. L. Hull, Jan. 7, 1873.

"THE BUILDING NEWS."

EXTRACTS FROM CORRESPONDENCE.

"I for one of your numerous readers are exceedingly glad to note the marked improvement in the present number of the BUILDING NEWS, and I am sure no one of your subscribers can possibly object to the small extra charge of a penny in return for so lavish an expenditure in engravings."—WILLIAM B. HALL, Gateshead.

"Your liberality in giving so many illustrations deserves all praise and success. I subscribe through a country agent, as that prevents the plates being damaged in the post."—C. HODGSON FOWLER, F.R.I.B.A., North Bailey, Durham.

"I think you have placed the whole profession, and those intended for the profession, under a debt of gratitude to you for your latest development of the pictorial department of the BUILDING NEWS."—MATTHEW SYMONS, Windsor-terrace, Plymouth.

"Your first number for the new year is to hand. I should take it in if it were double the price, as I think it a great boon to the profession."—STEP. SHAW, Kendal.

"I am greatly pleased with the change you have made. I shall endeavour to get my acquaintances, who have not yet taken the B. N., to become subscribers, as in my opinion it is the best paper published for the profession."—ROBERT WALKER, Ravenstone Hall.

"Of course we are all pleased at the 'remarkable development' the BUILDING NEWS has undergone, though to all appearance, and certainly in this town, you had before disconcerted your rivals. Our fear is that you have promised too much for the money."—JAMES MACFARLANE, Abercrombie-square, Liverpool.

"I should think that there are very few of your readers who are otherwise than satisfied with the BUILDING NEWS of the past, and feel sure one and all will agree in saying that the first No. of the new year is excellent in all respects. Speaking for myself, I am particularly glad to hear that you are to favour us with a continuation of the works of the great German Master, Albert Dürer. Permit me the pleasure of wishing you, as Editor, a Happy New Year, and all success in your bold, very bold, but not too bold, undertaking."—T. RUSSELL, 28, Salisbury-road, Dalsdon.

"I consider the alteration in your paper a very great improvement."—JAMES T. JOHNSON, R.E. Office, Woolwich.

"As a subscriber of 14 years, I beg to say that I am very pleased with your alteration. I am looking forward to the reproductions from A. Dürer and others. Those that

you have already published I have had mounted and glazed and I should be only too pleased to cover every part of my walls with similar works."—ROBERT E. JAMES, 129, Kennington-lane, S.E.

"The enlargement of your esteemed paper, with the wide range of subjects and illustrations your increased space will allow, cannot but meet with universal approval. It should be remembered that many of your readers, while not architects, are engaged in art callings, and your attention to their wants will be well received."—H. JONES, 26, Kempster-terrace, Lower Broughton, Manchester.

"Perhaps it would be impossible for an architectural journal having no illustrations to live in the present race of competition, and I think you have rightly interpreted the desire of the subscribers to the BUILDING NEWS in your determination to increase the quantity of illustrations. The extra bulk which you say will be added will be worth twice the additional cost. Now that you will have 'ample room and scope enough,' it would be very interesting for architects to present along with general views large working details of their designs. In that way a clearer insight into the merits of the building may be obtained."—JAMES HICKS, Sparrow, Redruth.

"It strikes me, sir, that you are doing more for the advancement and improvement of architects' assistants and pupils than you get credit for. From time to time we have evidences of your lively interest, and now we have another outburst of goodwill by augmenting the illustrations of the BUILDING NEWS, at such a trifling additional cost, and I am sure we shall hail with delight the new arrangement for which we may all feel very grateful."—ABSALOM WOOD, 24 Hanover-street, Burslem.

"I think your alteration a great improvement, and I look forward with interest to the promised illustrations of engineering works."—ROBERT LITTLE, 17, Archibald-place, Edinburgh.

"You have taken us quite by surprise. I and three friends who are subscribers desire to say that we approve of the alteration. We should like you to give us plenty of good details."—E. GRIMES, Manchester.

"Accept my hearty thanks for the alteration in your very valuable paper."—S. T. WILLIAMS, Bacup-road, Rawtenstall.

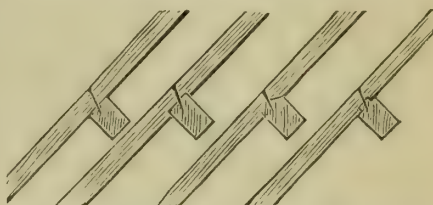
"I congratulate you on your enlargement. I know several who have given up their other papers in your favour."—T. L. WATSON, 23, Bloomfield-street, Westbourne-terrace.

[The above are culled from a large number of letters before us, from which, if we have room, we may take some other extracts next week.—Ed.]

Intercommunication.

QUESTIONS.

[2751].—Fixing Spars.—All things considered, which is the best method of fixing rafters on to purlins?—F.



[2752].—Book-keeping for a Jobbing Builder.—I shall feel obliged if some of your contributors would kindly inform me of the best method of book-keeping for a jobbing builder. I am commencing business in that branch, and not liking the manner in which the books have been previously kept, I would like to begin as I wish to continue, and therefore would like to profit by the experience of the numerous readers of the BUILDING NEWS, and adopt the method best known to them, feeling sure I shall thereby obtain the information I require.—A. O. F.

[2753].—Selenitic Mortar.—Could any of your numerous readers inform me the best way of preparing the selenitic mortar, to be used as plastering?—A. CONSTANT READER.

[2754].—Chimney-pots.—Who should pay for damage done by one of my chimney-pots, which was blown down by the late gales on to my neighbour's roof, breaking the slates?—M. O. S.

[2755].—Glass Cisterns.—Some time since I read somewhere of cisterns being constructed of glass slabs of a similar thickness to those used in pavements to light basements. I think they are used in America. Will any one be good enough to give some information on the matter?—TANK.

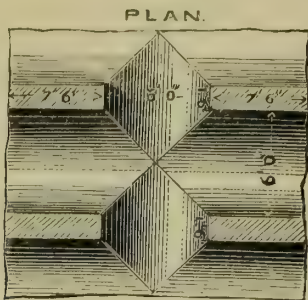
[2756].—Summer Houses.—Will some of our readers kindly give a true interpretation of the "Metropolitan Building Act" as applied to summer houses. Several surveyors, whose opinions have been taken, differ as to whether summer houses erected at the bottom of gardens come under the jurisdiction of the Act. The one in question is constructed lightly of trellis work and roofed with painted weather boarding, and is about 7 ft. 6 in. square, and correspondingly high. The surveyor of the district has objected to it, although erected years ago, and as nearly every garden in the neighbourhood has a summer house similar in construction and situation, this interference becomes a matter of anxiety to a great many. If any parallel case tried in court could be quoted, the information would be valuable.—BUSY BEE

[2757].—Best Roof for Dairy.—What will make the best covering for the roof of a dairy, in order to obtain a regular temperature of heat internally, Welsh slates of themselves being considered too hot in summer?—A. YORKSHIRE SUBSCRIBER.

REPLIES.

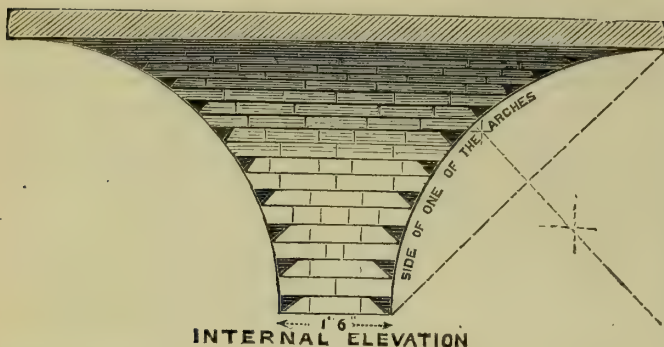
[2725.]—Groins.—If the enclosed drawing of groined

DORKING.—The men employed in sinking the well for the new waterworks at the foot of Tower-hill, Dorking, have already succeeded in obtaining a depth of 35 feet of water, and the process of pumping the same into the newly erected reservoir is now going on, so that the inhabitants may look for an almost immediate supply from this source.



SEWAGE VENTILATION.—At the first sessional meeting of the year of the Social Science Association, held at the rooms of the Association, Adam-street, Adelphi, London, on Monday, under the presidency of Lord Napier, a paper was read by Dr. Carpenter on the simplicity and safety of sewage ventilation. He urged that the source of danger in connection with sewage was to be found in discharges of air rather than from the house drain than from the public sewer. Stagnation generally existed in house drains as at present constructed, except when they were in use, whilst in sewers the sewage was generally running. The principle to be avoided was stagnation; the principle to be inculcated movement. Keep the sewage constantly moving, said Dr. Carpenter, and no evil will arise. If every soil-pipe is extended upwards in a straight line above the closet, so as to provide openings to the external air, there will be a constant current from within the sewer through the house drains into the open air.

which will prevent the possibility of stagnation, and cut short the evils which spring from the introduction of sewer gas into houses. Dr. Carpenter cited the case of Croydon in support of the efficacy of this principle.



arches in brickwork is of any service to "Portsmouth," he is welcome to it.—ANON.

[2740.]—Ventilation.—"B." appears to me to have made rather a muddle of his verbal explanation at page 30. Possibly it might serve his purpose to put in one or more zinc pipes under the flooring, with perforated openings for cold air, and for heated air the same above the ceiling. Or for fresh air, if the staircase be ventilated, simply cutting holes inside of wall next it might serve.—P.

[2745.]—Valve Water-closets.—A simple and good water-closet, and one which combines cistern within itself, is Shank's patent, an illustration of which appears in the BUILDING NEWS for 13th September last. One fault it has, however, is that instead of the top of syphon-trap being placed immediately under centre of basin, it is placed about 10 in. to one side. Of course, for a new job it is just as easy to put in the syphon trap to one side as it is to put it in centre. I may here mention that I have found some plumbers fitting up these closets without syphon-traps. I denounce such a cut-and-run style of doing the work. Apart from patents, however, the common pan closet, properly fitted up with cistern and service-box above it, is hardly to be excelled by any for general use.—P.

[2745.]—Valve Water-closets.—In reply to "Plumber" I have, from practical experience, found Jennings's patent white water closet apparatus, which is made in one piece, to be the best, provided there be a good pressure of water.—A BUILDER.

[2745.]—Setting Fire Grates.—Underhay's patent Regulative Closets are, in my opinion, the most suitable, as all valves, cranks, and wires are dispensed with.—AN ARCHITECT.

[2746.]—Fonts in Churches.—One would have thought in these days, when so much is written and said about the ritual of the English Catholic Church, that even "A Puritan" would have known why the font is placed near the entrance of a church. It is placed there simply to remind one that it was by Holy Baptism that we were made Christians and members of the Catholic Church.—A CHURCHMAN.

WATER SUPPLY AND SANITARY MATTERS

WATER SUPPLY.—The rivers Thames and Lea have been in high flood throughout December, and Dr. Frankland, F.R.S., reports that "their waters, even after filtration, were very unsuitable for domestic use." Of the five companies drawing their supply from the Thames, only the West Middlesex delivered water "in an efficiently filtered condition," and on the 24th both the Grand Junction and the Lambeth Companies sent out "turbid and repulsive-looking water." The Lea water, distributed by the New River and East London Companies, was efficiently filtered; and that supplied by the Kent Company and pumped from deep wells was not affected by the heavy rainfall, its brilliancy remaining unimpaired. Taking unity to represent the amount of organic impurity contained in the Kent Company's water, the proportional amount in an equal volume of water supplied by each of the other metropolitan companies was:—New River, 4.7; West Middlesex, 5.8; Chelsea, 6.6; East London, 6.7; Southwark, 7.0; Grand Junction, 7.2; and Lambeth, 7.6. Dr. Hill, the medical officer of health for Birmingham, reports that the water supplied to that town on the 6th was slightly turbid, and showed an increase of impurities.

Cement from Slag.—Some notes from M. Hugh, on a new cement obtained with blast furnace slags appeared in the *Revue Hebdomadaire de Chimie*. These slags ordinarily consist of silicates of alumina and lime. One part of pulverised slag is mixed with one part of hydrochloric acid, and one part of water, and the mass well stirred. The slag decomposes and forms a gelatinous mass, from which the metallic chlorides may readily be washed. The residue is heated and ground to an impalpable powder. One part of this powder with nine of slag gives a good hydraulic cement.

STATUES, MEMORIALS, &c.

THE LATE MR. LAMB, ARCHITECT, PAISLEY.—At a meeting of his friends and townsmen held on the 27th ult., within the Council Chambers, Paisley, Provost Murray in the chair, it was resolved to erect a granite monolith, surmounted by a colossal bronze bust, over his grave, to commemorate their respect for his character as a citizen, and as a man of culture and of letters.

THE LATE DR. NORMAN. McLEOD.—Shortly after the decease of the Rev. Dr. Norman McLeod, the inhabitants of the parish of Loudoun, to the pastoral charge of which parish he was ordained in 1838, resolved to erect a tablet in the church to his memory. The tablet is now completed. It is of Gothic design in white marble, on a background of black marble. It is supported on consoles, and at each side is a pillar with carved capitals.

THE SALT MEMORIAL AT BRADFORD.—The site of the memorial statue to Sir Titus Salt in front of the Town Hall at Bradford, has been marked out. The Corporation has granted permission to the architects, Messrs. Lockwood and Mawson, to erect a wooden model of the canopy that is to surmount the statue, in order that a correct idea may be formed as to how the memorial will look on the site selected. The canopy, under which the seated figure in white marble will be placed, is an elaborate piece of Gothic work, chastely designed, and in keeping with the architecture of the Town Hall.

BAVARIA.—The King of Bavaria has given a commission to the celebrated sculptor Halbig for a colossal group representing the Crucifixion, to be erected on a mountain commanding the valley of Ammes, in the Bavarian Highlands, the scene of the decennial Passion Play. The figure is to be carved out of an immense block of marble weighing upwards of fourteen hundredweight.

DUNDEE.—£1,400 having been subscribed towards the erection of a statue of the late Mr. James Carmichael, engineer, Mr. Brodie, R.S.A., is at present engaged preparing the model. On one side of the pedestal it is proposed to place a medallion of Charles Carmichael, and of the other three bas-reliefs of the inventions of him whose memory the statue will perpetuate.

STAINED GLASS.

DOVER.—The last of the memorial windows in the Maison Dieu Hall, Dover, is shortly to be erected. The subject of the window will be the visit of Edward III. on his second expedition to France. The cartoons will be by Mr. Edward J. Poynter, and the work will be executed by Messrs. Heaton, Butler, and Bayne, of Garrick-street, London.

ALL SAINTS' CHURCH, ACTON.—Another of the windows in the chancel of this church has been filled with stained glass, the gift of Mr. William Hunter, of Purley Lodge, Croydon. The subjects are selected from the lives of SS. Stephen and Paul, and are characteristic of the saintships of martyrdom and faith. The window has been designed and executed by Powell Brothers, of Park-place, Leeds.

EYNESBURY.—The four lights in the porch of St. Mary's Church, Eynesbury, have lately been filled with stained glass by Messrs. Hardman and Co., of Birmingham. Each light contains a single figure, very rich in treatment, both in colour and detail. The figures are these: (1) Blessed Virgin, with a lily in her hand; (2) St. Joseph, also with a lily; (3) St. Philip, with a spear in one hand and a book in the other; and (4) St. Mary Magdalene with a pot of ointment.

LAND AND BUILDING SOCIETIES.

NEWCASTLE-UNDER-LYME.—The twenty-second annual report and balance-sheet of the Newcastle-under-Lyme Building Society, of which Mr. John Cooper, jun., is secretary, have just been issued. It announces a considerable increase in every department of the society's business. Advances amounting to £9465 have been effected during the past year, making the total amount since the commencement of the society £60,211. The report states that all property of a speculative character has been avoided, and advances carefully made only upon property of sufficient value. Last year the total number of shares was 823½. During the past year 865 shares had been entered, 143 ordinary, and 30 realised shares withdrawn, leaving a total of 1,005½ shares on the register. The sum received during the year by way of deposit was £5,924, the sum repaid £303, and the sum now standing to the credit of this account was £7,935. 14s., which figures showed an increased confidence in this department of the society's business. The liabilities and assets account showed a balance of profit for this year of £11,443 4s. 7½d.

SOUTHAMPTON.—The twentieth annual meeting of the Southampton and South Hants Permanent Building Society was held on Tuesday week. The director's report stated that they considered the profits for the past year highly satisfactory. They amounted to £1,307. 17s., and as the directors had resolved that the guarantee fund should remain the same as last year, namely, £1,250, the whole would become divisible amongst the investing and borrowing members.

RECENT PATENTS CONNECTED WITH THE BUILDING TRADES.

1788. J. MILROY, Edinburgh, "Constructing foundations, piers, quays, and similar structures."—Dated June 13, 1872.

The structures are formed by sinking columns of circular or polygonal cross section, in contact with each other in single rows, or in two or more contiguous rows, such columns being made up of sections of concrete, brickwork, or stonework, in the manner described in No. 2255 of 1870. The present invention consists principally in making the columnar sections so that adjacent columns may interlock with each other. This interlocking is vertical as well as lateral. In some cases each separate mass may comprise the united or conjointly made sections of two, three, or even four columns. Or the segments or sections of one tier or layer are disposed so as to "break joint" with those of the tier or layer below. Weight is applied by means of iron rings or annular weights cast of shapes corresponding to the sectional contour of the columns, and so as to lie fairly and evenly on the entire top surface of the columns.

3759. G. HASELTINE, Southampton-buildings, "Method of and apparatus for laying wood pavements."—Dated December 11, 1872.

First puddle the foundation or bed of the pavement and give to the latter a firm bearing by applying water to the said foundation after the blocks had been laid, and the channel or spaces between them partly filled with gravel. Afterwards ram the filling and blocks with an iron blade.

1698. J. HARTLEY & Z. SUGDEN, Halifax, "Boilers."—Dated June 5, 1872.

The inventors employ an outer water heating space concentric with the interior or boiler, and on which additional water space the flame and heated gases act. The interior boiler is connected to the interior water space by means of hollow or water way mid-feathers.

Our Office Table.

PUBLIC WORKS IN PARIS.—In the budget of the city of Paris a sum of 24 millions is inscribed for masonry works. The buildings on which that money is to be expended are the following:—Completion of the churches of S. Joseph, Notre-Dame-des-Champs, S. Francois Xavier, and Notre-Dame-de-la-Croix, at Ménilmontant; also of the synagogues in the Rue de la Victoire and Palais Royale; and the Rollin and Chaptal Colleges; for the construction, totally or partially, of the mairies in the 12th, 13th, 15th, 16th, and 20th arrondissements; of various district schools and markets, and of the reservoirs at Montrouge.

A HOUSE WITH A STORY.—No house in Fleet-street, says Mr. Walter Thornbury, in "Old and New London," has a more curious pedigree than that gilt and painted shop opposite Chancery-lane (No. 17, south side), falsely called the Palace of Henry VIII. and Cardinal Wolsey. It was originally the office of the Duchy of Cornwall in the reign of James I. It is just possible that it was the house originally built by Sir Amyas Paulet, at Wolsey's command, in resentment for Sir Amyas having set Wolsey, when a mere parish priest, in the stocks for a brawl. Wolsey, at the time of the ignominious punishment, was schoolmaster to the children of the Marquis of Dorset. Paulet was confined to his house for five or six years, to appease the proud Cardinal, who lived in Chancery-lane. Sir Amyas rebuilt his prison, covering the front with badges of the Cardinal. It was afterwards Nando's, a famous coffee-house, where Thurlow picked up his great brief. One night Thurlow, arguing here keenly about the celebrated Douglas case, was heard by some lawyers with delight, and the next

day, to his astonishment, was appointed junior counsel. This case won him a silk gown, and so his fortune was made by that one lucky night at Nando's. No. 17 was afterwards the place where Mrs. Salmon (the Madame Tussaud of earlier times) exhibited her waxwork kings and queens. There was a figure on crutches at the door; and Old Mother Shipton, the witch, kicked the astonished visitor as he left.

A PROPOSED LONDON IMPROVEMENT.—At the Metropolitan Board of Works on Friday last a deputation from the vestry of the precinct of the Savoy was introduced, in order to urge the desirability of constructing a new street from the Strand to the Thames Embankment between Surrey and Villiers Streets. It was stated by the deputation that the Embankment was at present a failure from the want of some such communication, the number of vehicles making use of the roadway from Whitehall to Blackfriars being at present extremely small. The matter was referred to the Works Committee.

PRECAUTIONS AGAINST FIRE AT SALISBURY CATHEDRAL.—The precautions against fire at Salisbury Cathedral are now completed. The water from the reservoir is introduced at the west end; the pipes conveying it are carried along the whole length of the nave, up to the Lady Chapel, which branches into the transepts. Connected with these pipes are nine hydrants in various positions, with six 40ft. lengths of hose, kept on wheels, which instantly on the alarm of fire could be carried to the spot required.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—The first of the four *conversazioni* announced to take place during the present session in connection with the Society for the Encouragement of the Fine Arts will be held, by permission of the Council of the Society of British Artists, at their gallery in Suffolk-street, Pall Mall, on Thursday evening next, the 16th inst.

STREET NOMENCLATURE.—The Hackney District Board of Works has come to an issue which the Metropolitan Board of Works and its own Committee respecting a change in the names of certain roads in the district. The Metropolitan Board, as is well known, is frequently advising the Local Boards to change the names of streets under the control of the latter, and in the present case has suggested the re-naming of King's-road, Queen's-road, and Prince's-road, at Homerton New Town, and the Committee of the District Board has stated that they would recommend the substitution of Berger-road, Kelday-road, and Gowland-road for the old names. Mr. Cowper, a member of the Hackney Board, has resisted the adoption of the Committee's Report, and at the last meeting contended that in place of honouring local members of local bodies by calling streets by their names, the Board ought to endeavour to perpetuate the names of eminent men who had been in bygone times associated with the parish, by naming the streets after them. Three men of great talent, Drs. Priestley, Oxley, and Edmiston had lived in the district, and he moved as an amendment to the Committee's Report that the roads be called after these gentlemen instead of names recommended by the Committee. After a warm discussion, Mr. Cowper succeeded in carrying his amendment.

THE LATE MR. THOMAS BONNAR.—On Monday the remains of the late Mr. Thomas Bonnar, well-known in architectural circles from his services in connection with decorative art, were interred in the Dean Cemetery, Edinburgh. Mr. Bonnar was born in West Port, Edinburgh, in 1810, and at an early age was apprenticed to Mr. Somerville, house painter. While still young he entered the service of Mr. Wardlaw, Glasgow, and for some time took charge of the decorative department of the business. In 1839 he returned to Edinburgh, where he filled a similar position in the establishment of Mr. D. R. Hay, until he commenced business on his own account in connection with Mr. R. Carfrae. Since then, Mr. Bonnar has been engaged in carrying out a large proportion of the important works of decorative art that have of late years been executed throughout Scotland, besides others in England and Ireland. Of these it may be sufficient to mention the large saloon in Newbattle Abbey, executed in the old Italian style, and as his latest work, the restoration of Ossian's Hall, Penicuik House, recently completed. Though arrived at a ripe age, Mr. Bonnar showed few symptoms of declining health, but the incessant strain connected with the carrying on of the many elaborate works on which he was

engaged seems to have had the effect of hastening his demise.

WOODEN RAILROADS.—The wooden railroads in the vicinity of Quebec have attracted some attention. It appears that there are now a hundred miles in operation. The gauge is 4ft. 8½in. The running time is about 16 miles per hour, but trains have been run at the rate of 35 miles per hour. The rails are made of maple, 4in. by 7in., set up edgewise, and notched into the cross ties 4in. deep, and held by two wedges down in the notch on the outside of the rail. The ties are 8in. thick, and laid 20in. apart. The cars have four wheels, and some of the engines weigh 30 tons. In frosty weather the driving wheels have less adhesion than on metal rails, but no considerable difficulty is experienced from this cause. The rails will last from two to four years, according to the quality of the timber and the amount of the traffic. The cost of such roads is from 4,000 to 7,000 dols. per mile. They seem to be very well adapted for light traffic, and as soon as the business of such lines may require it, metal rails may be substituted for wood without any change in the equipment.

MR. HOLMAN HUNT'S NEW PICTURE.—The *Guardian* notices Mr. Holman Hunt's great picture, which even the artist says is now finished. It has been for some months at a private studio in London, and has been seen by many of the artist's friends. It is named the "Shadow of the Cross." There is no legend on which the picture can be founded, although it looks at first sight as if it must be a scene from the Gospel of Nicodemus, or another apocryphal Gospel. The principal figure stands in the workshop at Nazareth—the ground covered with shavings, painted with all Mr. Hunt's usual minuteness,—and holds up His hands in an eastern attitude of prayer. His shadow is cast on the wall behind by the setting sun, and the Virgin Mother, who is engaged in examining a chest which contains the offerings of the Wise Men, is startled as it assumes the form of a crucifix. The room is full of the glow of sunset, and an evening landscape is seen through a landscape behind. The Son is in crimson and white, the Mother in blue. The flesh is very solidly painted, and finished to the highest point. The Virgin's face is turned away, but her thin hands are full of expression. The picture will probably be the subject of controversy among art critics, opinions being already much divided as to its merit. It will shortly, we understand, be exhibited to the public.

CHIPS.

Complaints are again made as to the bad law-court accommodation at the Guildhall, London. Mr. Justice Quain lately said of one of these courts:—"This is a horrible dungeon to be put into, but this is what the Corporation of the City of London provides."

The works at the Palais-Royal, Paris, which were suspended two months ago, have been resumed by M. Chabrol, architect. The wing forming the corner of the Rue de Valois and the Place du Palais-Royal, which had not been as yet touched, will be renovated like the other parts of the building.

A portion of a new Abbey, erected for Benedictine nuns near Ramsgate, has been opened. The building, which is a Gothic one, will cost between £15,000 and £16,000.

A new building for the London City Mission is about to be erected on the site formerly occupied by Radley's Hotel, in New Bridge-street, in the Italian style, from designs by Messrs. Spalding and Knight.

During the repairs to the roof of St. Joseph's Church, Axbridge, some lead had to be replaced, and underneath, to support the old lead, two perfect paintings of St. Paul and Zacharias were discovered. Some hedge-carpenter had divided the panels, upon which the paintings appear in excellent preservation, into three parts, and had then nailed them to the lead. The paintings appear to have been done in or about the fifteenth century.

The fourth Melbourne exhibition of natural products and works of art was opened on November 6th last.

The Unitarians are about to erect, in a central part of London, a public hall, at a cost of £30,000, towards which subscriptions to the amount of £11,000 have already been received.

Mr. Richardson Gardner, who recently purchased the Prince Consort's Model Cottages at Windsor, has just announced to his tenants that he intends reducing their rents.

The *Boston (U.S.) Journal* says, *apropos* to the late fire in that city, that in the rear of the premises of Messrs. Butler, Johnson, and Co., hardware merchants, in Federal-street, may be seen a

melted brick wall. The liquid brick has run down over a considerable space (!)

Messrs. Treggon, Hickson, and Co., of Jewin-street, have been appointed to make the iron wire guards to the lower lights of the new west wing of the Metropolitan Meat Market.

The latest freak of Messrs. Cole and Co. is thus described by the *Guardian*:—"In one of the most conspicuous and central places in the South Kensington Museum, inclosed in an outer case of glass and enshrined in a *chasse* or reliquary, is the season ticket No. 1 to the Exhibition of 1851, with the autograph of the Prince Consort, it being the ticket which he himself used." What a relic to expose in this fashion in a great national institution!

A new reredos has just been executed by Mr. Earp, from designs by Mr. Street, for the parish church of Leeds. It is conceived somewhat in the spirit of those in the Church of St. Catherine, at Marburg, and in the Cathedral at Arezzo, as far as regards the general outline and the position in the chancel, the reredos not being against the east wall, but brought forward slightly, so as to leave a passage behind. It is built principally of alabaster and marble.

On Friday last the spire of Newbould Church, near Sheffield, was struck by lightning and rendered unsafe. A church at Aughton, about a mile from Ormskirk, was also struck and damaged. This church, although completed some time ago, has not yet been opened. The part struck was the tower, all the windows in which, fully half an inch thick, were broken and scattered about the churchyard. A large stone in the base of the tower was also driven out of the wall.

On Christmas-day a new Welsh Calvinistic Methodist Chapel was opened at Craig, near Bangor, the architect being R. G. Thomas, of Menai Bridge, and the contractor, Evan Williams, Bangor. The total cost was about £1,800. Mr. Thomas has also in course of erection a large mansion at Tuborth, near Bangor, for R. Davies, Esq., M.P. for Anglesey; and at Trevecca College, South Wales, a handsome Memorial Chapel to the late Hoel Harris, one of the founders of Welsh Calvinistic Methodism.

The total amount of landed estates, &c., sold and registered at the Estate Exchange for the year 1872, has been £9,901,220, against £5,796,384 in the previous year.

A public meeting was held at the Star Hotel, Hemyock, on Monday, to promote the construction of a light, cheap railway, to open up the Culm Valley, and to be worked in connection with the Bristol and Exeter line. A letter was read from the Bishop of Exeter approving the scheme. The cost of the line will not exceed £25,000.

In limited competition, Messrs. Walford and Pollard, of Bradford, have been appointed architects for the new church of St. Mark, Manningham-lane, Bradford.

Mr. W. R. Kinipple, C.E., of Westminster, has been appointed engineer to the Harbour Trustees, Greenock, at a salary of £800 per annum.

Trade News.

TENDERS.

ALDGATE.—Alterations, St. James's-place. Messrs John Young and Son, architects:—

Philips and Besiker	£1090
Axford and Co.	1047
Perry	1012
King and Son	1010
Newman and Mann	995
Merritt and Ashby	933

BEAUMARIS.—New coffee-room and billiard-room, &c., to Bulkeley Arms Hotel, for Sir R. B. W. Bulkeley, Bart. Mr. R. Y. Thomas, Menai Bridge, architect:—

J. Pritchard, Gaernon (accepted)	£836
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CROYDON.—Schools, Princess-road, for the Croydon School Board. Henry Dawson, Esq., architect, 16, Finsbury-place South, E.C. Quantities by C. N. McIntyre North:—

Henshaw and Co.	£8371
Rider and Sons	7990
Colls and Sons	7944
J. Woodward	7324
Pesket and Taylor	7323
Higgs	7150
Holledge	6995
Hyde	6975
J. Smith, Norwood (withdrawn)	6136

FOLKESTONE.—For a new window to be inserted in the west end wall of the Parish Church at Folkestone, as a memorial to the great Dr. Harvey, the discoverer of the circulation of the blood. Mr. S. Slingsby-Stallwood, A.R.I.B.A., architect. Mason's work only:—

Bowley	£159 0 0
Adcock and Rees	204 10 0

LEICESTER.—For alterations to Christ Church. Mr. J. Goddard, F.R.I.B.A., architect:—

Herbert	£828 10 0
Knight and Hodgkinson	755 0 0
Osborne Brothers	728 0 0
Ratcliffe	710 0 0
Nicholson	619 0 0
Thrall, Vann, and Co. (accepted)	617 0 0

EAST SHEEN.—Alterations and additions to the Cedars, for Mr. E. H. L. Penrhyn. Mr. W. Hudson, architect.—		
Colls	£1131	
Goodall	1022	
Newman and Mann	985	
Bowling	980	
Sweet	904	
Simms	890	
Sewell and Son	887	

DUNDEE.—For the construction of a stone reservoir at Zinthrathen, for the Dundee Water Commissioners, Messrs. J. and A. Leslie, Edinburgh, engineers:—

Adamson	£39489
Wilson and Son	36500
Young	35954
Morrison and Son	35200
Scott (Montrose)	34797
Macdonald (Dundee)	34600
Gibb	33297
Pand	33200
Ireland and Co.	32919
Buttle	31660
Stewart and Creber	31121
Cairns	29781

LONDON, HAGERSTON.—For building a cottage, with workshop in rear, at Weymouth-terrace, for Mrs. H. Baker. Messrs. Ebbetts and Cobb, architects.

C. Ferne (accepted).....£325

SOUTHWARK.—New Buildings, Bear Gardens. Messrs. John Young and Son, architects.

Coleman	£2469
Kilby	2379
Pritchard	2377
Hart	2347
Elkington	2300
Merritt and Ashby	2197
Newman and Mann	2183
Robbins and Co.	2180

PADDINGTON.—For completing No. 32, Warrington-crescent, Maids-hill, for Henry Vallance, Esq. Messrs. Fowler and Hill, architects. Quantities supplied.

Mallett	£2546
Nixon and Son	2316
Taylor	2137
Reed	2128
Johnson and Co.	1988
Everal	1845
Butland	1850

BERKS.—For new schools and teacher's residence for the parishes of Gaxford and Trilford, Berkshire. Mr. Edwin Dolby, architect, Abingdon, Berks.

Aldworth	£649.
King	582.
Bryan (accepted)	580.

WILLESDEN.—For boundary Wall, Jews, cemetery. Mr. N. J. Josephs, architect:—

Ashby and Son	£1310
Langmead and Way	1297
Perry Brothers	1284
Henshaw and Co.	1272
Clark	1270
Newman and Mann	1258

MEETINGS FOR THE ENSUING WEEK.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—"On the Practice and Results of Irrigation in Northern India." By Colonel W. H. Greathed, C.B., R.E. 8 p.m.

WEDNESDAY.—SOCIETY OF ARTS.—"On the Sulphur Deposits of Krisuvik, Iceland." By Mr. C. W. Vincent. 8 p.m.

Ashton & Green, Slate, Iron, and Marble Merchants, and Quarry Agents, keep the largest and best selected stock of BANGOR, PORTMACDOC, and GREEN ROOFING SLATES, Slate Slabs, and every description of Slate Goods, Marble and Enamelled, Slate Chimney-pieces, Slate Ranges, Rain-water Goods and General Castings. A. & G.'s SPECIAL RED TILES prepared to use with the celebrated WHITLAND ABBEY GREEN SLATES. Drawings and Prices upon application.—Offices and Show-rooms, 14 and 15, Bury-street, S. Mary Axe, London, E.C. Agents for London and Country for Sale of Whitland Abbey Green Slates.

COMPETITIONS OPEN.

CARLISLE PUBLIC HALL COMPANY, January 15, 1873.—For plans for the proposed building.—Mr. C. Vynne, Hon. Sec. 1, English-street, Carlisle.

THE CARLISLE DIOCESAN CHURCH EXTENSION SOCIETY, January 31, 1873.—For plans for a mountain chapel, suitable for 100 persons. Two prizes of twenty and fifteen guineas for the best designs. This competition is open to architects residing in Cumberland, Westmoreland, and Lancashire only.—Rev. Canon Shipman, Vicarage, Asparia, Cumberland; and Rev. Canon Stock, Rectory, Windermere.

CHESTER UNION, February 1, 1873.—For designs and estimates for a new workhouse to accommodate 500 male and female inmates, with the requisite offices, &c. Premium of £100 for the best, and £50 for the second best design.—Mr. William Keardland, Clerk to the Guardians, Chester.

THE CONFERENCE COMMITTEE ON COMPETITIONS will be glad to receive, from provincial architects, the earliest possible notice of proposed competitions, in order that the committee may, in sufficient time, transmit to the promoters of such competitions, for their guidance, copies of the regulations passed at the General Conference of 1872. Communications to be addressed to the Secretary of the Committee on Competitions, 9, Conduit-street, Hanover-square, W.

THE FROME DISTRICT AGRICULTURAL SOCIETY.—Feb. 20.—For adapting a field near Frome for the purposes of a Cheese, Corn, and Cattle Market, and for the erection of suitable buildings. Premiums of £20 and £5 for first and second best designs.—Messrs. Cruttwell and Daniell, Solicitors, Frome.

THE NORTHAMPTON SCHOOL BOARD, January 27, 1873.—

For designs for two new schools, with class-rooms and out-offices. One of the schools is to be built in Spring-lane, and is to accommodate 650 children; the other in Vernon-terrace, and is to accommodate 500 children. The architect whose design shall be selected will be appointed to superintend the erection of the buildings.—Mr. J. B. Henman, Solicitor, Northampton; Offices of the Board, 6, St. Giles-street.

VIENNA, December 31.—For designs for a monument to the memory of the late Vice-Admiral Tegethoff. Prizes of £300, £200, and £100 to be awarded to the three best designs.—The Committee of the Tegethoff Monument, Vienna.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 6s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY, January 31, 1873.—For Dowston's pumps and water-closets.—Mr. F. W. Rowse, Superintendent of Contracts, Admiralty, Whitehall, S.W.

BRITISH COLUMBIA, January 15, 1873.—For the construction of the Esquimalt Graving Dock.—Mr. G. U. Walkem, Chief Commissioner, Land and Works, Victoria, British Columbia.

BRISTALL (near Leeds), Jan. 18.—For macadamising, flagging, and channelling North-terrace.—Mr. J. Smith, solicitor clerk to the Local Board, Bristol, near Leeds.

CUCKFIELD (Sussex), Feb. 7.—For proposed alterations and additions to the Workhouse and premises at the Cuckfield Union.—Mr. E. Waugh, Clerk to the Board, Cuckfield.

CONGLETON, Jan. 21.—For the erection of a new Congregational church and school. Mr. W. Sugden, architect, Leek.

GLENMUIK, Feb. 1.—For the construction of 3 000 to 4,000 yards of sunk fencing.—Mr. Milne Forrester, Glenmuik.

HALIFAX, Jan. 20.—For the erection of a villa residence.—Mr. John Hogg, architect, Hall End, Halifax.

HUNSLT, LEEDS, January 13.—For the erection of a Primitive Methodist Chapel (to seat 900), Schools, and two Dwelling Houses. Messrs. Kirk and Son, Architects, Dewsbury.

LEEDS, Jan. 17.—For the erection of two houses at Woodhouse Hill, Hunslet.—Mr. A. Bentley, architect, 2, Bond-place, Leeds.

LEEDS, Jan. 13.—For the erection of a photographic studio.—Messrs. C. S. and A. J. Nelson, architects, Albert Chambers, Park-row, Leeds.

LEEDS, Jan. 15.—For the widening of Wellington Bridge.—Mr. J. J. Henderson, C.E., Assistant Borough Surveyor, Town Hall, Leeds.

LEEDS, Jan. 15.—For the construction of drains in two estates, off Camp-road, Leeds.—Mr. J. J. Henderson, C.E., Assistant Borough Surveyor, Town Hall, Leeds.

LEEDS, Jan. 15.—For paving, flagging, and levelling Cross Bank-street, Cross Rockingham-street, Holmes-yard, Galway-street, Newton-street, Upton-street, Angel-street, Newlay-street, Back Blundell-street, Finsbury-street, and Strattan-street.—Mr. J. J. Henderson, C.E., Assistant Borough Surveyor, Town Hall, Leeds.

LLANTWIT MAJOR (near Cowbridge), Jan. 18.—For building schools and master's residence (utilising the old rectory for the purpose) at Llantwit Major, to accommodate 200 children.—Mr. J. Garsed, honorary clerk to the Board, the Moorlands, Llantwit Major, near Cowbridge.

LLANTWIT, Jan. 15.—For making certain alterations in the existing school buildings at Llantwit, and for the erection of an infant school capable of accommodating 152 children.—Mr. H. S. Davies, Clerk to the School Board, Post Office Chambers, Pontypridd.

LONG SUTTON SCHOOL BOARD, Jan. 28.—For the erection of new school room.—J. Wright, Clerk to the Board.

MERTHYR TYDFIL SCHOOL BOARD, Jan. 16.—For the erection of school buildings and master's house.—C. Taylor, architect, Court-street, Merthyr.

MANCHESTER, Jan. 15.—For the construction of a railway from the Junction of the Liverpool Extension Line with the Manchester, South Junction, and Altrincham Railway, at Cornbrook, to Great Bridgewater-street, Manchester.—Mr. E. Boss, Secretary, London Road Station, Manchester.

SANDY (Bedfordshire), Jan. 13.—For repairs, alterations, and additions to a house in Beeston Green.—Mr. Lucy W. Ridge, architect, 23, Bedford-row, London.

TREES ESTATE, MANNINGHAM, January 13.—For the erection of ten semi-detached villas.—Messrs. Hope and Jardine, Exchange Buildings, Bradford.

WEST ROYD, STANNINGLEY, January 14.—For the erection of a Lodge and Boundary Walls.—Messrs. C. S. and A. J. Nelson, Architects, Albert Chambers, Park Row Leeds.

TO ARCHITECTS.

GREEN ROOFING-SLATES.

As supplied to H.R.H. The Prince of Wales at Sandringham.

The Penmoyle Son-green Slates are specially adapted for Churches, Public Buildings, &c., &c.

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	Per 1,200 Slates.	Equivalent to per square
Best Green Slates 14 by 7	2 17 6	16s. 6d.
Do. do. 13 by 8	2 17 6	16s. 6d.
Do. do. 13 by 7	2 5 0	14s.
Do. do. 12 by 7	1 13 6	13s.
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Prices of large Sizes, Cost of Transit, Reference Testimonials, and Sample Specimens may be obtained on application to

MESSRS. RANDELL & CO., Corsham, Wilts.

Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tufton-street, Westminster.

BATH AND OTHER BUILDING STONES, OF BEST QUALITY.

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Quarrymen and Stone Merchants.

List of prices at the Quarries and Depots, also cost of transit to any part of the United Kingdom, furnished on application to

[ADVT.] BATH STONE OFFICE:
CORSHAM, WILTS.

BANKRUPTS.

(To Surrender in the Country.)

Sittings for Public Examination.

Jan. 21, T. Evers, Richmond-road, West Brompton, builder and House Decorator.

Scotch Sequestration.

John Cockburn, Cupar, contractor, Jan. 15, at 11.

PARTNERSHIPS DISSOLVED.

S. and J. Walker, Mansfield, ironfounders. C. and H. Greyson and Co., Liverpool, shipbuilders. William Howitt and Co., Ilford, and Great George-street, Westminster, horticultural builders. Tomlinson and Taylor, Coventry, stone and marble masons. Gray and Pottage, York, carpenters. Clarke and Co., Pendleton, plasterers and painters. Swithenbank and Fisher, Liversedge, stone-masons and contractors. Bennetts and Stephenson, Great Grimsby, timber merchants. J. and W. Scott, Liverpool, plumbers. Novis and Collard, Hastings, painters. Morton and Co., Oxford-market, builders and decorators. Manning, Wardle, and Co., Leeds, engineers. Salkeld, Jones, and Co., stockport, ironfounders. Rigby and Midghall, Preston, joiners. The Darwen Iron Company, Darwen, Lancashire.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

LEAD.		per ton		£21 5 0		£21 12 6	
Pig—Foreign							
" English W.B. ..				22 10 0		23 0 0	
" Lead Co.				22 5 0		0 0 0	
" Other brands ..				21 15 0		22 0 0	
Sheet Milled				22 15 0		0 0 0	
Shot, Patent				24 10 0		0 0 0	
Red or minium				23 5 0		0 0 0	
Litharge, W.B.				0 0 0		0 0 0	
White Dry				28 10 0		30 10 0	
" ground in oil ..				0 0 0		0 0 0	

COPPER.

British—Cake & Ingot ..	per ton	£96 0 0	£98 0 0
Best selected		96 0 0	100 0 0
Sheet		98 0 0	102 0 0
Bottoms		102 0 0	108 0 0
Australian cake		96 0 0	97 0 0
Spanish cake		87 0 0	0 0 0
Chili Bars, cash		90 0 0	93 0 0
" Refined ingot ..		94 0 0	99 0 0
Yellow metal	per lb.	0 0 8	0 0 8½

IRON.

Pig in Scotland, cash ..	per ton	£6 6 6	£0 0 0
Welsh Bar, in London ..		11 10 0	12 0 0
" Wales		10 10 0	10 15 0
Staffordshire		11 15 0	12 0 0
Rail, in Wales		10 0 0	10 10 0
Sheets, in London		15 10 0	16 10 0
Hoops, first quality ..		12 10 0	14 0 0
Nail Rod		11 15 0	13 0 0
Swedish		17 0 0	18 0 0

OILS, &c.

Seal, pale	per tun.	£39 0 0	£0 0 0
Sperm body		92 0 0	94 0 0
Cod		38 10 0	0 0 0
Whale, South Sea, pale		40 0 0	40 10 0
Olive Gallipoli		47 0 0	0 0 0
Cocoonut, Cochin		36 0 0	39 0 0
Palm, fine		39 0 0	0 0 0
Linseed		33 15 0	34 0 0
Rapeseed, English pale		41 10 0	0 0 0
Cottonseed		31 5 0	0 0 0

TIMBER.

Teak	load	£14 10 0	£15 10 0
Quebec, red pine		3 10 0	5 0 0
" yellow pine ..		3 5 0	6 0 0
Quebec oak, white ..		6 10 0	7 0 0
" birch		5 0 0	6 0 0
" elm		4 15 0	5 0 0
Dantzic oak		4 10 0	6 10 0
" fir		3 10 0	5 0 0
Biga		4 0 0	4 5 0
Swedish		2 15 0	3 0 0
Masts, Quebec red pine		4 0 0	6 10 0
" yellow pine ..		4 0 0	6 10 0
Oregon		7 0 0	9 0 0
Lathwood, Dantzic fm.		8 10 0	10 0 0
" St. Petersburg ..		10 10 0	11 10 0

Deals per C, 12ft. by 3 by 9in		20 0 0	24 0 0
Quebec Pine, 1st qual. ..		14 10 0	16 10 0
" 2nd do.		10 0 0	11 0 0
" 3rd do.		11 10 0	12 0 0
Canada Spruce, 1st ..		8 15 0	9 15 0
" 2nd & 3rd		9 0 0	9 15 0
New Brunswick		14 10 0	15 10 0
Archangel, yellow ..		12 10 0	13 10 0
St. Petersburg yellow ..		8 10 0	9 10 0
Finland		0 0 0	0 0 0
Memel and Dantzic ..		10 10 0	13 0 0
Gothenburg, yellow ..		10 0 0	10 10 0
" white		12 0 0	13 10 0
Gefle yellow		10 0 0	13 10 0
Christiania		7 10 0	8 10 0
Battens, all sorts ..		8 10 0	9 10 0
Other Norway		0 11 0	0 12 6
Flooring boards pr square		0 9 6	0 11 6
of lin, first yellow ..		0 7 0	0 10 0
First white			
Second qualities			

"REMARKABLE, VERY REMARKABLE INDEED" are the effects of LAMPOUGH'S PYRETIC SALINE in Preventing and curing Smallpox, Fevers, and Skin Diseases. Specially refreshing and invigorating during hot weather. Sold by all Chemists, and the Maker, 113, Holborn-hill, London.—[ADVT.]

THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 17, 1873.

SCHOOL PLANNING.

IN another column the decision of the judges to whom the designs submitted in competition for the BUILDING NEWS prizes were referred will be found embodied in a report of some detail. We shall hope to place before our readers reproductions by means of photolithography, not only of the prize designs, but also of those selected for mention; it will be possible for those who wish to gain information on the subject to compare each plan as it appears, with the judge's observations upon it; and to note the differences between designs of varying degrees of merit. This, however, is a tedious process, and perhaps we may anticipate some of the results of it by drawing attention in a few words to some of the principal points which make a school plan a good or a bad one, and to the difficulties which beset school planners.

There is little doubt that such a competition as has just taken place is a more severe trial of strength than that for a dwelling-house, and this on more accounts than one. Building a house is of the most frequent occurrence in architectural practice—there must be few students who have not worked upon plans for one or many; its design is little liable to the variations occasioned by change of views as to the uses it is to be put to, and every architect lives in one house and frequents others. Now, a public elementary school differs from all this. It is not so common a portion of every architect's work; it is liable to many modifications as general opinion changes. It is not the class of school in which young men who become architects have been brought up, and it necessitates special knowledge or special research; so much so, indeed, that no one ought to attempt to design a school without visiting some good schools and examining the working of them most carefully in detail.

The principles which guide the teachers of schools are those upon which the planner must base his scheme; they have varied widely and are likely still to change, but for our present purpose it will suffice to take them as they now apply to an English elementary school. We first meet with the division of the children into two groups, viz., infants and elder children; and the subdivision of the latter (the elders) into boys and girls, and again into six "grades," according to their advancement and age. There must consequently be for a complete set of school buildings, an infants' school, a boys' school, and a girls' school. The infants are taught mainly on "galleries," that is rows of raised seats which allow each child a good sight of the teacher. In each infant-school there ought, however, to be a few desks and forms for teaching writing. The gallery is best if placed in a recess; the teacher should be able to get to some distance from it, and a large open space should be preserved for the infants to march about in. A second gallery is very desirable if an infant-school be of some size, but it should not face the first, or the children will see each other and be led into mischief, and the teacher facing one class will have his (or her) back turned to the other class.

The London School Board desire two class-rooms for each infant-school—one for "babies," that is to say, quite young children, which will have a gallery, and one for the eldest infants, with desks and benches.

The principal divisions of the schools for elder children should be laid out with reference to the six "grades" into which the children are themselves divided. The London School Board desire to have two double class-rooms and a general room in which two classes can be taught, and

all the classes can assemble, sitting close. A double class-room means one in which two classes are taught—one in each half of the room—with a movable partition dividing them. It ought to be so seated that by simply sliding back the partition one teacher shall obtain command of the two classes and shall be able to lead or examine both at one time. It is astonishing how many authors of competitive designs, in other respects good, have so placed the seats of their double class-rooms that on moving back the partition the children would be found facing each other or facing opposite ways. In such a school two grades will be taught in the school-room and two in each double class-room, and when the six classes are assembled in the school-room the use of a few additional seats will be required, even though the whole sit close.

The tendency of the management of schools as they have improved has been to isolate classes more and more. Thus in the old Lancasterian schools a number of classes were grouped side by side in a large room, or in other cases they were placed facing one another on opposite sides of the same room. In the schools aided by Government, it has been for many years a leading principle that the scholars shall occupy one side of the room only, and shall be separated by curtains, and hence the restrictions on the width of school-rooms. This restriction, by-the-by, is rather carried to an extreme; for any experienced school-master would prefer his school-room 22, or even 24 feet wide, if he could have it; and few such would object to teach with rows of children four deep or five deep, were they allowed. The most recent school arrangements we have seen withdraw the classes a little more from the master's eye; for though it is almost an essential that all class-rooms should open out of the school-room and that their doors should have a large pane of glass in each, yet still scholars so placed are in effect more retired, and the teacher directing them is left rather more to himself than in one long school-room. The Prussian system carries this isolation still further, and ignores the school-room altogether, as has been the case in Scotland for many years. It is a very desirable point, almost a *sine qua non* with many school managers that the school-room should have ventilation across it from front to back. Consequently the best places for the class-rooms are at the ends of the school-room, and he has best fallen in with modern views as to ventilation who has left the largest amount of space in his school walls unoccupied by stair-cases and other adjuncts, and so free for the wind of heaven to blow through when the windows are open. It is perhaps more conducive to compactness to place the double class-rooms at one side of the school-rooms than at the ends; but this always interferes with the ventilation of the school-room. It not absolutely essential for both the halves of a double class-room to open out of the school-room, though it is to be preferred, but it is very undesirable for neither half to do so.

The lighting is an essential part of school planning. The best light is on the left hand of the children; the next best is from behind them. It is very disadvantageous for the lighting along one row of classes to be unequal, one class or part of a class having plenty of window space, and another going short. A skylight is a very excellent source of light, and may at the same time be a powerful auxiliary to ventilation; but when unduly large it is apt to give rise to troublesome draughts. It is, however, a favourite mode of lighting infants' schools.

The school and class-rooms being understood, and their actual dimensions and those of the seats for the different classes having been determined by a reference to the rules of the Education Department, the next consideration will be how to arrange the school-rooms and class-rooms so as to form a well-disposed whole. It is most instructive to notice in varied schemes of arrangement, sub-

mitted in the competition that has given rise to these remarks, how completely the adage "Many men, many minds" is borne out. The differences between the composition of different designs—limiting our remarks to those sent in by men who evidently understood the subject—are very great. It would be going too far to say that no two resemble one another, for the same leading idea has evidently been taken up by different competitors in more than one instance; but the varieties of arrangement are very great, and here the superiority of one planner to another comes into play. The points which are essential and those others which are so desirable as to be almost essential are sufficiently numerous to embarrass the designer. It is essential that the infant-school be on the ground floor, and very desirable that it be wider than the school-rooms for boys and girls in the "graded" schools (*i.e.*, the schools in which all the children above infants are divided into six "grades"). It is essential for the entrances of boys, girls, and infants to be distinct, and desirable for that of the boys to be far removed from the others. It is important to secure the thorough separation of the conveniences of each school, and yet to get them near together and accessible under cover. When practicable, they are best in one straight line. It is absolutely indispensable to secure uniformly good light and to preserve ventilation, and the building must be independent in these respects of its adjoining neighbours—a point which several competitors have overlooked. It is also necessary to avoid waste of space, to enter the schools readily and at good points; and where a drawing-class room is provided, available sometimes for boys and sometimes for girls, it is requisite that access be well contrived so that the room is well within reach from either school, and yet so shut off that the approach to it cannot become a means of breaking discipline. It is also necessary, if the site be restricted, as it usually is in towns, that the playground shall not be such a mere ungainly residuum of land as happens to remain over after the buildings have been put down in the most convenient way—a method which several competitors have adopted; but as carefully planned as any room in the building. There ought to be few sharp angles or projections such as form hiding-places for children desiring to escape notice, or threaten danger when a crowd of children are romping in the playground. An infants' playground is never quite complete without a covered shed, and it is very desirable that girls should have one; the girls, by-the-by, can often with advantage share the infants' playground. A shed is not of so much importance for boys, but still is very advantageous in their playground also.

In a town site it is rarely possible, perhaps rarely desirable, to have these schools all on the ground level, and the choice is between a building for the most part two stories high but partly one storey, and a three-storey building. Competitors have tried both of these plans. The relative advantages are pretty evenly balanced: for if the infants' school be one storey only, it may be any width the architect pleases, without in any way cramping his treatment of his other schools, only it encroaches on the playground. If, however, the building be three storeys high, then either the infants' school is narrowed to the width of those above it, which diminishes its efficiency, or some expedient more or less injurious to good construction has to be adopted. Very few of the competitors have tried the plan of enlarging their infants' school by means of a recess—not going higher than the ground floor, and large enough to hold the great gallery. It is perhaps the best mode of getting over this difficulty where a three-storey building has to be employed.

The staircases ought to have no windows. The flights ought not to be very wide or very long, and it is always most desirable to build them as only a few competitors have proposed,

with a wall occupying the place of the well-hole. Rectangular staircases, with a large square well-hole, are not safe for children. Where a school is very large, it is better to provide two moderate-sized staircases for boys and two more for girls, than to increase the width of the stairs. There ought always to be a hand-rail on either hand.

A very useful feature in school arrangement, and one which might have been particularly well introduced in planning buildings for a site like the one proposed to the competitors, is the double staircase, in which two staircases, entered from opposite ends, occupy the space of one, and ascend on opposite sides of a central wall, without the children's even seeing each other. Strange to say, this has been left almost unattempted by the competitors as a body, and does not form a feature of either of the premiated designs.

In each division of the school a cloak-room and lavatory is needed. It is of importance that the lavatory be well lighted, and all the plumbing arrangements connected with it require the greatest care, or discomfort is sure to follow. The cloak-room ought always to have two doors, so that children may pass through it in a continuous stream. That for infants can often be economically provided for under the great gallery.

The care-taker's house requires just this precaution, that it be placed where he can be readily found by persons coming to the school on business, at hours when the school is not at work, as in holiday time. The teacher's residence, on the contrary, ought to be so placed, when one is provided, as to secure him a little privacy in his hours of relaxation. The care-taker's position ought to be also to some extent determined by the mode of heating adopted. If open fires are introduced, then, as he is required to supply them with fuel, he must be as nearly as is practicable planted between the fuel store and the staircases. If a heating apparatus of any sort has been decided upon—and this, as a scientific and economical mode of burning fuel, has many recommendations—then the care-taker must be within easy reach of the furnace-room.

We ought to add that all those arrangements which raise the heating surface to a very high temperature, and thus supply the school with deteriorated air, are to be avoided, as most fatal to success.

And now, having glanced in a hasty way at two or three of the salient points of school-planning, one word as to the architectural treatment of school buildings. They certainly offer a tempting opportunity for the lover of the picturesque; for a good school is commonly more or less broken up into blocks of buildings, and mullioned windows are very useful in arranging for the easy opening and closing of the lights. Schools have, on the whole, been fortunate during the last twenty years, for though, of course, many poverty-stricken buildings have been erected, together with some over-done and pretentious ones, a large number are suitable and pleasing, and are free on the one hand from baldness, and on the other from needless ornament or over-ambitious treatment. The materials of a school should be good, the scantlings not poor, the doors fitted for rough work, the glass sturdy, and the general construction substantial yet modest; and these rules give a good key-note for the architectural feeling which should pervade the exterior. If to sturdy modesty be added taste and grace, the result will be exactly that expression which best befits an architecturally-treated school-design.

THE PRINCIPAL COMPETITIVE DESIGNS FOR THE PROPOSED NEW EDINBURGH CATHEDRAL.

(Continued from page 34.)

MR. ROSS'S design is so unlike anything that gentleman previously produced that we do not think we wrong him by attributing much of the credit due to the able set

of drawings sent in his name to extraneous and English influence, although, as we are advised, to quite other immediate assistance than that which rumour has pointed out. But obviously the general idea is taken from Mr. Burges' version of the Early Gothic of France, and notably from his design for Cork Cathedral as executed. In many respects it is an advance upon that building, as is Mr. Burges' own design for Edinburgh Cathedral. The plan, the grouping of towers and spires, the triple portal, the detail of towers and spires, are those of Cork Cathedral, revised and refined. It is somewhat remarkable that the ability to obtain such assistance as this should be at the command of men in the profession who, having been favoured with the opportunity, have the wisdom and modesty of Mr. Ross to secure such assistance rather than trust to their unaided powers. We do not grudge this course of action which we have noted as coming into fashion, but we do think that it should be done openly, and the credit of the design given to whom it is strictly due. Mr. E. W. Godwin is conducting the Town Hall at Plymouth as consulting architect in this manner, and in the interests of architecture and art we rejoice at it. In the present instance, though we cannot specify the clever adapter of Mr. Burges' views, we shall not be far wrong in giving to the latter gentleman himself the credit of having been the consulted architect, though rather more without his leave than is desirable. But also in these days it too often happens that the first cause is still further removed from us. If we turn to the illustrations of Notre Dame Etampes in "King's Study Book of Mediæval Architecture, &c.," we shall see the upper part of Mr. Ross's western towers and spires; and therefore to some architect of A.D. 1130 let us give the glory of them. The general plan, also of French origin, is compact and excellent; a compact Latin cross with apsidal end to chancel, and ambulatory carried all round, western narthex, shallow but sufficiently marked transepts. A grand rose window occupies the principal part of the west end, and, under the circumstances, some variety of treatment for the transept ends would have been preferable to the repetition of the rose window as their main feature. The side elevation of Mr. Ross's design is perhaps the best, and the noble range of clerestory windows is a grandly-concentrated source of enrichment, well enhanced by the very simple and dignified treatment of the aisle below. In perspective, however, all this is sadly concealed by the range of flying buttresses which wholly obscure the windows themselves. What is the use of building up and then blocking out such a feature? Precedent there is for the treatment, as there is for every portion of this well-studied design, but precedent that were well dispensed with, as Mr. Burges has succeeded in doing in his design. To sum up, Mr. Ross's design for Edinburgh Cathedral is a beautiful exotic not particularly suited for its purpose and position, thoroughly able and well studied from ancient Early French examples, and refined in detail, and quite cathedral-like in its general type. We must, however, deny it the higher praise of originality, or special adaptation to the time and place. Stone groining throughout was contemplated. The central tower served mainly as lantern, as it should do. The bells were to be located in one of the western towers, and the clock in the other. An oblong parallelogram served as the chapter-house, and we doubt not that, as the author claimed, the comfort of the congregation was studied throughout the interior, but we question that the church and all its appurtenances could, as he gives as his opinion, be built for £65,000, though to have set aside the design altogether on the score of cost would, we think, have been over-straining the limits which must always be granted in such competitions, since the completion of the towers might well be left to subsequent liberality, sure to be accorded.

To Mr. Burges' own design we feel we ought to accord a very high place. With far more

reason and less cause of objection, it was obviously founded upon his previously executed work of Cork Cathedral; for we think an architect cannot do better than work out again and refine upon what he has done before with some amount of success. Still, what we have said about the comparative suitability of adopting a French type is applicable here. Such, however, we have to accept at Mr. Burges' hands, and that many think he is justified and right is quite evident. His copyism is, however, by no means slavish, and the vigour of his innovations, and the fancy which he introduces into all he does, is incontestable. In many respects his Edinburgh Cathedral design is a great advance upon Cork, showing that he has profited by experience. A much lighter and more graceful handling of detail and better proportion is observable throughout; but we have the same admirably compact plan. The west end is a beautiful composition flanked by two fine towers, with spires which it would have been a pleasure to see carried out. They have leaden spires, rising from square towers with single couplets of windows on each face. The spires have pinnacles at the angles, and are octagonal for some distance, whence they are playfully broken into a 16-sided figure for the greater part of their height, the point of separation of the two forms being marked by rich crowns of gabled lucarnes. The centre of the crux is marked only by a fine flute instead of central tower, a reticence which might have been regretted were it not obviously a conscientious concession to the limits of the cost imposed. The nave is of five bays with two simple lancets to each clerestory compartment. The aisles below have couplets of similar lancets, but combined with circles of tracery in the head between them. A veritable triforium formed by a continuous arcade of three arches to each bay conceals the transverse walls, which this design only needed as abutments for the roofing, which is of wood throughout, with carved panel ceiling and bold tiebeams.

The chancel ceiling is trefoil-shaped, and provided with a collar beam above the tie. The transepts only have rose windows, which are not very satisfactory, having semicircles springing from the outer rim, which always have a weak look, as if they could be scooped out. A fine triplet of lancets occupies the west end of the nave, instead of repeating the rose form again, as Mr. Ross has done.

The chancel has three bays westward of the apse, and all the arches of its main arcade are highly stilted. Altogether, the design is thoroughly characteristic of its author, and calculated to sustain his already high reputation, and no doubt will form a precedent for the work of many of his followers and admirers for the next ten years, who will not fail to repeat the few slight weaknesses and mannerisms, among which we must count the endless repetition of somewhat too-strongly marked triple bands in the heights of all the nook shafts throughout this design, as well as that of Cork Cathedral.

SEWAGE IRRIGATION AND SUBTERRANEAN WATER.

THERE is a possibility of creating a greater and more insidious evil, in many districts, by means of sewage irrigation, than that which already exists in the more gross and offensive pollution of rivers by sewage. In the Thames Conservancy Act of 1866—the first legislative scheme for effecting river purification—powers were given to the Conservators of the Thames to prevent the admission of sewage into the Thames itself, or into any open water-course, within a prescribed distance leading thereto. Those powers were obtained without any demur on the part of the inhabitants of the Thames valley, because it was represented that the locality was one wherein sewage irrigation could be carried out with great success. Immediately after the passing of the Act, the authorities of the several towns upon the river undertook the considera-

tion of disposing of their sewage by the means suggested. At one of the towns, an exceptionally good site for the purpose, as to its accessibility, soil, and surface conformation, presented itself. But it was soon discovered that this site formed a portion of the watershed wherefrom the subterranean water flowed into the wells of the town; and it was urged that, in the absence of experience to the contrary, it was reasonable to assume that in course of time the soil, like the human stomach in excesses, would become overcharged, and the subterranean water would be polluted. This view of an imminent danger from a similar cause is now under the serious consideration of the Visiting Justices of the counties of Oxford and Berks.

The Oxford Local Board, after a remarkable consideration of the question for about eight years, has recently determined, under the advice of Mr. J. Bailey Denton, to carry the sewage of their district, for the purposes of irrigation, to a tract of land at Sandford, about four miles distant from the city. This tract of land, like the site near the other Thames town referred to, is admitted to be well adapted, in all its surface conditions, for the purpose. Within a mile of it stands the Littlemore Pauper Lunatic Asylum, an institution containing at the present time 472 patients from the two counties of Oxon and Berks. At the Oxfordshire Quarter Sessions, held at Oxford last week, it was reported that the Committee of Visiting Justices to the Asylum "had been advised that this tract of land contains the water-shed from whence the whole supply of water to the Asylum is derived." Acting upon this advice, the Visitors are taking steps to obtain scientific opinions with a view to oppose the scheme, if necessary. It appears that the northern boundary of the Asylum grounds is formed by a perennial brook. The water from this brook is conveyed to a storage reservoir, thence passed into filtering beds to correct its calcareous quality, and, finally, is pumped into tanks within the building for distribution to the various boilers, bath-rooms, kitchens, and other domestic and culinary receptacles. It is the only water drank on the establishment, and the Visitors urged that its pollution would endanger the health of the whole of the patients, the resident staff, and others. That the Visitors have not been unnecessarily advised appears probable, if any value may be attached to the report of a local geologist familiar with water questions, the Rev. J. C. Clutterbuck, of Long Wittenham. This gentleman states that the strata of the selected tract of land consist of Coral rag, being layers of rock alternating with argillaceous and sandy loams, into which the surface-water percolates, forming a subterranean bed of water which sustains the Asylum brook. Mr. Bailey Denton proposes to discharge upon his selected site the sewage of a present population of 45,000, creating 1,350,000 gallons per day of sewage proper. From the pervious nature of the soil, Mr. Clutterbuck states that this sewage liquid "will inevitably find its way to the bed of subterranean water, and will be discharged with the overflows of that water into the brook." Into the more difficult chemical question as to the change which may be wrought in the sewage by percolation in the soil before reaching the subterranean water-bed Mr. Clutterbuck does not enter.

It is manifest that this question of the contamination of subterranean water is one of vital importance, and yet, up to the present time, it has received no public attention. There is more shortsightedness in regard to it than there was when public opinion was directed, at a period within our recollection, to the capacity of rivers for carrying away town refuse. The volume of water in a river-course was considered amply sufficient to do the required work of scavenging a district, gratuitously; so, now, there is a popular impression that the soil will perform a like gratuitous service without any ulterior

disastrous consequences, provided the sewage can be poured upon it. It will do nothing of the kind. It becomes sick and poisonous, even sterile, upon the surface, after a liberal application of sewage for a comparatively short period. The Craigentinney meadows become glutted with the sewage of Edinburgh in two years, and have to remain fallow for a considerable period before their fertile power is restored. With this indication of unhealthiness upon the surface, what result may be expected from the continuous process of percolation which goes on upon every sewage farm? Naturally, there will be a more or less rapid flow of sewage water, according to the nature of the soil, into the springs, or subterranean water beds. There may be some districts in which the area may be large, and the population widely scattered, and in these little harm may arise. In the densely-populated districts such a supply to the springs and wells may become one of the most deadly evils, existing without being seen, and probably without being suspected.

It is a fortunate circumstance that the subject has been mooted in connection with the scheme of an engineer who has made the storage and supply of water an especial study. Possibly Mr. Bailey Denton may be enabled to refer to facts, and show that his process will not contaminate the water-shed upon which he proposes to operate. We hope the discussion likely to arise upon his decision may do something to give public assurance that, in carrying out projects of sewage-irrigation, local authorities will not be effecting a mere exchange of evils—supplanting polluted rivers by polluted springs and wells.

NOTES ON STONEWORK.—III.

SLATE.

THE granitic rocks already mentioned are essentially different in structure from those which succeed them; these are the stratified crystalline schists—gneiss, mica schist, and clay slate (this last not so crystalline as the other two), which appear to be formed of the disintegrated particles of the granitic rocks, inasmuch as they contain nearly the same elements, but in a stratified form, although the marks of stratification are mostly obliterated by the influences—whether of heat or pressure, or of both—which they have undergone. They have been changed in form since they were first deposited, and are hence called metamorphic (Gr. *meta*, change, and *morphè*, form.) The term metamorphic refers to the mineral characteristics of these formations, and implies that their original structure and texture have undergone some internal change or metamorphosis.

The several strata down to the Portland stone were described in Fig. 1. In Fig. 4 they are continued down to the granite. These diagrams are given to guide the attention to the geological position of the various kinds of stone to be mentioned, and not as illustrations of the science of geology; these can be better seen in any of the treatises on that science; and we will here say that we consider the geological position of strata to be a very important thing to be taken into consideration when the qualities and properties of stones are under consideration.

In thus recognising the metamorphic rocks as distinct in character from the igneous granitic rocks, we obtain a starting point from which to commence a description of the strata that follow.

The terms schist and schistose rocks are given to those formations which have a foliated structure, and split up in thin irregular plates, such as mica schist, chlorite schist, gneiss, &c., and not to those, as in clay slate, which split by regular cleavage, nor to those which split in large flat laminae, as in flagstones.

In whatever state of aggregation the particles of gneiss may have been when originally deposited, we now know that it is a hard, tough, crystalline rock, exhibiting curved and

flexured lines of stratification, and composed in the main of quartz, felspar, mica, and hornblende. In granitic rocks the crystals of quartz, felspar, &c., are distinct and entire, but in gneiss they are broken, indistinct, and confusedly aggregated. In the most granitoid masses of gneiss the stratified disposition is never wholly obliterated; hence they split in one direction, and not in an indeterminate and hackly fracture, as the true igneous granites do.

The sedimentary origin of mica schist is much more apparent than in gneiss: it is often finely laminated, and distinct in its lines of stratification. This distinction appears to arise from the greater attrition the particles have undergone, and from the greater proportion of mica entering into its composition in the form of fragmental flakes or scales. Though it is often difficult to draw lines of distinction between these groups, and to say where one ends and the other begins, it may be received, says Mr. Page ("Advanced Text-book of Geology"), as a general truth, that gneiss, or rocks of a gneissic character, occupy the lowest position in the Metamorphic system; that these are succeeded by a zone of quartzitic compounds, and these again by mica schists, which graduate imperceptibly into the chloritic and argillaceous slates that cap the series. In the gneiss and mica schists are found highly crystallised limestone (primary limestone) which, from their highly saccharoid texture—resembling loaf-sugar—and mottled and veined appearances, yield valuable marbles. The serpentines, when found in solid masses, like those of Portsoy, Lizard Point, and Connemara, produce a very elegant material for internal decoration. "Of all the stones used for decorative purposes in architecture," says Mr. Hull ("Building and Ornamental Stones"), "none surpass in general estimation some of the varieties of serpentines. This is due both to the richness and variety of its colouring, and its capability of receiving a fine polish. It is not, however, adapted to outdoor use, especially in the smoky or gaseous atmosphere of cities; for, being acted on by hydrochloric and sulphuric acids, it is liable either to decay or to become tarnished." Its specific gravity is from 2.5 to 2.7, and it contains from 38.49 to 44.22 per cent. of silica. Of the Lizard serpentine, Mr. Hull says that it has come into great and just repute within the last thirty years. It is extremely variable in colour; the principal mass is of a deep olive green, but this is variegated by veins or bands and blotches of rich brownish red, or blood red, mixed with lighter tints. This variety may be obtained at the Balk, near Landewednack, at Kynance Cove, at the Signal Staff Hill, near Cadgwith, at Cennack Cove, S. Keverne, and on Goosehilly Downs. A variety with an olive-green base, striped with greenish-blue steatite veins, is found near Treloarwarren, and a third and extremely beautiful variety at Maen Midgee, Kerwith Sands, in which the deep reddish-brown base is studded with crystals of diallage, which shine out with a metallic lustre from a polished surface. Of this stone Mr. R. Hunt says, "For purposes of ornament this elegant stone is well adapted, being moderately soft, but not brittle, and therefore easily worked, while it is sufficiently hard to receive an excellent polish." Blocks of 7ft. or 8ft. long, and 2ft. to 3ft. diameter, have been obtained.

Although the sedimentary origin of gneiss and mica-schist is not very plain, there can be no doubt as to the true aqueous origin of the clay-slates and their associated strata. The bluish, greenish, and purplish roofing-slates present a vast thickness of fine-grained, fissile, argillaceous rock, of considerable hardness. It seems to have been originally deposited as a fine clay or silt, and then to have undergone metamorphism in a less degree than the underlying mica-schists and gneiss rocks. If these were derived from the disintegration of the granitic rocks, clay slate

seems to have been derived from the same source, and also from the further and finer disintegration of the gneiss and mica-schists. "In the clay-slates the quartz and mica of the original rocks appear in minute grains and flakes, and the clay of the felspar appears as impalpable sediment, destitute of the potash and soda which entered into its crystallised condition in granite. All this bespeaks the long-continued action of atmosphere and water—atmosphere and water to waste and wear down, and rivers to transport the material to some tranquil sea of deposit."—(Page.)

Fig. 4.

Portland beds.
Kimmeridge clay.
Coralline Oolite.
Oxford Clay.
Forest Marble.
Bradford Clay.
Great or Bath Oolite.
Stonesfield Slate.
Inferior Oolite.
Lias Beds.
New Red Sandstone.
Magnesian Limestone.
Lower New Red Sandstone.
Coal Measures.
Millstone Grit and Yoredale Rocks.
Mountain Limestone.
Old Red Sandstone.
Upper Silurian Rocks.
Lower Silurian Rocks.
Cambrian Rocks.
Metamorphic Rocks.
Granite.

The lines of cleavage of slate are very peculiar. They are not often parallel with the bedding, as they are in flagstone, but are in a direction right through the bed, whatever the direction of the stratification may be, and are often found to be almost at right angles to it. According to the views of Professor Phillips, Mr. D. Sharpe, and Mr. Sorby, as given by Professor Hull, the terrestrial forces acting in a lateral direction have not only contorted the beds, but, by changing the dimensions of the rocks, have so rearranged the laminae, or particles, as to cause a very great majority of them to lie in

a plane perpendicular to the direction of the forces themselves. Slate is one of the most dense of stratified sedimentary rocks; it weighs from 170lbs. to 180lbs. per cubic foot; its strength to resist crushing is also very high as compared with other kinds of stone.

A committee of the Royal Institute of British Architects, with the assistance of the late Mr. C. H. Smith (a most experienced man in the selection of stone) made experiments, a few years ago, on the weight required to crush cubes of four inch sides, of ten varieties of slate, including Bangor, Machynlleth, Festiniog, Maenoffern, Conway, Llanberis, Delabole, and Valencia, and the average crushing weight per square inch was 4.09 tons, that is 65½ tons on the 4in. cube, the crushing weight of the strongest being 5.21 tons per square inch. Mr. Williamson, however, as stated by Mr. Hull, found the slate of Killaloe, in Ireland, to require a much greater weight, even than this, to crush it, stating it to be as much as 30,730lbs., or more than 13 tons per square inch; but that must have been an exceptionally good specimen.

The transverse strength of Welsh slate is greater than that of any other mineral product of the stone kind. In Rankine's manual of civil engineering, the modulus of rupture of "slate," without, however, stating what kind of slate, is stated to be 5,000, and this would give the co-efficient 280 for the break-

ing weight in the formula $W = \frac{c b d^2}{l}$ wherein

W = the breaking weight in lbs. in the middle of a bar, l = the length of bearing in feet, b = the breadth, and d = the depth, both in inches; c being the co-efficient, found in the above case to be 280. There is no reason to suppose that the strength of slate or stone of any kind follows a different law from that of other material, which is always as the breadth and the square of the depth, and inversely as the length. Applying this formula to Mr. Rankine's modulus of strength, the breaking weight of a bar of "slate" is

$$W = \frac{280 b d^2}{l}, \text{ when } W \text{ is taken in lbs. on}$$

the middle of the bar, l in feet, and b and d in inches.

But experiments on slate from the Cambrian formation have shown that that kind is much stronger, while slate from the Silurian and Devonian formations is not so strong.

Above the Metamorphic rocks are the Silurian strata, so called by Sir Roderick Murchison as being typically displayed in the counties of Montgomery, Radnor, and Salop, the *Siluria* of the ancient Britons. The lower portion of these rocks is sometimes called the Cambrian, as being more fully developed in Wales (*Cambria*); but while it is doubtful whether any proper distinction can be made between these rocks and those immediately above them, or the true Silurian strata, it is best to consider them as the bottom rocks of the great Silurian system. Immediately succeeding these bottom rocks are the Llandeilo flags, consisting of slaty flags and bands of limestone; then the dark calcareous flags and slates of the Bala beds; then thick-bedded, whitish freestone called the Caradoc sandstone, and the grits and sandy shales of the "Lower Llandovery" beds, which, altogether, make up the Lower Silurian rocks.

Then we have the Wenlock series, consisting of the "Upper Llandovery" beds of gritty sandstones and shales, the shelly limestone and sandstone of Woolhope and Mayhill, the Wenlock argillaceous shale in thick beds, and the Wenlock concretionary limestone; these form the middle Silurian rocks, succeeding which are the Ludlow series, comprising the "Lower Ludlow" shale with concretions of limestone, the Aymestry argillaceous limestone, and above this micaceous grey sandstone, and finely laminated reddish and greenish sandstones, locally known as "tilestones," which, together, form the Upper

Silurian rocks. Some of the Silurian sandstones, says Mr. Page, "are finely laminated and bear evidence of tranquil sediment; some are ripple-marked, and testify to the presence of tides or currents; while others are pebbly conglomerates, and bespeak the existence of waves and gravel beaches, such as we witness at the present day. Of the shales or argillaceous beds some have evidently been thrown down in deep water as soft black mud, while others have been formed in shallow bays, and contain a certain admixture of sand, with sea-shells, such as are found at no great depth from the shore. Of the limestones, or calcareous strata, many are replete with the remains of corals and shells, and recall the existence of seas in which the coral polype reared its reefs, and shell-fish congregated in beds, like the oyster and mussel of our own times. Indeed, the abundant presence of fossil zoophytes, corals, molluscs, and crustaceans tells of varying conditions of water and sea-bottom, of light and heat; of tribes that secreted their nutriment from the ocean, or preyed on each other; and generally of a state of things different, it may be, but still analogous to that which we perceive in existing nature."

The great slate quarries of Penrhyn, near Bangor, and those at Llanberis, are in the Cambrian formation, which produces chiefly green and purple slates; the Llandeilo beds of the Lower Silurian produce dark-coloured slates, sometimes black; the Caradoc or Bala beds of the same period produce generally pale grey slates; that of Skiddaw, in the Lower Silurian, is of a sea-green colour. Killaloe, in the county of Tipperary, also in the same formation, produces slate of a dull bluish grey colour. The Westmoreland slate is quarried in the Upper Silurian rocks, and is of a pale blue or green colour.

Above the Silurian system is the Old Red Sandstone, or Devonian system of rocks, in which also slates are quarried, as at Delabole, in Cornwall, of a grey or blue colour, and at Valencia, in the county of Kerry, of a colour greener than that of Killaloe—(Hull). Amongst the numerous slate quarries in the Lower Silurian formation are those at Festiniog, Machynlleth, Aberdovey, Barry Island, Dolwyddelan, and Langollen.

Experiments on the transverse strength of slate of various kinds were made, under the direction of the late Mr. James Simpson, C.E. Seven slabs of Llangollen slate were taken, each 6in. wide, and of the respective thicknesses of ½in., ¾in., 1in., 1¼in., 1½in., 1¾in., and 2in. The specific gravities were successively 2.90, 2.83, 2.85, 2.83, 2.82, 2.81, and 2.80, the mean of which is 2.83, and the mean weight per cubic foot 177lbs. The slabs were laid down flat upon bearings 3ft. apart, and the value of the co-efficient determined by the experiments was as follows, in each case,

in the formula $c = \frac{l W}{b d^2}$, l being the length of bearing in feet, W the breaking weight in lbs. applied in the middle of the length, b the breadth, and d the depth, in inches; c being the co-efficient sought.

Piece	½in. thick,	value of c =	223
"	¾in. "	"	178
"	1in. "	"	183
"	1¼in. "	"	241
"	1½in. "	"	235
"	1¾in. "	"	209
"	2in. "	"	209

Mean, 211

Three large pieces were next taken, the mean weight of which was 177.3lbs. per cubic foot. They were 11¼in. wide, 4in. deep, and were placed on bearings 6ft. apart. The first experiment gave a co-efficient of 221, the second 220, and the third 169, the mean of which is 203. Few as these experiments were, they show a considerable difference in the strengths of the various pieces, and, perhaps, that is to be expected of all stone more than

of fibrous material. These specimens were planed on both sides.

Other experiments, on Bangor slate, have shown that it is much stronger, especially when self-faced, as riven from the quarry. The first set of experiments were made with slabs self-faced on both sides, from $\frac{3}{4}$ in. to 1 in. thick, from $2\frac{1}{2}$ in. to $7\frac{1}{2}$ in. wide, and from 2 ft. 3 in. to 7 ft. 3 in. length of bearing. The co-efficients were as follow—viz., 373, 267, 792, 606, 435, 600, 380, 425, and 445, the mean of which is 480. The deflections were measured, and the last deflection, taken in the case of a slab with 7 ft. 3 in., bearing, 3 in. in width, and $\frac{3}{4}$ in. depth, was .88 in. (the co-efficient of the breaking weight of this piece was 600). The deflection of another piece 5 ft. 9 in. bearing, 4 in. wide and $\frac{3}{4}$ in. thick, was .65 in. (the co-efficient of ultimate strength, 435). Another piece of the same length of bearing, and the same width, and $\frac{7}{16}$ in. thick, showed a deflection of .85 in. (co-efficient of ultimate strength 606). The elasticity of slate, therefore, is very considerable.

Another set of experiments on Bangor slate, self-faced on the one side and planed on the other, showed the following results:—The lengths, widths, and thicknesses were within the limits of the other set, and the co-efficients of ultimate strength were 540, 722, 311, and 271, the mean of which is 461. Experiments on Valencia slate—sawn on both sides, from $3\frac{1}{2}$ in. to 6 in. wide, from $\frac{3}{4}$ in. to $1\frac{1}{4}$ in. thick, and from 2 ft. 10 in. to 8 ft. 3 in. bearing, gave the following co-efficients, viz.—353, 250, 205, 353, and 189, the mean of which is 270. Llangollen slate, sawn out of block, 2 ft. 10 in. bearing, 6 in. wide, and varying from $\frac{3}{4}$ in. to $1\frac{1}{4}$ in. thick, gave co-efficients 223, 178, 183, and 240, or a mean of 206. Larger pieces of the same sort of slate, 5 ft. 6 in. bearing, $11\frac{1}{2}$ in. wide, and 4 in. thick, gave the co-efficiency of ultimate strength 221, 220, and 169. We have calculated out the several averages of these experiments, not because they are to be relied upon in practice, for averages never are, but for the purpose of more readily comparing the strengths of the different kinds of slate.

What portion of the breaking weight would be a safe load in any particular case depends somewhat on the nature of the material; for fibrous material it is sometimes, though seldom, perhaps, taken at 1-3rd; more often 1-4th, and in some cases 1-5th, or even 1-6th, in exceptional cases. With any kind of stone, however, it would be hazardous to take more than 1-8th, in general, although the range may extend from 1-5th to 1-10th according to the appearance of the fracture, whether laminated or "short." Taking 8 to be the proper factor of safety, and taking, instead of the average, the least co-efficient of ultimate strength in the above-named experiments, the value of c , in the

formula $W = \frac{c b d^2}{l}$ as given before, is, for

$$\text{Bangor slate, } \frac{267}{8} = 33; \text{ for Valencia } \frac{189}{8}$$

$$= 23, \text{ and for Llangollen } \frac{169}{8} = 21. \text{ The}$$

necessary thickness of any piece, therefore, when the weight or working load is known,

$$\text{will be for Bangor } d = \sqrt{\frac{W l}{33 b}}; \text{ for Valencia}$$

$$d = \sqrt{\frac{W l}{23 b}}; \text{ and for Llangollen } d = \sqrt{\frac{W l}{21 b}}$$

At a meeting of the Burntisland Town Council, held on Tuesday week last, the clerk reported that the contractor for the new wet dock, Mr. Scott, of Newcastle, had got forward his plan, and was pushing on the preliminary arrangements. He will be represented on the spot by Mr. Naylor, who is busy arranging for office accommodation, and the housing of the men employed on the works. Messrs. Bouch and Meik, the engineers, have appointed Mr. Walter Meik resident engineer.

QUANTITIES.—III.

BRICKLAYER.—(Continued.)

ARCHES AND VAULTING.—In their admeasurement, take the length by the mean girth between the *intrados* and the *extrados*; and state the thickness. This is afterwards reduced to the standard rod, and valued accordingly.

GAUGED ARCHES, AXED ARCHES, &c., are measured by taking the width of the opening between the reveals, and add to this dimension the projection of one skewback for the length, then take the height thus, referring to Figure 6 in last week's issue.

	Opening,	3ft. 6in.
	1 Skewback	9
		4ft. 3in.
4ft. 3in.		
1 0	4ft. 3in. Extra to gauged arch in yellow malms, set in putty (or, as case may be).	
3ft. 6in.		
9	2ft. 7in. Add soffit.	
	6ft. 10in.	

It will be necessary to deduct these arches from the "facings."

RELIEVING ARCHES are charged as extra to the ordinary brickwork. They are afterwards averaged (that is, the openings) and the width of soffit stated thus:—

No. 24. Extra only to relieving arches in cement, in three half-brick rims to 4ft openings (average), and 9in. soffit.

Centering, it will be seen by the Table, is taken at per foot super., measuring the soffit of the arch. The turning pieces are measured at per foot run, stating the length and width of soffit only.

It is also advisable to measure the cuttings after the arches for the sake of convenience: thus, in the example just given, the cutting would be taken and described as:—

$$2-1 \cdot 2 \quad 7-1\text{ft. 9in. Fair cut skewbacks.}$$

If the arch be segmental, it will be necessary to describe the cutting as cutting to face bricks to fit segmental arches, or as circular fair cutting where the arch is semicircular, greater labour being entailed where the cutting is circular. It should be particularly observed that all cuttings should be described as they are executed.

Groined arches are measured the same as ordinary arches. The cutting to groin being, however, taken separately at per foot run.

Circular brickwork must be kept separated from the straight, and described accordingly. If under 20ft. diameter, it is customary to state the radius. Some surveyors allow $1\frac{1}{2}$ times the straight to meet the additional labour, without describing the work as circular; but this should not be done, as all works should be described in the bill according to the nature of its execution, whether circular or straight. It is always understood to be straight, unless otherwise specified.

Brickwork in cement is measured with the ordinary brickwork in mortar, and an extra charge made to meet the increased price for the cement. It is, therefore, measured first with the brickwork in mortar; and the same item appears a second time as *extra only* in cement. Items, however, other than the plain brickwork are specified, without the extra, as trimmer arches in cement, &c.

It may be as well to observe here that all brickwork is understood to be executed in mortar unless specified to the contrary.

The measurement of bricknogging includes the timbers, but there must be deductions therefrom for the openings where they occur.

Brick paving.—State whether brick on edge or brick flat, also whether in cement or mortar, &c., also the quality of the bricks.

Tile paving requires no explanation; the Table showing all that is necessary.

Rendering in cement by bricklayer is

sometimes measured by the yard, and sometimes by the foot superficial, the former, however, is more generally adopted; and therefore I have so placed it in the table. It is described as "rendering in cement from the trowel."

Brick on edge coping.—Measured, as will be seen, at per foot run, stating thickness of wall, and described as "extra only" to brick on edge in cement, it having been firstly measured in with the brickwork in mortar.

Pointing is taken and measured similarly to "facings." The description is taken from specification, as tuck pointing, &c., and the nature of the work should also be stated, whether to old or new fronts, and if scaffolding is required:—

In measuring tile creasing, state if bedded in cement or mortar, and if laid double.

In taking slate or other damp-course, it is necessary to give exact description.

Hoop iron bond is taken at per foot run, giving size and description, whether tarred and sanded, or as the case may be. It is afterwards abstracted, brought into the Smith's bill, and charged at per weight.

Drains require to be described. Also state whether jointed in cement or mortar, and the net diameter of the pipes. Number the bends and junctions which are charged as "extra." the length having been taken with the ordinary pipes. Also state whether single or double junctions; and in stating the size it is advisable to give the dimensions of both of the pipes it is intended to unite, as 4 in. into 6 in. (or as the case may be). If barrel drains, it is best to measure them at per foot run, stating net diameter and number of half-bricks in thicknesses of the ring, including centering, &c.

Gully traps are numbered.

Cesspools, if will be seen, are numbered, giving the depth, and diameter, and description of method of finishing. Number the drain-pipes discharging into same, and describe as "Extra to making good to drain-pipes."

ABSTRACTING.—In abstracting this trade, it is necessary to allot a certain number of columns to the several descriptions of work, as recommended in the "Excavator;" but great care and circumspection will be necessary in the uninitiated to obtain a proper arrangement. It is, therefore, advisable to enter the several items as widely apart as possible, leaving, of course, greater space for those that occur the more frequently.

In an ordinary job, one column will suffice for cube brickwork, one for one brick and another for one and a half brick, with an additional column between them for the deductions. Deductions are made where practicable on the dimension paper (as for example, where the deduction occurs after the addition), so saving unnecessary labour.

The next three or four columns will be taken up with "extras,"—as brickwork in cement, facing bricks, arches, and the other superficial quantities.

We then allot the remainder to the "runs," or lineal dimensions, leaving two or three columns for the numbers, and any remarks.

It is customary to include in the "Bricklayer" the parochial and other fees, as for example, water, district surveyor's fees, &c.

With respect to the brickwork, as the standard adopted consists of 272ft. superficial of $1\frac{1}{2}$ bricks thick, all brickwork will have to be reduced to this thickness.

This is accomplished in the first place by reducing the brickwork, where above $1\frac{1}{2}$ bricks, to either 1 brick or $1\frac{1}{2}$ brick, whichever is the simplest, and abstracting it accordingly.

Then, after it is all abstracted, bring the sum of the 1 brick into $1\frac{1}{2}$ brick by multiplying it by 2-3rds.

If we take the case already given with respect to footings, we have 50ft. of $3\frac{1}{4}$ brick, which can either be reduced to 162ft. 6 in. 1 brick, or 108ft. 4 in. of $1\frac{1}{2}$ brick; but when the latter can be as easily done as the former, it is advisable to do it. It will be necessary to divide some dimensions between the two: thus,

supposing it to be $2\frac{1}{2}$ bricks, we should have 500ft. of 1in. brick and 50 of $1\frac{1}{2}$ brick in the abstracting, this being the easier method of reducing the quantity.

Cube brickwork is abstracted as such. It is afterwards reduced to the standard of $1\frac{1}{2}$ brick by multiplying by 8, and dividing by 9.

TABLE II.

This table has a double use,—1st., it shows the order of taking the items of this trade, and, 2nd., the method of measurement.

DESCRIPTION OF WORK.	HOW MEASURED.
Stock brickwork in mortar	At per rod reduced.
Do, to fence walls, or walls under $1\frac{1}{2}$ brick thick	"
Do, circular	"
Brickwork in cement	"
Facings (extra only to), stating whether picked stock, yellow malms, white Suffolk, or as the case may be, always placing the inferior quality first; and whether including pointing	At per foot superficial.
Gauged and axed arches (extra only to)	"
Rough cutting	"
Fair cutting	"
Circular fair cutting	"
And all cuttings over 6 inches wide	"
Pointing	"
Half-brick walls in cement	"
Trimmer arches in cement	"
Damp course	"
Brick nogging, flat or on edge	At per yard superficial.
Brick paving do.	"
Tile paving	"
Rendering in cement	"
Cutting to birdsmouth *	At per foot run.
Squint quoins	"
Chamfers	"
Splays under 6in. wide	"
Beads and quirks	"
Chases in brickwork	"
Pointing to flashings	At per foot run.
Lime and hair or cement filletings	"
Brick on edge coping	"
Tile creasing	"
Fascias	"
Cornices	"
Glazed stoneware drain pipe according to size and description	"
Bends and elbows—extra to single and double joints extra to.	At per number.
Brick relieving arches in cement (14in. soffit to 4ft.) average openings—extra to	"
Frames, bedded and pointed	"
Flues, cored and parge-tted	"
Setting to stoves	"
" " range	"
Chimney pots and setting	"
Setting chimney-pieces	"
Building in ventilators and air bricks	"
Ends of sills made good	"
" rainwater pipes made good to drain	"
" timbers cut & primed	"
Stops to chamfer, moulding, &c.	"
Returns do.	"
Mitres do.	"
Angles do.	"
[Some take the last four items under the items to which they refer, but I think they are more usually taken in this order.]	
Cesspools, with description	"

THE TIMBER TRADE.

THIS trade, always a very important one to the building interest, seems destined, in spite of the increased use of iron as a building material, to assume still larger proportions. The estimated number of loads imported into the United Kingdom in 1872 is nearly five millions, probably worth in round numbers £15,000,000 to £17,000,000. In 1867 the number of loads imported was 3,449,532, and since that date, with the exception of a slight decrease in 1869, a steady progression has been made, and principally in foreign grown wood. A time, however, is rapidly approaching when the steadily advancing prices will reach a climax, and that time is not far distant. It is obvious that for the convenience of shipment, the wood nearest to the ports is first felled. As years pass by, a very sensible inroad is made in the forests, and new means of transit to the sea must be provided. Difficulties of all kinds accumulate, improved machinery, increased cost of labour, enhanced value of forest

land, and so forth, all go to make the price of wood higher almost every year, and the result will some day be the earnest seeking and working of fresh districts. Again (although it has nothing to do with import cost, but everything to do with a builder's estimate) this overgrown city causes the cost of carriage from the docks to the builder's yard, and from thence to the works he has undertaken, to be so enormous that it may be doubted whether many in the trade really know the exact amount they are out of pocket. Better facilities will have to be given by the railway companies for suburban goods traffic before we shall get rid of the sight so common now, of, say three horses wrestling with a load of about as many tons of wood, bound from Rotherhithe, perhaps to Kilburn or West Brompton. But there is one advantage about such slow progress. It can be calculated within an hour or two when the load will arrive at its destination when horses are drawing it; but who could even speculate, even to a day or so, as to the time of its arrival when behind a locomotive?

There is no doubt, however, that in the due course of events, other districts will arise to compete with the old, and that Asia, India, Africa, and Australia will eventually compete in this market.

Petersburg wood, which used to be in such great demand, seems (partly from the causes above mentioned) to be falling into comparative disuse, as consumers prefer Swedish, which is about as good as recent Russian shipments, and much cheaper. Excepting Archangel and Onega, it is difficult to see what better European goods can be had than best Gelle yellow. But, it must be remembered that Sweden does not seem able to supply all we need, and in spite of advancing prices, the importation for last year is below that of 1871. Her balk timber, like all similar description of wood, is little sought after, and for this reason—builders buy wood which is as near as possible to the size they happen to require. Hence the large importations of 4in. planks and deals. We are having our doors, sashes, and mouldings all manufactured for us, as well as pantile and slating laths, not to forget plaster-laths by hundreds of thousands of bundles. Steamers from the Swedish ports bring over small consignments if required, and builders, if they like to set about it in the right way, may positively import for themselves and save an intermediate profit. Sometimes two or three men of small capital might not find this plan to pay, but with even moderate means, more may be done with advantage than most are aware of. Norway imports are not much in favour, unless of the very best quality. Very good prepared flooring boards can be had at comparatively low prices, but they are principally white wood, and only 6 $\frac{1}{2}$ in. wide. Fredrickshall boards are also in good repute, both as regards yellow and white wood.

There is such a demand for wood in the United States that Quebec and other Canadian deals, &c. are high in price, and will probably be higher. Broad pine deals fetch almost any price the owner chooses to ask, and are eagerly sought after. Floated pine, unless quite dry, is not in demand, and sells very low. Its great liability to rot, of course, accounts for it, and the market, besides, is almost always overstocked. Good spruce deals from St. John always find purchasers at fair prices, but they are over-weighted in the race with Norway and Swedish importations. For American yellow pine timber there is not much demand here, and Liverpool will naturally continue the chief and ruling market in the country. Pitch pine timber, although the importations have been very moderate, still is surely working its way among builders and cabinet-makers. For bed-room furniture it is much used, and nothing can compete with its price, compared with its appearance, for this purpose. It may be seen now made into furniture at all the large makers, and it looks exceedingly well, though it is hardly suited for drawing-room purposes.

Considering how of late years the Admiralty have been selling off enormous quantities of thoroughly dry and sound teak, oak, sabcu, &c., from various dockyards, the inquiring taxpayer, of whatever politics, may naturally wonder how such timber is to be replaced, at the present advanced prices, without enormous loss; for replaced it will be to a great extent. However, the building trade has had a good chance of recouping itself for advanced prices of labour and material, and more than one firm have laid in a good stock of such wood from the Royal

dockyards. This unbusiness-like folly has been more than once noticed by the press, and severely commented on. But the trade will know how to profit by a Chancellor's very laudable ambition to have a balance on the right side. There can be no doubt whatever that the high price of labour in this country is stimulating the foreigner to supply manufactured wood goods to a far greater extent. If care is taken not to send over inferior articles (which, indeed, will not pay the sender in the long run), but to let us have our wants properly studied and promptly attended to, there is no doubt of a large demand springing up. English machinery does the work abroad, and Englishmen conduct the operations. The great saving is in labour. It may be sad to see work thus slipping away from England and going to Sweden and elsewhere; but it need not be added that this result is just the A B C of political economy.

All descriptions of fancy woods have been in good demand during the past year. There are about 28,000 logs of mahogany now at the docks, exclusive of cargoes now discharging. Rosewood is not so much esteemed as it was, and walnut (especially in the piano trade) is much preferred, and its exquisite figure will always make it a favourite, although it should only be placed where wall paper and hangings are in unison with the peculiar colour.

Those builders are to be congratulated who hold large stocks, and perhaps some account of the reason for high prices may be acceptable. It is a good symptom that there is not the over-speculation in the trade that led to such disasters some years ago, and that more profit can be got out of a hearty trade with wood at the present prices, than with timber and deals going for cost price, when work is almost suspended from rash and foolish ventures.

FIRE-PROOF HOUSES.

MR. HIRAM POWERS, the sculptor, takes occasion from the Boston fire to put in a word for reform in house-building. He writes from Florence to a New York paper:—"I have the highest respect for the ability and skill of my countrymen. Indeed, they surpass, in the main, all other nations in this regard; but, nevertheless, we have a few things to learn, and among them is how to make, not a house, but a whole city, fireproof; for no fire-proof house can be made in the midst of highly combustible buildings. Indeed, there is no safe that will withstand the heat of a furnace. The very walls will melt, or crumble into dust, if not from inner fire, at least from outer flames. Therefore, to be fire-proof in our buildings, our neighbours' houses must also be fire-proof; and this calls for municipal laws regulating the material and the construction of buildings, and what should be required. First—The abandonment of all wood floors. Second—The floors to be made of bricks, thus sealing down all ventilation in case of fire. You may lay a floor of wood on bricks. Third—The stairs to be metallic or of stone. Fourth—The rafters of the roof, like the joists of the floors, to be all bricked over before putting on the slates or tile. But it may be asked will not joists and rafters take fire? Yes, they will, and often do take fire here in Florence. But with a floor of bricks laid with mortar upon them the fire department need not hurry to such a fire; hours, indeed, might elapse before they reached it. I have known an instance of nearly two days burning of the end of a joist, just under a fire-place, and yet the beam not burnt off, only deeply charred. The fire cannot get through the bricks, but it would soon find its way through a wood floor, and then, with ventilation, it would soon reach the garret. In short, the whole building would be in flames within half an hour. Brick floors do not prevent fires, but they prevent conflagrations. No city can be burnt with brick floors, nor has a house been burnt within the City of Florence during my residence here of 35 years."

The proposal of the Chelsea Waterworks Company to form large reservoirs by the side of the Thames from Boyle Farm, the residence of Lord S. Leonards at Thames Ditton, to a spot near the river Embur at Moulsey, is to be strenuously opposed when the scheme comes before Parliament.

At Venice steps are being taken for founding an Art School wherein pupils dedicating themselves to art may receive a special education under the direction of Signor G. Stella.

* Where the return wall of a building is otherwise than at right angles with the front, the angle bricks will require cutting to the rake of the return wall. That cutting which is made to the inside angle is called cutting to birdsmouth, and that to the outside angle as cutting to squint quoin.

Civil Engineering.

ABERDEEN HARBOUR WORKS.—The report of the Harbour Engineer, Mr. Dyce Cay, of the works executed at Aberdeen Harbour during the last financial year, ending 30th December, has been issued. It shows that 262,649 tons were dredged from the dock, tidal harbour, channel, diversion of Dee, and lower basin. This work cost £6,557, or about 7½d. per ton. To complete the present dredging works in the channel, tidal harbour, and docks, £15,373 is set down as the approximate cost. The annual amount of silt, mud, &c., deposited in the harbour and channel, by sea, river, and sewers is estimated at 40,000 cubic yards, to remove which and maintain the harbour clear £2,500 per annum is expected to be required. During the year the new south breakwater has been advanced 300½ lineal feet, which together with staging, manufacture of concrete, and sundries, involved a cost of £16,540. The breakwater is now advanced 787½ feet, leaving only 412½ feet to be built, which it is calculated will occupy the most of the next two years. Judging from the cost of the executed portion, the engineer thinks it probable that the expense of completing the gigantic undertaking will be close to the original estimate of £78,842. As far as can be judged as yet, Mr. Cay says—"The new channel of the Dee seems well adapted as to dimensions, levels, and works, for carrying the river." The removal of part of the old south breakwater, and of the point of the Inches, make satisfactory progress.

BERWICK-UPON-TWEED.—The Harbour Commissioners have accepted the offer of Messrs. Morrison and Son, contractors, Edinburgh, for constructing the new docks, amounting to £37,951 12s. The works will be commenced next month. Messrs. D. and T. Stevenson, Edinburgh, are the engineers.

NEWCASTLE.—The Tyne Commissioners have accepted the tender of Sir William Armstrong and Co. for the ironwork and hydraulic machinery of the new swing bridge across the river, the amount being £110,000. The whole cost of the erection will be about a quarter of a million.

THE INSTITUTION OF CIVIL ENGINEERS.—At the meeting of this Society on Tuesday, the 14th of January, Mr. Hawksley, President, in the chair, twelve candidates were balloted for and declared to be duly elected, including two Members, viz., Mr. Arrott Browning, of the Madras Irrigation and Canal Company; and Baron Max-Maria Von Weber, Imperial Royal Councillor in the Austrian Board of Trade. Ten gentlemen were elected Associates, viz., Mr. William Frederick Alphonse Archibald, B.A., Stud. Inst. C.E., Surveyor, Metropolitan Board of Works; Mr. Nicholas Procter Burgh, Waterloo Bridge-road; Mr. Henry Carmichael Christopher, Surveying Officer, P.W.D., Ceylon; Mr. Edmund Henry Harris, Engineer and Manager of the Water and Gas Works, of the Wallasey Local Board; Mr. Benjamin Kitt, Gas Examiner to the Corporation of Bristol; Mr. John Mackay, Shrewsbury; Mr. Joseph Prime Maxwell, Stud. Inst. C.E., Contractor's Staff, Devon and Cornwall Railway; Mr. William Henry Scott, Local Fund Engineer, Dharwar, Bombay; Mr. John Isaac Thornycroft, Chiswick; and Mr. Richard Tip-lady, Principal Resident Engineer, Bahia Railway, Brazil. It was announced that the Council, acting under the provisions of the bye-Laws, had recently admitted Messrs. James Samuel Brown, William Coulthurst Gibbons, Arthur Trethowan Goodfellow, Alfred Joyce, Horace Challoner Knox, Theophilus Michell, Alexander Miller, jun., George Moyle, George Augustus Grant Shawe, and Zacchaeus Walker, Students of the Institution.

THE THAMES VALLEY.—Since the upper sections of the Thames were transferred to the Conservators, six years ago, various engineering works have been planned and executed on the river between Windsor and Staines, with the double object of diminishing floods in winter and of keeping up a sufficiency of water for the purpose of irrigation and navigation in summer. The most important of these works are the Bell Lock, opposite Egham, Old Windsor Lock and Weir, and Romney Lock, opposite Eton. All these locks were in a very dangerous and dilapidated state in 1866, and large beds of gravel existed in

the river, so that in summer the standard level could not be maintained, and no check whatever existed over the winter floods. It was therefore resolved to renew these locks and weirs, and to construct, in connection with each, one or more large "tumbling bays." That at Old Windsor is 60 feet wide, and is so placed that the water passes over it whenever there is a rise of more than 18 inches above the standard summer level. The waterways of the new structure have also been considerably increased in width, and the small islands immediately above the weir have been cleared of bushes and eel bucks, both of which greatly obstructed the current. The cost of the works at Old Windsor, which are not yet quite completed, has partially been defrayed by the Crown estates, which abut on the right bank of the river in the neighbourhood for several miles. The structures on Romney Island now include two tumbling bays, which have done great service during the late floods. The evidence of all local authorities goes to prove that these works have exercised a most favourable influence in relieving the upland districts (as well as the immediate vicinity of Windsor) during the late rainy season. The engineering details have been planned and executed under the superintendence of Mr. Stephen W. Leach, and Mr. Menzies, deputy-surveyor of Windsor Great Park, has watched the progress and given advice on behalf of the Crown lands, which have been very much benefited in every way by the alterations.

THE INTERNATIONAL EXHIBITION OF 1873.

THE Commissioners have issued the following special notice to artists and others intending to exhibit in the Fine Arts Division of the Exhibition for 1873.

The attention of artists and manufacturers is especially called to Division I. of the subjects chosen for the series of International Exhibitions. Hitherto the exhibition of works of fine art has been too much limited to the display of pictures and sculpture, dissociated from purposes of utility; and it may be doubted whether a picture on enamel or on pottery, destined to be applied to a piece of furniture or a sculpture in wood intended for a picture-frame, however great its merits would find any place in the exhibitions of the Royal Academy of London, or in any of the numerous other exhibitions of the works of artists. Still less would a Cashmere shawl or a Persian carpet, the chief excellence of which depended upon its combination of colours, find in any of these exhibitions its proper place.

Such a complete separation of artistic work from objects of utility may indeed be said to be only the characteristic of modern times; for in the ancient and mediæval periods the highest art is to be found in alliance with the meanest materials of manufacture. The Etruscans painted on vases of clay subjects which still charm us by their beauty of composition and skilful drawing; and the finest works of Raffaele were designed as decorations for hangings to be made of wool.

It is intended that these exhibitions shall furnish the opportunity of stimulating the revival of the applications of the artist's talents to give beauty and refinement to every description of object of utility, whether domestic or monumental.

In the annual exhibitions every work in which fine art is a dominant feature will find proper provision made for its display. Painting, on whatever surface, or any method—sculpture in every description of material—engravings of all kinds—architectural design as a fine art—every description of textile fabric of which fine art is a characteristic feature—in short, every work, whether of utility or pleasure, which is entitled to be considered a work of excellence from the artistic point of view, may be displayed in the exhibitions under the division of Fine Art. Whilst the manufactures which fall within Division II. will have been brought under review in a series of ten years, the fine art division will recur annually so that the greatest possible encouragement may be given to progress in the application of art to objects of utility.

Every artist workman, moreover, will be able to exhibit a work of merit as his own production, and every manufacturer may distinguish himself as a patron of art by his alliance with the artistic talent of the country. In the fine art section the artist may exhibit a vase for its beauty of

painting, or form, or artistic invention; whilst a similar vase may appear in its appropriate place among the manufactures of the appointed year, on account of its cheapness or the novelty of its material.

THE WORK OF THE LONDON FIRE BRIGADE FOR 1872.

CAPTAIN SHAW'S report of the London Fires during 1872 has just been issued. The total number of calls to fires received during the year was 1671. Of these 104 were false alarms; 73, chimney alarms; 120, serious fires; and 1,374, fires resulting only in slight damage. Compared with 1871, the total number of fires exhibits a decrease of 348, and with the average of the last ten years a decrease of 52; the proportion of serious to slight losses is also much more favourable than it has ever been before. In 71 instances life has been seriously endangered, and in 15 cases sacrificed, the total number of lives lost being 22. To chimney fires there were during the year 3,263 calls, 1,094 proving false alarms. The number of journeys made by the fire engines of the fifty stations of the Brigade has been 6,281, and the total distance run 17,669 miles. The quantity of water used for extinguishing fires has been 15,387,224 gallons, or about 68,000 tons. Of this quantity somewhat more than three-fourths was taken from the river, canals, and docks, and the remainder from the street pipes. In his report in 1871, Captain Shaw expressed a hope that the constant service provision of the new Water Act would have the effect of making every fire-plug represent an immediate supply of water; but although this Act came into operation in April last, he is unable to point out one instance in which the work of the Brigade has been effected, and as far, therefore, as the extinguishing of fires is concerned, the Act at the end of more than eight months remains inoperative. The force of the brigade at present consists of 50 fire-engine stations, 106 fire-escape stations, 4 floating stations, 52 telegraph lines, 84 miles of telegraph lines, 3 floating steam fire stations, 1 iron barge to carry a land steam fire engine, 8 large land steam fire engines, 17 small land steam fire engines, 16 seven-inch manual fire engines, 56 six-inch manual fire engines, 13 under six-inch manual fire engines, 125 fire escapes, 396 firemen, including chief officer, the superintendents, and all ranks. The fluctuations in the increase of the number of fires in London during the last forty years are remarkable, and form a somewhat perplexing subject of study to those who desire to ascertain the cause with a view to the application of a remedy. Thus, in the year 1836 there was an increase of 93, in 1837 a decrease of 63, and in 1838 an increase of 67; in 1845 there was a decrease of 55, and in the following year an increase of 127; in 1857 there was an increase of 158, and in 1858, 1859, and 1860 a falling off, which for the three years combined amounted to 59; in 1866 there was a decrease of 164, and in 1867 an increase of 59. The greatest irregularities of all, however, have taken place within the last three years, during which time the abnormal increase of 374 in 1870 has been followed by a decrease of 104 in 1871, and 348 in the year just concluded. The number of houses has increased in almost exact proportion to the population, there being always one house for every 8 persons, or to be more precise, 100 houses never accommodating less than 738 or more than 780 persons. The increase of the population, however, and that of fires have been at very different rates; the former, which numbered about 1,700,000 in 1833, having reached about 3,340,000 in the present year, in other words not quite doubled, while the latter, having increased from 458 in 1833 to 1,494 in 1872, have more than trebled.

Unable to account for these fluctuations, the lesson taught by their study has been the necessity of a continual state of active preparation on the part of the Brigade, and Captain Shaw's report testifies to the success with which this end has been kept in view.

A small Baptist chapel has been opened at Arbroath. It is a plain building, accommodating 270 persons.

The Ramsgate Local Board have decided to dispense with the services of their late surveyor, Mr. George Hinds, who for twenty years has filled the post, and have determined to pay him £120 instead of giving him twelve months' notice. Mr. Ellice Clark has been appointed surveyor, at a salary of £200 per annum.

OUR LITHOGRAPHIC ILLUSTRATIONS.

DESIGN FOR TOWN HALL, CHORLEY.

We this week give an unsuccessful competitive design for a new town-hall for Chorley, Lancashire. The result of the competition adds another to the long list of unsatisfactory ones; as we believe that the design which was selected is not being carried out. It will be remembered that the Town Council invited architects to compete, and issued a sketch-plan suggesting that the town-hall and offices in connection therewith should be placed towards S. Thomas's-square, the frontage towards Market-street to be laid out for shops. By the time most of the competitors had their designs well in hand, the majority of the townspeople showed a determination that the hall should front Market-street, having simply lock-up shops underneath, and that no other arrangement should be accepted. This accordingly led to this design being prepared as an alternative, and certainly it was not inferior in arrangement to any sent in. After a long squabble in the Council, it was agreed to call in a professional man to select a design. Mr. Paley was accordingly asked to take the office, and he selected one (very properly so) agreeing with the original instructions issued, and that of Messrs. Ladds and Powell, we believe, was successful. The design we illustrate is by Messrs. Woodzell and Colcutt, of 12, Finsbury-place, South.

MR. STREET'S DESIGN FOR CATHEDRAL, EDINBURGH.

In obedience to promise, we give north elevation and ground plan of Mr. Street's design for the Cathedral Church of St. Mary, Edinburgh. Last week we gave an exterior perspective, and section in detail of choir. For explanation we beg to refer the reader to Mr. Street's full report to the trustees for the erection of the Cathedral, which appeared in our last impression.

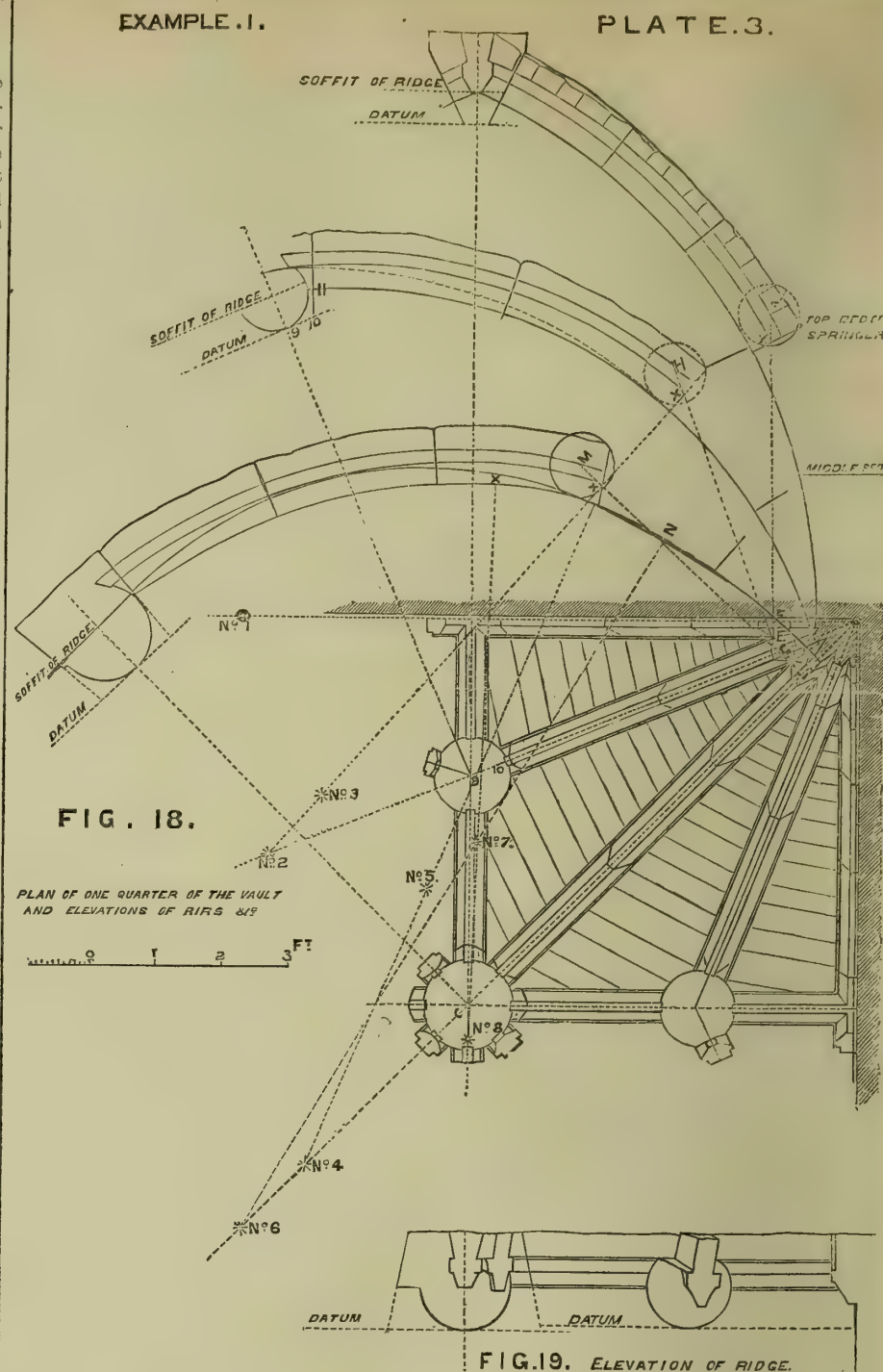
EXAMPLES OF GROINED VAULTING.

(Continued from p. 54.)

EXAMPLE I.

TO find the elevation of the diagonal rib through the point *k*, where the diagonal and intermediate ribs separate on the plan, draw the line *lm* perpendicular to the base line *lc*, make *lm* equal to *ff* or *gh*: *m* will then be the point of separation in the elevation of the rib, or where the top edge of this rib separates from that of the intermediate one. From the point *c* erect the perpendicular for the elevation, and set up the height to the soffit of the ridge, the same as before, and from *m* describe a circle with a radius equal to the depth of the rib. First find a centre on the base line from which the curve may be drawn from the springing to touch the circle at *m*, as shown by the dotted line. This will be at No. 4. Draw a line from this centre to a point at, or near to the circle at *m*, and on this line, as before, find a centre which will continue the curve from *m* to the ridge. This will be at No. 5. But as this centre comes within the centre line of the elevation, the curve at the upper end, instead of rising to the centre, first rises, and then falls, as shown by the dotted line. To avoid this, take first a long radius on the base line *oc*, so as to throw the curve more upright at the springing. This will be at No. 6, but this would throw the curve outside the point of separation. To prevent this, draw the curve only to a part of the distance, say as far as the point *n*, draw the line No. 6 *n*, and on this line take a centre (No. 7), from which the curve may be struck so as to touch the circle *m*, and then come lower down, so that when drawn to a short distance past the circle *m*, say to the point *p*, it will allow of another centre being taken on a line drawn from *p*, through the centre No. 7, which will be on the outside of the centre line of elevation, as at No. 8, from which centre the curve may be completed to the ridge, and retain the pointed form.

These radii and centres can best be found



by repeated trials, or some such course as just described.

As the centre No. 4 throws the curve so high when passing the circle at *m* that it cannot be brought down without having a dip at the upper end, we take a centre which would throw the curve still higher for a short distance only, and then with a shorter radius bring the curve lower when past the circle, and by so doing, a chance occurs of finding a centre which will bring it to the right place at the ridge, and retain the pointed form.

It will be seen from what has been shown that the curves of the intermediate and diagonal ribs in this example are regulated chiefly by three things, viz:—the position of the ribs at the springing, the point of separation, and the height at the ridge, the various radii being so arranged as to work in with these points as shown, and so as not to cripple the curves where the changes occur, the vaulting surface betwixt the ribs being left to take its chance as to the form it takes, on the top of the ribs; all this depending upon the principle on which the vault is designed.

It now remains to arrange the joints of the ribs and the filling in.

It will be seen, on referring to Fig. 18, that the top bed of the solid springer is kept some-

where below the level of the point where the ribs become fully developed; this was done on account of the great depth of the stones. It would perhaps have been more correct to have made the top bed radiate from that level, and then to have divided the total height of the springer into three courses instead of two. As it is, each rib has to be slightly bevelled off at the back from the vertical lines above the points *x, x, x*, these being taken as the points from which to draw the beds or joints of the ribs on the top of the springer, these joints being extended far enough back to receive the feet of the ribs, including the back portion, and the stone beyond this taken to a level bed to form a true surface for working from, shown in the drawing as top bed of springer; the joints at and above this level in all cases radiating to their respective centres; the intermediate, or middle bed of springer is made horizontal, the plan of which would be developed from the elevations.

(To be continued.)

The Governors of the South American States have recently held a convention at Atlanta, Georgia, to promote the construction of a continuous line of water communication, by natural and artificial channels, from S. Louis, Missouri, to Savannah, Georgia, a distance of about 1,300 miles.

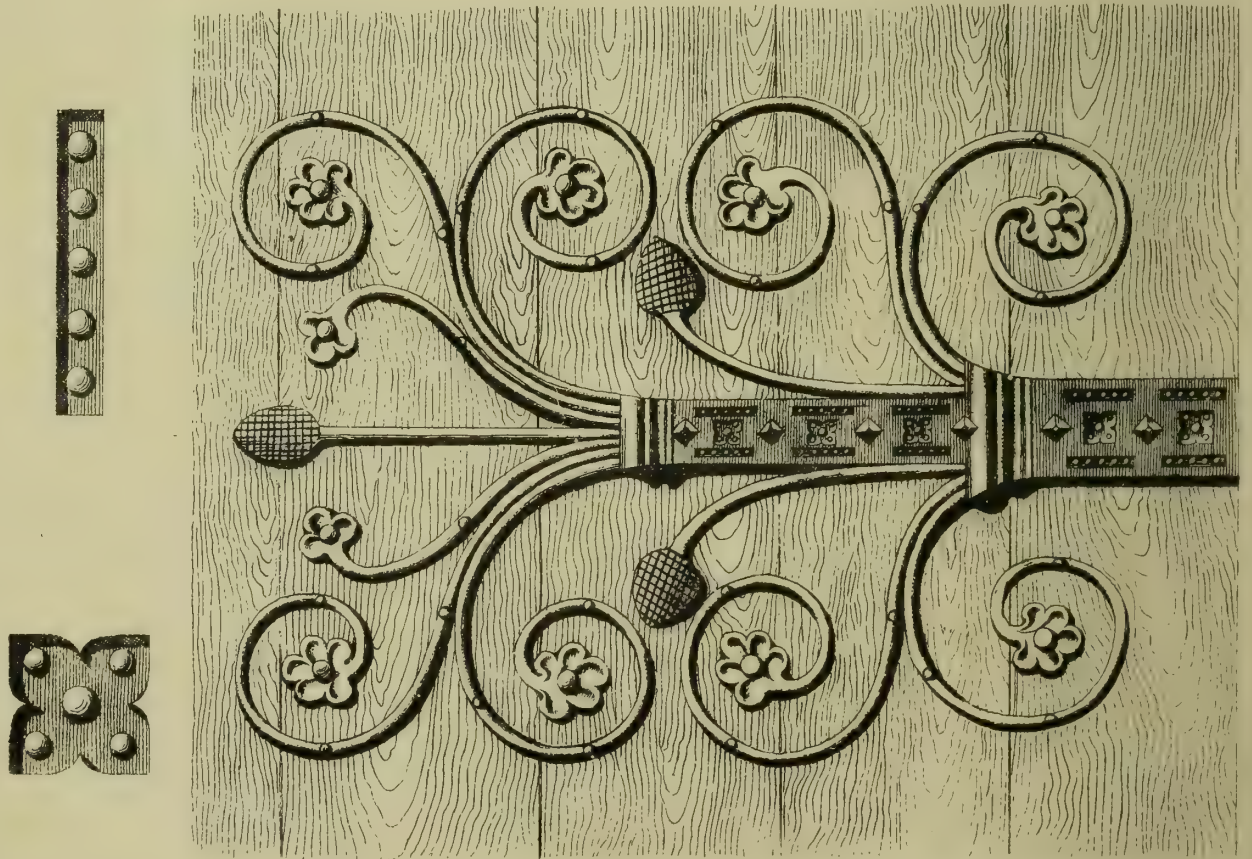
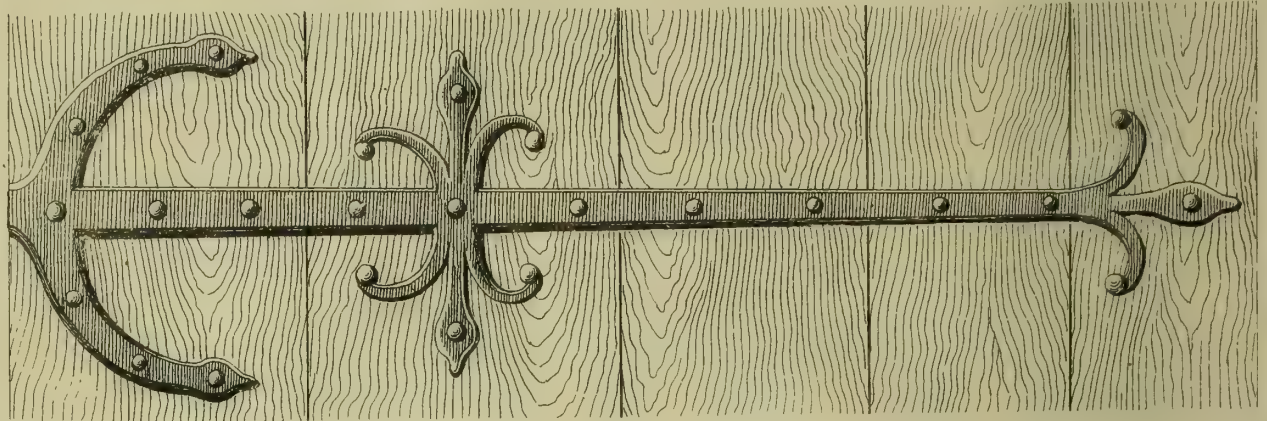
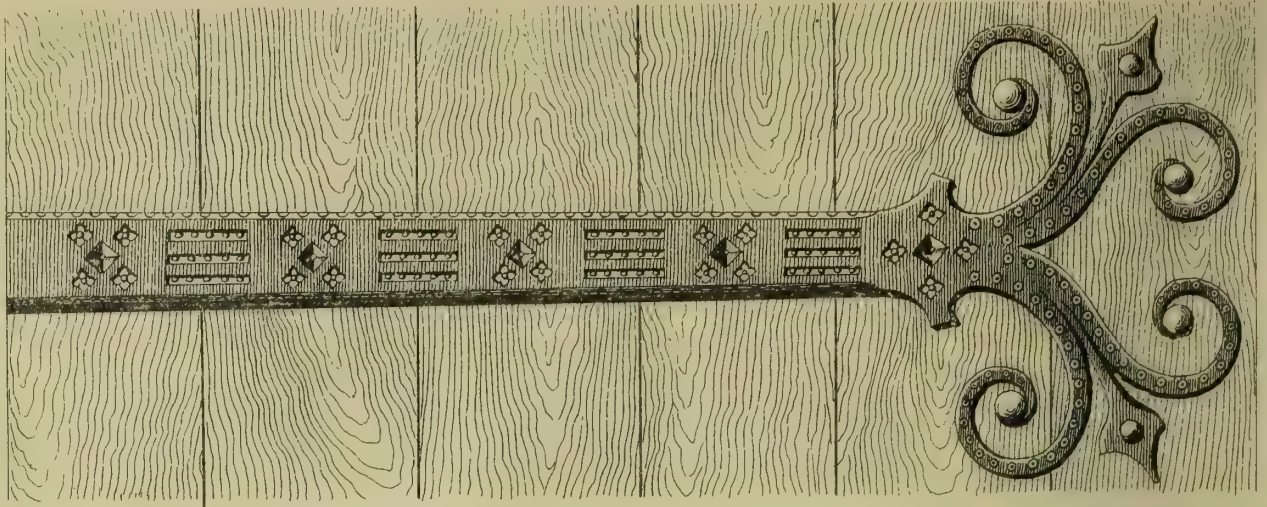
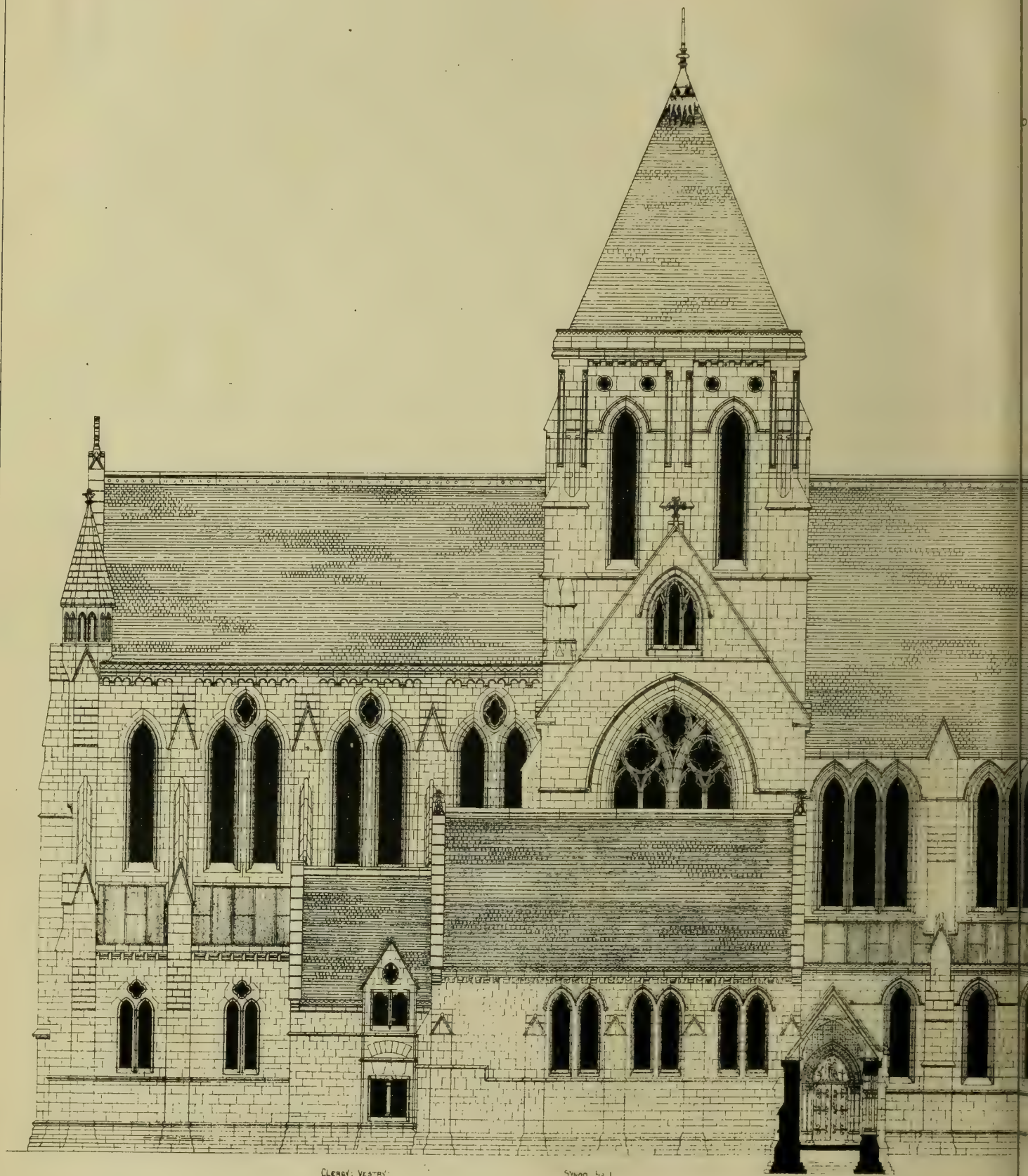


Photo-lithographed & Printed by James Abernethy, St. George's Lane, E.C.

HINGES FROM FRENCH CATHEDRALS.
13TH CENTURY.



CLERGY VESTRY

SYNOD HALL

SECTION THROUGH CLOSTER

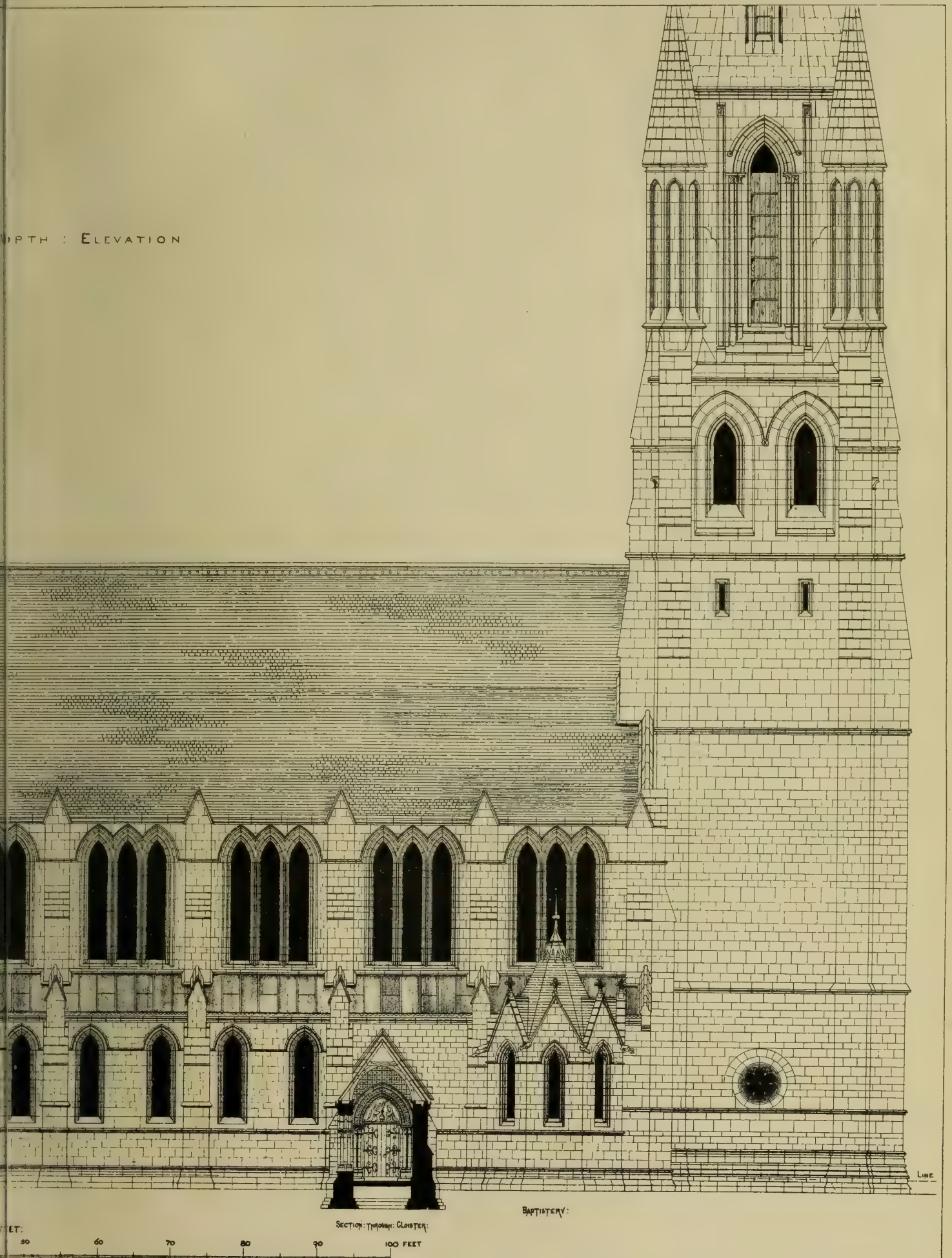
SCALE: 1/4" = 1'

DESIGN FOR THE CATHEDRAL

GEORGE EDMUND STUBBS

MS. JAN. 17. 1873.

DEPTH : ELEVATION



CHURCH OF ST MARY, EDINBURGH.
FEET, R.A.—ARCHT.

Photo-Lithographed & Printed by James Akerman, 51 Grays Inn Road, W.C.



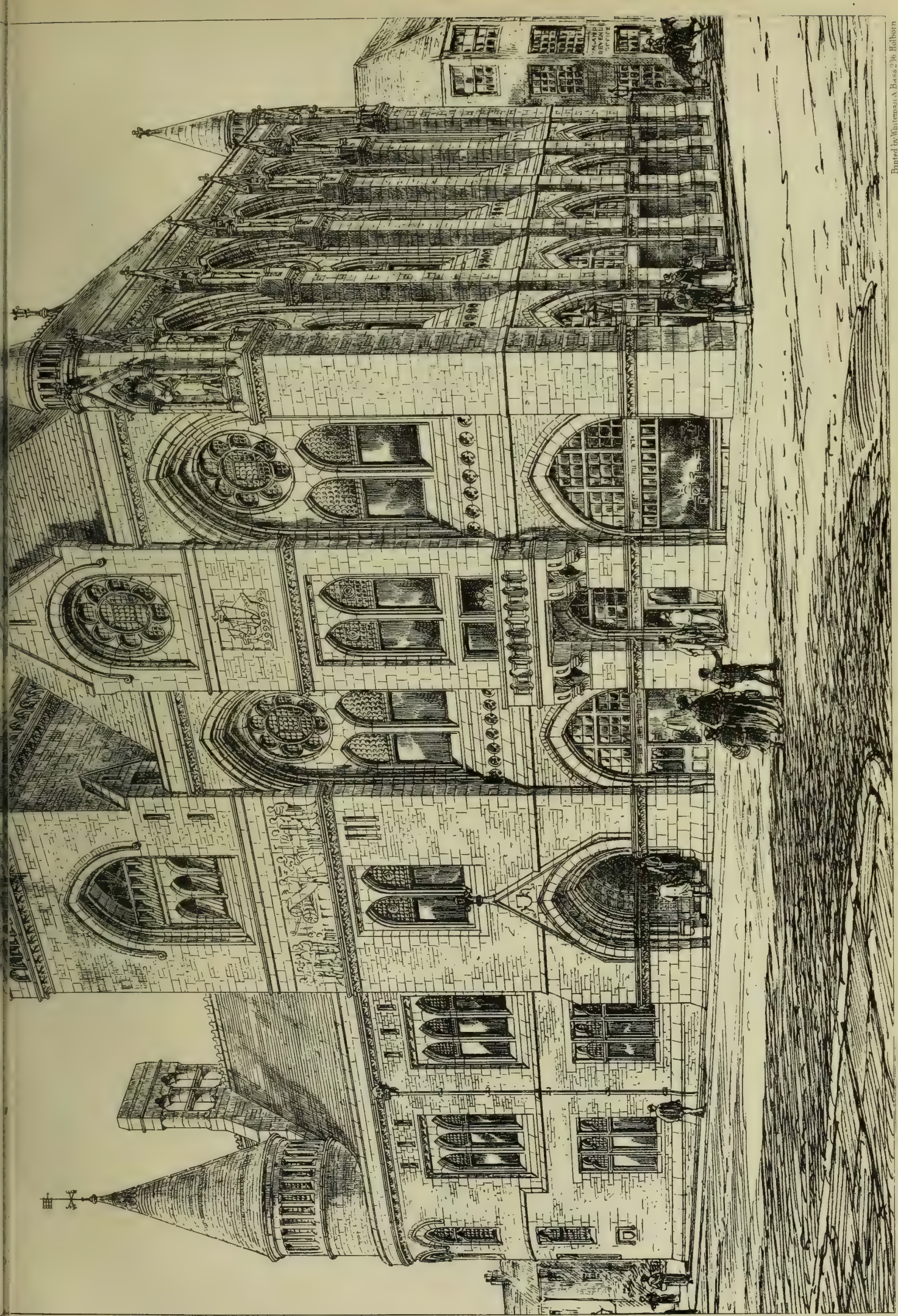
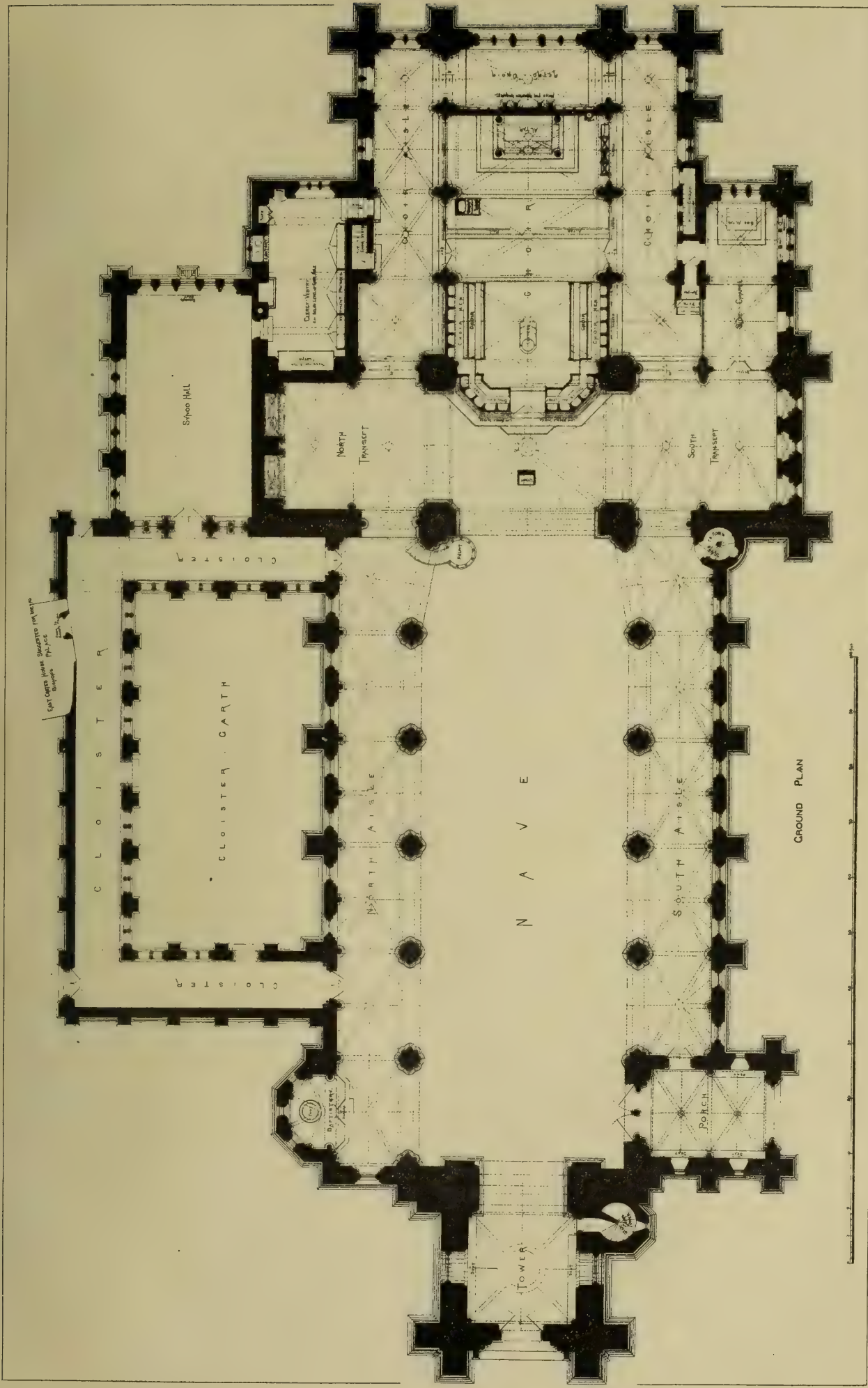


Photo-Lithographed by *James Mearns*, 51, Gray's Inn Road, W.C.

DESIGN FOR TOWN HALL, CHORLEY, LANCASHIRE.

WOODZELL & COLLCUTT ARCHTS.

Printed by Maitland & Bass, 27, Holborn



DESIGN FOR THE CATHEDRAL CHURCH OF ST. MARY, EDINBURGH.
GEORGE EDMUND STREET, R.A.—ARCHT.

Photo Lithographed & Printed by James Munro, St. George's Lane, Road, W.C.

"BUILDING NEWS" SCHOOL-PLANNING COMPETITION.

ARBITRATORS' REPORT.

SIR,—We beg to make our report on the very interesting series of plans for school buildings upon which you have consulted us. We have examined them repeatedly, and with great care, and desire to offer the following recommendations:—

WE LIVE TO LEARN.

This design is, in our opinion, the one which most equally unites excellence in all the six points referred to us—namely, arrangement, lighting, ventilation, economy, architectural treatment, and draughtsmanship; and is therefore, in our opinion, entitled to a first prize, notwithstanding that there may be some designs which surpass it in some one of these points.

In selecting this design for what is really a high distinction, we consider that we are bound to point out its blemishes. The most serious one is that the relation of the principal staircase, and class-room near it, to the school-room hinders that free through ventilation which is so desirable. The boys' staircase is too cramped; the boys' cloak-room has only one door, the w. c.'s are not quite sufficient in number; and the numbers of children in a class are not arranged precisely as is desirable for carrying out the Revised Code. In the infants' school the gable window is not as useful for light or ventilation as it might be.

We have great pleasure, on the other hand, in recognising the simplicity of the plan and treatment; the good shape of the playground; the ease with which the difficulties of the site have been met; and the general and uniform merits of the design.

NUNQUAM EXSPES.

We have awarded the second place to this design, which, however, with very great excellences, combines some defects more serious than those of the first one.

The general school-room on each floor is too long, and that for the infants' school is decidedly too narrow; the lavatories and cloak-room to infants' school are too large, and the architectural treatment is not so successful, and draughtsmanship not so good, as in many other designs. On the other hand, the disposition of the class-rooms is the best possible; and the ventilation is, perhaps, the most thorough, and the lighting most complete of any design. The requirements of the Revised Code have been strictly attended to. The shape of the play-ground is good. These practical merits appear to us to entitle this design to the second place.

R R R ON A SHIELD.

After very closely weighing the merits of several designs nearly equal, we recommend that marked with R R R on a shield for the third prize. We do so on account of its compact and skilful planning, and great merits as regards lighting, architectural treatment, and draughtsmanship. It is less satisfactory in point of ventilation and of economy than we could wish. The general style of the treatment is more expensive than ought to have been resorted to for a building to be estimated at 5d. per foot. The entrances and exits, position of and access to drawing class, position and treatment of care-taker's house, shape of playground, and introduction of playshed, are points of excellence; and for effective draughtsmanship few designs submitted equal it.

We now proceed to enumerate the designs which we consider worthy of honourable mention, placing the first six in order of merit, with a few brief notices of the points of each:—

R R R.

We regret that the author of this design has made four windows on ground floor—one on first and one on second obtain light from adjoining properties. This is so fatal a defect

in a building for a town site that it shuts out the design for any chance of competing for a prize.

Arrangement excellent. One class-room in each school does not open out of school-room; this is undesirable. Infants' school narrow. Too many w. c.'s, but well arranged; playground good; lighting excellent; ventilation good. Economy, treatment, and draughtsmanship satisfactory.

AN ADVANCED INFANT.

Arrangement compact and clever, but ground-floor crowded; yet occupying a great deal of space, and thus contracting the size of the playground. Infants' gallery much too wide. Girls' entrance awkward. The access to the girls' closets through open yard undesirable. Treatment of the obtuse angle bold and sensible. Lighting generally good, but insufficient in one boys' double class-room; ventilation tolerably good, except to infants' class-rooms; economy not neglected; treatment useful and sensible; draughtsmanship excellent.

ERGO.

Arrangement good in many respects; infants' school good; class-rooms excellently placed on upper floors; and difficulty of placing a narrow school on upper floor and wide one on ground floor cleverly met; access to girls' school awkwardly planned; too many w. c.'s; playground cut up; light good; ventilation good; economy neglected; treatment has merit, but no provision made to carry the heavy side walls of central tower; draughtsmanship good.

SCHULE LADDIE.

Arrangement of schools themselves, on the whole, good; playground very bad; lavatories and closets badly placed; access to w. c.'s is not under cover, either for girls, infants, or boys. Further, the boys and girls must first cross their school to obtain caps or bonnets, and then re-cross school to go to the w. c.'s.

LIGHT.

Many excellent points, but not fitted to the site; playground consequently cramped; care-taker's house in out-of-way position; closets not sufficiently numerous; double class-rooms wrongly seated; the access to drawing-class excellently managed; lighting fair, but unequal; ventilation good; treatment picturesque.

UTILITY.

Planning compact; playground good; position of gallery in infants' school very good; ventilation obstructed; one or two class-rooms are deficient in light; treatment fair; draughtsmanship good.

The following ten designs, though not equal to the foregoing, deserve honourable mention, and we place them in alphabetical order:—

EDUCATE LIBERATE. (1.)

Arrangement—plan put together in a rather clumsy method, but most of its individual parts good; playground not good; class-rooms all wrongly seated, and could not readily, as in some other cases, be re-adjusted. Girls' w. c. close to boys' class-room windows; infants' school very good; drawing-class well placed and arranged; lighting generally good; ventilation insufficient; economy fairly considered; treatment suitable, unassuming, and well worked out, but false bearing for a wall very undesirable; draughtsmanship good.

FIDES. (2.)

General arrangement good, and many of the details of access and communication very well contrived; double class-rooms of a bad shape when separated; playground much cut up; infants' school-room very long and narrow, entrance to north class-room is behind a gallery; too few w. c.'s; lighting good; ventilation good; economy fairly considered; treatment not so satisfactory as in some other cases.

LUX. (3.)

Very simple, compact, and well treated plan. Revised Code numbers attended to. Access good; drawing-class admirably placed; school-rooms, as in many designs, unnecessarily long; access to closets not well provided for; lighting very good; ventilation good in class-rooms, fair in school; treatment unsatisfactory.

PRO PATRIA. (4.)

Arrangement though compact and simple, wasteful of space; playground good, but small; class-rooms a bad shape; school-room long; master and mistress's room cramped and badly placed. The columns in infants' school objectionable; light good; ventilation fair; economy disregarded in many particulars; treatment clever, but too ambitious; draughtsmanship very good.

QUA VERE VERUM. (5.)

It is very much to be regretted that a designer capable of producing a plan with so many good points should have so entirely ignored the necessity of lighting and ventilating his buildings without putting lights in all the walls adjoining the boundary. The plan, entirely inapplicable from the above cause to the site, is in itself good; and playground good; access to infants' closets not under cover; class-rooms wrongly seated; lighting and ventilation—see introductory remarks; economy kept in view; treatment and draughtsmanship very satisfactory indeed.

SPECTEMUR AGENDO. (6.)

Arrangement compact, yet wasteful in offices, &c.; playground and access to drawing-class good; two class-rooms wrongly seated; excess in number and size of w. c.'s. Those for boys and girls back to back—contrary to Education Department regulations. One infants' class-room too many; infants' school-room wrongly seated; lighting hardly sufficient in class-rooms, elsewhere good; ventilation insufficient; economy not studied in the offices; treatment pleasing; the oblique angle well dealt with; draughtsmanship fair.

TEMPORA MUTANTUR. (7.)

Ingenious plan, well arranged, but entrances to pair of class-rooms adjoining side of rooms such as would disturb the working of school extremely. In this plan the classes would be better against N. wall of school. Boys' and girls' school-rooms long; lighting obtained to a large extent from windows within a foot or two of boundary, and consequently liable to be blocked up; the lighting is, excepting this serious defect, good for all but one class in each school; ventilation good; economy—waste of space in staircase and lavatory block, and style expensive; treatment not very successful.

THIS IT IS, AND NOTHING MORE. (8.)

Planning unequal; infants' schools good; boys and girls' bad, with recess where it cannot be superintended, and some children facing one another; some class-rooms badly shaped, all wrongly seated; girls' and boys' closets back to back, contrary to the rules of the Committee of Council on Education, and in heart of the block. Lighting good; ventilation very fair; economy well kept in view; treatment picturesque and suitable; the obtuse angle particularly well dealt with; draughtsmanship deserves considerable praise.

THREE COMPASSES. (9.)

Arrangement good; playground very good; oblique angle very well dealt with; infants' school narrow; seating of two class-rooms wrong; lighting unequal, and several windows get light from adjoining site. North end of girls' school has only borrowed light; ventilation unequal, that shown to boys' w. c.'s impossible; treatment picturesque; draughtsmanship pleasing.

VIVO IN SPE. (10.)

Arrangement compact, almost too much so, yet wasteful of space in lavatories and staircases, and mistress's room; good block of building; good playground; seats in classrooms wrong; too many w. c.'s on girls' floor; column in infants' school undesirable; lighting good; ventilation deficient; economy—the great staircase, towers, and other large spaces extravagant; treatment and drawing fairly good.

We beg to mention the following designs which are distinguished for merit—some in planning, some in draughtsmanship and design—but which fail, in our opinion, to come up to the level of those before mentioned:—

K.; Excelsior; Two Heads are Better than One; What Will Be, Will Be; Laborare Est Orare (9); Spes; Laborare Est Orare (44); Honoris Causa; Robur; Ausus Sum; Spero; Valeat Quantum Valere Potest; A School for Scandal; Points; The Brilliant Star; Tempus fugit; Trefoil.—We are, Sir, &c.,

BANISTER FLETCHER,
T. ROGER SMITH.

ARCHITECTURAL ASSOCIATION.

At the usual fortnightly meeting of this Association, held on Friday evening last, the President, Mr. J. Douglass Mathews, in the chair, Mr. Paice announced that the series of visits to works in progress would commence on Saturday (to-morrow), the 18th instant, when the new Post Office buildings in St. Martin's-le-Grand will be visited.

The President stated that a subscription list had been started among the members of the Association in aid of that deserving charity the Architects' Benevolent Society, and the Committee of the Association had headed the list with a donation of five guineas. It was proposed that the subscription should be limited to 5s., and he hoped that a fund of a permanent character would be established in the Association, for the benefit of so excellent an institution.

Mr. LACY W. RIDGE objected to the appropriation of the funds of the Association, as proposed by the Committee, without due consideration.

The President said that the proposal had been duly considered and sanctioned by the Committee. It was, however, open to Mr. Ridge to move a counter-resolution if he thought fit to do so.

The subject having dropped,

Professor KERR proceeded to give a lecture on the requirements of

A SMALL COUNTRY HOUSE.

The Professor said that the subject he had announced was one which must commend itself to every student of architecture. The planning of a small country house was a thing which every young architect ought to thoroughly understand. He would take as a standard a house which should cost from £2,000 to £3,000, less or more, built within a few miles of London, or any other large town, standing upon a piece of ground three or four acres in extent. This was a well-known standard, and one which could be well appreciated by the members of the Architectural Association. The first question to be considered was that of site. The architect had either to select the site or approve of a site which had been chosen by some one else. The best site, speaking in general terms, was one which was approached from a public road on the north, which had an open prospect towards the south, some shelter towards the east, and perhaps an open prospect towards the west. The access to such a house as this was from the north, the lawn was placed southward and westward, and the east wind was in some degree provided against by shelter which was to be had. When the lawn was spoken of as including a western aspect, the lecturer said he referred to the circumstance that the sunset, as a matter of prospect, was always of extreme value for a lawn in England. In this country the sunshine was always welcome, with but little reservation. At noonday the sun was south, at six in the morning it was in the east, and at six in the evening it was in the west. At nine in the morning, therefore, it was south-east, and at three in the afternoon it was south-west. Now, as the rooms which looked eastward were pleasant in the early morning, so, on the other

hand, the rooms which faced the west were rather unpleasant in the evening, owing to the glare. The rooms which looked south had the hot sun upon them from noonday until several hours afterwards, and in hot weather the sunshine was very sultry. The rooms which looked south-west were exposed still more to the sultriness of the heavens, and were besides exposed to the windy and rainy quarter. But the rooms which faced the south-east were the best situated of all, being warmed to a certain extent by the morning sun, while in the heat of the afternoon they were in the shade. The south-east aspect was the best for the living-rooms of the house. The entrance to the house should be, if possible, on the north. If it was not possible to get it on the north, it might be towards the east. The garden front should be southwards. In houses of this class it was a most unintelligent plan to have only one front, with a door in the middle and the best rooms on each side, with an unrepresentable back. Such a house as this really ought to have no back, but two fronts. The offices should be placed north and east, this being the aspect of least value. The dining-room, which in a house of this class would of course be used for meals only, should be placed between the entrance and the offices, to avoid cross traffic and culinary odours. This room should on no account be placed west, on account of the glare of the evening sun, but should be placed north or east. The drawing-room, which was properly speaking a sitting-room only, should be placed southward or south-east. The west and south-west should be avoided for this room, as from those points of the compass came the boisterous wet winds. The prospect of this room was very important, and should be as good as possible, although aspect should not be sacrificed to prospect. Along the drawing-room front, and on the same level, there should be laid out a terrace—a long, straight, broad, level promenade, raised or not, with lawn beyond to westward. The approach to the entrance front should not overlook the lawn, and should be laid out with shrubbery, and not flowers. The servants' entrance should be on the north front, or on the return of the east front; access to it should be gained by a branch from the main carriage approach, and provision made for tradesmen's carts to wait, which should not be allowed to stand in the carriage-drive. From the servants' offices there should be an outlook on to the servants' and tradesmen's approach. The butler's pantry should be sufficiently near this entrance to be convenient, but yet not so near as to offer facilities for plunder. The staircase in a house of this kind was, it should be remembered, a stately road to the bedrooms only. It should be placed near the entrance, for the convenience of ladies coming in, and yet it should be as central as possible, for convenience upstairs. The servants' or back stairs should not be far off. The north aspect was best for the staircase, as sunshine through the staircase windows, where blinds were somewhat inconvenient, was avoided; in addition, the clearest light was to be had on the north, and placing the staircase there helped to utilise the north and save the south aspect. The entrance should not, for the sake of mere picturesqueness, be located in any nook or corner, but should be prominently placed, so as to give a stately appearance and thereby add to the value of the property—for architects should bear in mind, when designing property of this kind for their clients, that it might be required at some future date to sell the property, and that stateliness of effect would add very much to its value. The entrance should be set out as a direct way into the house, especially the drawing-room. A cloak-room, with lavatory and water-closet for gentlemen, was an essential in a house of this class, however small. It should be placed very close to the entrance, but yet out of the way of the internal thoroughfare traffic. It should be placed within the house, and not opening from the garden; it should, however, be accessible from the dining-room. There should be no other water-closet on the ground-floor. The library in a house of this kind would be a sort of public room for the gentlemen guests and visitors; or it might partake of the nature of a gentlemen's room or study, private for the master; or it might be of mixed character. Access should be had direct from entrance, also from servants' entrance by butler's pantry, near dining-room for waiting. The aspect of this room should be south-east, or east preferably. The boudoir (private) or morning-room (public) for ladies, or of a mixed character, should be so situated as to be easily accessible to intimate visitors. This room,

which might be upstairs, should have a south-eastern aspect. The plan of the billiard-room ought always to be devised upon the understanding that it was to be occupied by a full-sized table. A full sized billiard table was 12ft. by 6ft., and a good player would want 6ft. all round, making the room 24ft. by 18ft. It ought to be top-lighted, the light being about the same size as the table. The billiard-room was best as an adjunct on the dining-room side; if it was also used for smoking, proper precautions should be taken to keep the smoke out of the house. There should be a water-closet near. The garden entrance to terrace ought to be spacious, for garden parties; it might be a floral porch, with direct access to the interior hall and so to staircase, and might, when necessary, be used as an ante-room connecting drawing-room and morning room. The windows of the drawing-room might still open on the terrace. The conservatory might be attached on the drawing-room side, but indirectly, so as to prevent the admission into the house of the fumes from the heating apparatus of the conservatory; the aspect should of course be south. Coming to the offices, it was indispensable that a servery should be attached to dining-room. There should be a butler's pantry for plate and glass, dessert, wine, &c.; adjoining, and leading out of the butler's pantry should be a bedroom for the butler, with a safe in which to keep the plate. The butler's pantry should have an outlook on servants' entrance and approach. If no man-servant be kept, the arrangements might be the same. There should be a small cleaning-room provided, in which to clean knives and boots. The brushing of clothes would be done in butler's pantry or servants' hall. The kitchen should have the most favourable aspect for coolness, viz., north or east, and there should be no skylight. It should of course be accessible from the servants' entrance, and should lead by a short route to the servery. The scullery should be connected beside the kitchen fireplace, and open to the yard or not. The larder or pantry should be close to the kitchen or out of it, away from heat, and should on no account open from scullery, as the scullery vapours would be apt to taint the meat; the aspect of these should be north or north-east. There should be a store-room for groceries, &c., accessible to the lady of the house; sometimes this room was known as the housekeeper's room, and sometimes it was called the china-closet. A servants' hall, however small, should be provided near the servants' entrance, for use by the servants when the kitchen was not available. The backstairs should run down to the cellars and up to the bedrooms, for attendance; to servants' bedrooms and to nurseries. Sometimes the upper part of this staircase was used as the family-stair, but this reduced the value of the bedrooms. Near the top of the back-stair should be a housemaids' closet. There should be provided a linen-closet on the bedroom floor, easily accessible to the lady of the house. Cellars were not much required in a house of this kind, and were small in size; they should be without a window of any kind, as an even temperature was required. For coals it was best to knock up a shed in the servants' yard. The bedrooms should be planned as one or two stories above the ground floor. They ought to be well and compactly planned; and, in planning every bedroom, the furniture, bedsteads, &c., should be plotted, so as to suit the rooms to the furniture which they had to contain. Firstly, there should be the lady's bedroom, with one dressing-room attached; next, there should be a guest's bedroom and one dressing-room, with sometimes a bath-room attached; then would come single rooms, the access to all being always direct, by good corridors. The boudoir might be attached to lady's bedroom, but no other room. The nurseries, otherwise bedrooms, should be near the mother's room, accessible by backstair; they should be shut off, to prevent the noise of the children disturbing the other inmates of the house. The day nursery should have, if possible, both a south aspect and a good prospect. A nursery scullery should be provided, and a bedroom water-closet for the servants' part of the house. There should be a bath-room for general use on the bedroom storey; and care should be taken that any overflow from the bath should damage the ceiling of none of the principal rooms beneath. The water-closets for bedrooms (ladies') ought to connect; sometimes they opened into the rooms. The water-closets should all be placed against outside walls, with windows in each. If, however, it was impossible to do this, in order to thoroughly ventilate a water-

closet which was placed in the central part of the house, all that had to be done was to carry a tube, divided into two by a longitudinal diaphragm, right from the water-closet to the external atmosphere; it hardly mattered how circuitous was the route. However it might be desired, it would be impossible to make the two halves of this tube absolutely equal; and if there was only a slight inequality, the balance of the air in the two halves would be disturbed, and the air would rush in along one half of the tube, and out along the other half. This method was thoroughly effectual, and was applicable to the ventilation of every kind of room not abutting on the external air. In conclusion, Professor Kerr remarked that symmetry, compactness, and simplicity in a house of this kind enhanced its value in the market, while irregularity and a straggling character decreased the value of the property.

A brief discussion followed, in which Messrs. Benwell, Phené Spiers, Ridge, Quilter, and others, took part. The opinion was expressed that the accommodation which the Professor had enumerated could not be had for the sum he had named; and allusion was made to Mr. Rawlinson's letter on ventilation, &c., in a recent number of the *Times*. It was suggested by one speaker that the Roman plan of warming by a hypocaust might be applied to the hall of a gentleman's mansion. This would keep the staircase warm, and thereby materially add to the comforts of the inmates of the house. The President, having put the usual vote of thanks to the lecturer, which was carried with acclamation.

Professor KERR, in reply, said, in reference to Mr. Rawlinson's letter, that in his opinion sanitary science in this country was being very much overdone. If those gentlemen of whom Mr. Rawlinson was the best type would turn their attention to the ventilation of the houses of the poorer people, who were crowded together in great numbers under every disadvantageous conditions, then architects would understand that there was a necessity for the cause being taken up earnestly; but that was not their aim. Their aim was to ventilate the houses of the well-to-do and rich.

The proceedings then terminated.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

AT the third meeting of this society for the present session, held on Friday evening last, Mr. C. W. Whitaker, President, in the chair, Mr. W. F. BUTLER read a paper

ON THE VENTILATION OF BUILDINGS.

After a few introductory remarks, in which the author directed attention to the great and increasing importance of the subject, the term "ventilation" as used in this paper was explained to mean a gradual but complete changing of fresh air for foul, which must in dwelling-houses and places where men assembled together be constant, but imperceptible to the sense or touch. In factories this latter condition need not be so much regarded, and for sewers and underground railways any method might be followed which promised the most perfect results. Much of the apathy manifested towards the subject was the result of the abortive experiments and useless methods so often tried and resorted to for the purpose of supplying the want of ventilation. Although efficient ventilation would not cost a very large sum per room, it could not be denied that somewhat would be added to the expense of the house, and this "somewhat" the speculative builder never would add until he found intending tenants and purchasers refuse to take houses which were not properly ventilated. As with houses so with all other buildings and works: if we made up our minds to ventilate them, we must also resolve to pay for it. Even persons who built houses for their own occupation were but little in advance of the speculative builder, so far as any recognition of the absolute necessity of efficient ventilation was concerned. Many held to such crude devices as open windows and doors; others thought a hole of any size or in any part of the wall quite sufficient; while the majority pook-pooked the whole question. It was the duty of scientific men to educate the public up to the recognition of the fact that ventilation was every whit as important as drainage. Ventilation was a want arising chiefly from modern ways and customs, and was therefore a comparatively new branch of science. The every-day life of our forefathers who lived prior to the close of the seventeenth century was, in by far the larger

number of cases, an out-of-door life. If they were wealthy, their halls were large and lofty, with enormous fireplaces and loosely-fitting doors and windows from which innumerable currents of air rushed to the fire. If they were poor, they had, amid all the dirt and wretchedness which surrounded them, no want of air, as anyone who had seen an old English or Welsh cottage would readily admit. The windows, too, down to nearly the end of the period named, were in most cases filled with nothing better than shutters or louver boards, glass being then a rarity, at least in houses of the commoner sort, while its substitutes, oiled paper or plates of horn, could hardly have been in general use, at any rate not in the dwellings of the poorer classes in country districts. The first person who seemed to have turned his serious attention, with any practical result, to the subject of ventilation was Dr. Desaguliers, who in 1723 was called in to ventilate the House of Commons, upon which Wren had before tried his hand. The Doctor discharged his commission with success, but provoked the hostility of the housekeeper, who effectually extinguished him by not lighting the fires, upon the action of which his system depended until the House had sat for some time, and the chamber had got thoroughly heated. The Doctor was requested to employ other means, and he invented a centrifugal wheel, or blowing machine, so constructed as to force air either into or out of the house, according as either was required. Dr. Desaguliers was next applied to by the Admiralty to ventilate ships, but here, owing to officialism and red-tape, he got inventors' (not to say monkeys') allowance—more kicks than halfpence. The next person who came forward in the cause of ventilation in the Navy was Mr. Sutton. He made use of the fire which cooked the provisions of the ship's company as the motive power, laying pipes from all parts of the ship to the ashpit under the fire. When the ashpit door was closed, no air could get to the fire except through the pipes. The result was considered satisfactory, and the apparatus was fitted up on board the "Norwich" man-of-war. This was one of the first instances—if not the first—of the scientific use of the common fire as the power for ventilating any structure. This method had been called thermo-ventilation by M. Bernan in his work on the subject. Mr. Sutton fared very much as Dr. Desaguliers had done at the hands of the Lords of the Admiralty. Meanwhile, a Dr. Hales had been pressing an invention of his own upon the notice of "my Lords." This he called a "ship's lungs." The machine was, in fact, a magnified bellows, differing somewhat in construction from common bellows, but the same as far as the action was concerned. It consisted of a large square case with valves, enclosing a hinged midrip, which rose and fell by the action of a long handle or lever worked by some of the ship's company. The whole machine was cumbersome, and required about four men per hour to work it. It could not compare with the blowing wheel of Dr. Desaguliers, and soon fell into disuse, and became a thing of the past. The illustrious names of Count Rumford and Sir Humphry Davy (as well as those of a host of other persons less celebrated), which figure in the annals of ventilation attest the importance of the question. The causes which made ventilation a necessity might be classed under three different heads, viz.: Firstly, in private houses, the necessity for ventilation would commonly arise from (a) the presence of fires; (b) artificial light; (c) the presence of persons living in the house—i.e., from the air respired by them as well as the exhalations from their bodies; and (d) from badly constructed water-closets, cesspools, and drains. Secondly, in factories, there would be, in addition to the above causes, the presence in the air of a vast quantity of minutely divided fibre and dust, which were highly prejudicial to the health of the workers; and also the fumes from chemicals, &c., where the manufacture of such was carried on. Thirdly, in sewers, the necessity of efficient ventilation would almost entirely arise from the generation of poisonous gases by the putrid filth carried down. Fourthly, in underground railways, the fires of the engines and the saturation of the air by the waste steam would render ventilation in certain cases necessary. Considering these causes in the order named, there was, firstly, the presence of fires. At first sight it would seem wrong to include this under the head of things which necessitated ventilation, as fires were often (indeed, mostly) the only means of ventilation in private houses. But as by "ventilation" the author included not only the removal of foul air, but the supply of fresh, and

from this point of view it would be seen that the common fire was a very great consumer of fresh air, and required a supply of that quite as much as that of the fuel which fed it.

The fuels commonly used were composed, principally, of carbon and hydrogen in about the following proportions:—

Name.	Carbon.	Hydrogen.	Ashes, &c.	Water.
Coal	812	048	140	...
Coke	850	...	150	...
Wood	408	042	350	200
Charcoal	930	...	670	...
Peat	464	048	288	200

Combustion consisted in the union of oxygen gas with the elements carbon and hydrogen, and the result was a development of light and heat and the formation of carbonic acid and water, the carbon of the fuel uniting with the oxygen of the air to form carbonic acid, and the hydrogen doing the same to form water. One pound of carbon required for its combustion 158 cubic feet of air, while the same weight of hydrogen required 473 cubic feet. From these facts it would be seen that the different fuels mentioned above would take for their proper combustion the following minimum quantities of air, viz.:—

Coal,	148	cubic feet per pound.
Coke,	134	"
Wood,	65	"
Charcoal,	147	"
Peat,	81	"

From the above tables, for which the author said he was indebted to the researches of Péciot, Playfair, Regnault, and others, and which assumed the temperature of the air to be 62° Fahr., it would be seen that the ordinary fire played no unimportant part in the consumption of air, for if 1 lb. of coal per hour was assumed to be the quantity of fuel required, then 148 cubic feet of air would be consumed in that period, or 2.46 cubic feet per minute, or 2,072 cubic feet per day of fourteen hours. These, as stated, were only minimum quantities. In practice at least double must be allowed, as a large percentage would escape unconsumed. In the case of the common fire the products of combustion certainly did not escape into the room, but the air to supply the fire was required all the same, and in not one house in a hundred was this supply ever thought of, but was left to chance, and the cracks in the doors and windows, from which draughts whistled across the room in every direction. The second cause, artificial light, required far more serious consideration than the fire, for commonly the products of combustion were passed directly into the room, and were breathed in a diluted form by the persons in it. The introduction of coal gas had been most pernicious in this respect, for few houses were built with any regard to the method of lighting, nor were the ways in which the gas was generally burnt calculated for anything but to do the greatest amount of injury to the persons using it. Some forms of gas-light, such as the sun-burners and the ventilating globe light, were comparatively free from defect in these respects, but the latter were rarely used in private houses, and the former were almost entirely confined to offices and public buildings. Taking the argand burner, using 5 ft. of gas per hour, and 45 ft. of common air in the same time, as a standard, and knowing that the common burners burnt from 2 ft. to 6 ft. per hour, according to size and pressure, the author thought he would be safe in calculating the average consumption of gas by the common burners at 4 cubic feet per hour, and the amount of air at 36 cubic feet per hour. A room 25 ft. long by 16 ft. broad, and 10 ft. 6 in. high, would contain 4,200 cubic feet of air, but a deduction must be made for furniture, &c. of at least 10 per cent., leaving 3,780, or (say) 3,800 cubic feet as the net quantity of air in the room. Such a room would require at least three gas burners to light it, and these would consume 108 cubic feet of air per hour, rendering it absolutely unfit for breathing by depriving it of its necessary proportion of oxygen. Ordinary candles did not vitiate more than 11 cubic feet of air per hour per candle. As the chief constituents of coal gas were carbon and hydrogen, so the principal results of its combustion were carbonic acid and water. This water, in the form of vapour, saturated the air of the room, which had a greater capacity for moisture when warm than when cold. In a close, warm room, the moisture would be found condensed on the window glass. The air, cooled by contact with the cold glass, was no longer able to sustain the moisture, and the latter was therefore precipitated in the form of dew. The third cause mentioned by the author as necessitating ventilation was the presence of living beings in the room.

Man's body was a furnace, the waste from which was precisely the same as that from any other furnace, viz., carbonic acid and water. To quote the words of Professor Tyndall, "In the animal body the carbon and hydrogen of the vegetable are again brought into contact from the oxygen from which they had been divorced, and which is now supplied by the lungs. Reunion takes place, and animal heat is the result. Save as regards intensity, there is no difference between the combustion that goes on within us and that of an ordinary fire." Atmospheric air consisted of a mixture of several gases, for though it was commonly said to be formed of oxygen and nitrogen in the proportion of 21 volumes of the former to 79 of the latter in each 100 volumes, yet several other gases were mixed with these. The composition of air varied with its situation, inland air not being of precisely the same composition as that near the sea-coast, where there was a greater proportion of ozone. On mountains there was more carbonic acid than was found in the valleys. The quantity of air required by a man varied with the state of his body. Thus a man at hard work or violent exercise might require five times as much air as when he was asleep. This amount of air had been variously estimated. Box (whose calculations might, the author thought, be taken as correct) stated that an ordinary man took twenty respirations per minute, of the capacity of forty cubic inches each, thus vitiatng 28 cubic feet per hour. Added to this, there was the quantity of air saturated by the moisture evolved to be considered. According to Dumas, this quantity, in the form of vapour, equalled 0.836 of a pound of water per hour, which was sufficient to half-saturate (for air should not be more than half saturated to be pleasant) 187 cubic feet of air at 62° Fahr. To be in good health, a man must have 215 cubic feet of air per hour for his own use. Sick persons required very much more than this. There was one more source of contamination of the air of our houses, which often forced itself unpleasantly upon our notice—viz., the foul gases which escaped from drains and water-closets. It was not too much to say that if architect and builder always did their duty no foul air from any drain or closet ought ever to enter a house, and that the negligence of the one, and the ignorance, or worse, of the other, must be charged with causing a great amount of disease and a great destruction of human life. As a summary of results, it would be seen that in a room of the net cubic capacity of 3,800 cubic feet, having a fire burning, inhabited by (say) six persons, and lighted by three gaslights, there would be required every hour, so that the inmates might be healthy, 1,694 or (say) 1,700 cubic feet of fresh air at 62° Fahr. But air expanded one four-hundred-and-ninetieth, or 0.00204 of its volume for every degree Fahr. it was heated, and it was therefore obvious that, assuming the temperature of the outer air to be 32° Fahr., we should not require to admit so much cold air into the room by about 100 cubic feet, but exit must be provided for the full quantity. Professor Tyndall gave the following table of expansion of gases for an increase of temperature equal to 1° Fahr. :—

Hydrogen	0.00203	Carbonic acid	0.00206
Air	0.00204	Protoxide of nitrogen	0.00207
Carbonic oxide	0.00204	Sulphurous acid	0.00217

It would be seen from this that gases obeyed the almost universal law, and expanded with increased heat. Upon this fact was founded the whole system of thermo-ventilation, and upon its due appreciation depended success in this particular branch, for it followed that as gases expanded so their densities decreased, and they were lifted upwards by the heavier air without, rising, not because they were light, but because the outer air was colder, and consequently heavier. The following table shows the specific gravities of gases, from experiments and researches of Regnault and others, atmospheric air being 1 :—

Air	1.00000	Carbonic oxide	0.9727
Hydrogen gas	0.06926	Protoxide of nitrogen	1.5252
Oxygen gas	1.10563	Sulphurous acid	2.2464
Ditto	1.11100	Sulphuretted hydrogen	1.1710
Nitrogen gas	0.97137	Vapour of water	0.6235
Carbonic acid	1.62901		

There was another property of gases which merited consideration besides that of density, viz., the power they had of mixing with one another. The gases which composed common air, for instance, were not chemically combined to form any new substance; they existed each one of them just as if the others were not present. When we considered this, and the fact they were of different

densities, it would fill us with astonishment that they did not settle, as it were, away from one another, the heavier oxygen falling to the ground, and the lighter nitrogen ascending with the clouds, did we not know of this law and combination, which was called the law of diffusion of gases. Professor Graham expressed this law by saying that the diffusive power varied inversely as the square root of the density of the gas itself. Any proposal to admit cold air into a room would meet with violent opposition, nor would the author advocate such a thing were houses built upon principles worthy of our civilisation. He thought, however, that with proper means the possible evil might be so reduced as to be unfelt, and he was now also treating of existing houses which could not well be rebuilt. He proposed that in existing houses, when the want of ventilation was felt, the openings for admission of fresh air should be made as near the floor as possible, for, from what had been said, it would be evident that the cold air on entering would be heavier than that in the room, which it would gradually force upwards and out through the foul-air exit

(To be concluded.)

ON PROFESSIONAL PRACTICE.

LECTURE V.

MR. ROGER SMITH said the subject of this lecture was "Money," not merely £. s. d. but estimates, accounts, and professional charges. With regard to the estimates which practising architects were called upon to give, he said that one rule which he had laid down for his own guidance was that of avoiding guessing. When asked by a client what a work would cost, he invariably replied, "I have no idea; but when I have had time to make a careful estimate, I will tell you to the best of my ability." This was a principle that should be strictly adhered to, as if rough guess were given even in the most guarded manner, the rumour would get abroad that "Mr. So-and-so, the architect, is of opinion that the building can be put up for such and such a sum," whereas the architect had really formed no opinion at all. The preliminary estimates which the architect was called upon to give previous to the building being carried out were usually obtained by the process well-known as "cubing." This was simply the measuring of the cubic contents of the building as a solid block, and putting them at a certain price or series of prices per cubic foot, and working out the total. The value of this method of estimating depended very much upon certain conditions, the first and foremost of which was that the estimator should be careful to always follow the same method of procedure. There were two or three ways in which people worked in cubing a building. One man made it his habit to go down to the floor-line, and another made it his practice to go half way down between the floor-line and the footings; a third would go right down to the footings; while some would even take in the concrete. Again, some took in more, some less, of the height of the roof. He (the lecturer) believed that the safest rule was to begin at the bottom of the footings of the walls, including concrete, unless there was an extra quantity of it. If the latter was the case, he preferred to make an approximate estimate of the number of cubic yards of concrete. If the building had only an ordinary amount of chimneys, he thought it advisable in cubing to go up half-way between the top of the walls and the apex of the roof. If the chimneys were more numerous or lofty, of course, in cubing, the line would be drawn somewhat higher. It did not very much matter what system was employed so long as the same one was always followed. It was of course of the very greatest importance that to the results so obtained the proper prices should be affixed, and here came the value of skill and experience. The only thing which the architect could be guided by in this respect was that of his knowledge of what buildings tolerably resembling the one under discussion had cost. It was advisable for the architect, as soon as he knew the exact cost, extras and everything included, of a building which he had been engaged in carrying into execution, to cube it out, and see the price at which it worked out per cubic foot. They must not be content to do this with imperfect information, but reliable data should be used. This plan would afford information and guidance which would be of inestimable value at some subsequent period. The experienced man would soon know how to compare the cost of one building with the costliness of another building of the same class. One class of build-

ing would work out at 6d. per foot, another at 7d., and a third at 8d., and with a certain amount of familiarity with these different classes of building it would be no difficult matter to settle to which class any building in course of erection belonged. When an architect had a sufficient number of precedents to guide him, cubing was a very useful method of estimating. There were two or three other methods of approximately estimating the cost of a building, and which would act as a check on the process of cubing. The first was to estimate the building at so much per superficial square per story. It might be considered that the average price was something like £30 per square per story. After seeing the cost of the work as indicated by cubing, the cost might be calculated by this latter method, to see if the results of each method agreed. If there was any considerable discrepancy, the architect had better look to the cubing and see if anything was wrong. Another mode of arriving at some idea of the cost of a building, and one which required a good deal of skill, was to take out approximately the principal "quantities"—not taking them out in the detail in which the bill of quantities was taken out, but arriving at the amount of brickwork in the building, allowing so much apiece for every doorway and every window, and then taking the floors, and pricing them at a price which would include floor, joists, and ceiling, and the roof at such a figure as would include rafters, ceiling, and slate-covering. In this way an experienced surveyor would be able to form a good idea as to the cost of the building. He (Mr. Smith) should not rely upon such an estimate being worth more than a cubed estimate, but it was possible that such a method would yield closer results than cubing would; but everything depended in any case upon having the proper prices. There was yet a further check in making a preliminary estimate, supposing the building to cost so much per room, or so much per occupant. For example—stables of some sort might be built at £100 per horse; others at £150, £200, and even £250 per horse. In the same way a certain class of school could be built for £5 per scholar under favourable circumstances, and they rose from that to £6, £7, and perhaps £8 per scholar. The cost of hospitals had been in the same way approximated to at so much per bed. In this class of building the difference of cost was most extraordinary, ranging from £40 or £50 to £500 per bed. Another form of estimating was made use of by the Royal Engineers on their Indian works, and, for all the lecturer knew, on their works in this country. They had a sheet of paper somewhat resembling a bill of quantities, exhibiting all the dimensions on one sheet of paper. They took each wall separately—for instance, "north wall, 140ft. high, and 80ft. long," and then priced it out. They considered this a very reliable mode. These were the principal methods that architects had of approximately finding the cost of buildings which they were going to erect. He was strongly disposed to recommend them to, in most instances, make an approximate estimate; and it was rather desirable that, if they could do it with anything like reliability, they should submit an approximate estimate to the client before tenders were received. There were, however, some sorts of work which could not be estimated. The client should be informed that where foundations were doubtful, the expense of dealing with them could never be approximately calculated, because they might prove to be much more or much less troublesome than had been anticipated, and whatever expense was needed in this respect must be incurred if the building was to be put up. Again, there were often cases in which the work had to be done in a great hurry. For example, he did not suppose that any theatre which had been built within the last few years had ever been contracted for for anything like a fixed price. The work was designed and driven on at a headlong pace, and its cost had to be arrived at afterwards, for only a very shadowy approximation could be arrived at beforehand. In such cases, too, as the restoration of ancient buildings, it was often very difficult to determine with anything like accuracy what the cost would be, especially if the building was much dilapidated, or the reinstatement of some large feature, such as the roof, was found on close examination to be necessary—although general appearances indicated no such necessity. Some years ago, for example, he had to restore a church, in which the roof looked all right from below; but when the old lead was stripped off to make way for the new lead, the timbers were

found to be so rotten that it would have been criminal to have covered them up and left them. The roof was of course renewed, and was a considerable extra expense beyond what was contemplated. It could not be said that any one ought to have known how the timbers were, because there was plastering below and lead above, and there were no indications of the roof having given way, although it would inevitably have done so in five or ten years' time. When it was decided to build, the architect should write to such builders as might have been fixed upon to send tenders, stating what arrangements had been made as to quantities. If any express stipulation had to be made, it should be introduced in that letter. One such stipulation should be that the client would not promise to accept any tender. The general understanding on this point was that when a man invited tenders, if neither of the tenders was accepted, the person who submitted the lowest tender would be negotiated with. The contractors estimate was made up by two distinct processes. One of them was the taking out with more or less elaboration a set of the quantities, and putting such prices to them as the contractor had hitherto regarded as remunerative. The other process was the consideration by the contractor, whether, from all the circumstances of the case, the particular building under notice ought to be put up cheaper or dearer than usual, and this was generally settled by putting on or taking off a percentage on the result arrived at by the previous method. As a general rule, builders' estimates were never the same when sent in as when made out by their clerks. If the builder wanted the job, he of course took something off; if he did not, he put something on. If there were things in the building which he was unused to or afraid of, he put on more, as a safeguard; if he thought there were extraordinary facilities, he would take something off. His knowledge of the architect, and the probability of his being treated fairly or not by him, was one of the elements which would influence the builder in this respect; and the fact of his having materials which would work up in the building, or disengaged plant or foremen, would prompt him to name a lower figure than he otherwise would. The quantities were just the measurements of each particular portion of material and work, very carefully and systematically taken, and worked out into a blank bill, which was afterwards priced. This work was gone into with an extraordinary amount of elaboration and detail at the present day, and the lecturer was inclined to think that a good deal of this detail was unnecessary, although it was very difficult to know where to stop. There was no doubt that a man thoroughly familiar with building would, with comparatively few dimensions and some amount of details, be able to form an accurate idea of the price to put upon it; but persons less familiar would neither be able to give such a good description nor form such a good idea of the prices at which the work might be fairly executed. The work of taking out quantities was one in which two people generally engaged. The "taking-off" of the quantities was the part which entailed the most responsibility and required the most skill. It required an intimate knowledge of building, a cool head, and a great deal of system; and it required time and, as far as possible, a freedom from anything like prejudice. As to who should do this work, there could be no doubt that it was very attractive to a young man, if he felt he had any skill at the work, to take out the quantities for any building which came into his hands. It was keeping profitable business at least into his hands, and gave him a thorough knowledge of the building he was about to erect. On the other hand, the experience of a great many practical men pointed the other way, viz., that it was always undesirable for the architect to take out his own quantities. There was this risk in an architect taking out his own quantities—and these risks, although they might be braved with impunity for years, might still come down against him—namely, his own tendency to take too sanguine a view of the difficulties of the building, and the loss of all the advantage which a cool, unbiassed, and unprejudiced mind brought to bear upon a fresh set of drawings. The most serious of all the evils connected with the architect taking out his own quantities was that he was obliged to get his payment, in almost every case, from the builder, and for the time being, and to that extent, to be the builder's servant; and the mere fact of receiving money from a

builder placed [the architect, more or less under the thumb of the builder. These were evils which the architect had better not be fettered with, for supposing anything turned out wrong, it was not desirable that the responsibility should lie at the door of the architect, whose first business was to see that what had been contracted for should be carried out. Where architects desired to take out the quantities of their own buildings, Mr. Smith suggested that the architect should call in a quantity-surveyor and share the work with him, thus keeping a certain amount of profitable employment in his own hands, but making the surveyor who was called in responsible for the accuracy of the quantities, and causing the name of such surveyor to be recorded as the quantity-taker on the invitations to send in tenders. Moreover, the payment of the quantities should be made by the builder to the said surveyor. The lecturer thought this was about as far as architects could prudently go in this direction, but he saw no great harm in going so far. Having alluded to the many circumstances which are perpetually affecting the price of materials and labour, the lecturer brought his remarks on estimates to a close, and then proceeded to speak on the second head of his subject, viz., Accounts. Having shown that the system of accounts needed by the architect was exceedingly simple, Mr. Smith, before proceeding to speak on the last head of his subject, viz., professional charges, strongly insisted that architects ought not to be paid for their services by anybody except their employers. It was quite open to all architects to get very considerable sums of money from a very large proportion of contractors if they were only willing to take them, and on the most specious of pretexts. The contractor might urge a fee or a bribe upon an architect "because he was going to give him a good deal of extra trouble, and he ought to be paid for his time," &c., or "he wanted another set of drawings." But whatever shape the offer took—and this was varied enough—such offers all meant the same thing—viz., that the individual who made them wanted to get the architect under his thumb, and keep him there until the building was completed. The architect who accepted such a bribe would not be free only so far as the builder thought fit to let him be free—a most humiliating position for a professional man to be in. Another not less certain result would be that when it came to be known, a very large proportion of respectable clients would go to some one else; and if it came to be widely known, all the respectable architects and respectable builders would refuse to have anything to do with such a man. He had no hesitation in saying that there were, unfortunately, some few persons in the profession who had made large sums of money by taking bribes, and some were taking bribes now; but he also knew of many cases in which the taking of bribes had not prospered, and he was quite sure that in such cases as were not found out the architect had seen the work go on with great discomfort to his peace of mind, being obliged to pass work and materials which he ought not to pass. But notwithstanding the existence of such black sheep as he had referred to, the profession as a body had always enjoyed and deserved the reputation of being a highly respectable and honourable one. With regard to professional charges, Mr. Smith said he had not much to say beyond that the best guide in this respect was the paper on "Professional Practice" issued by the Royal Institute of British Architects. To all the essential points of that document the youngest practising member of the profession was expected to conform; but he advised young beginners in a professional career not to make their bills too heavy by charging for every little extra service which they had to perform. They must expect to do a certain amount of extra work, and to take extra pains and trouble in many matters without charging for it, although of course architects of established reputation could not be expected to undertake extra services of any kind without remuneration, inasmuch as time was more valuable to them than to their younger confrères.

NEW FLOATING BATHS FOR LONDON.

IN anticipation of the purification of the Thames—a consummation devoutly to be wished—the Common Council of the City passed a resolution, at a meeting a month ago, declaring that it was highly desirable that floating baths should be established on the river, and instructing the General Purposes Committee to inquire as to

the cost of their construction and maintenance. We understand that a scheme for the building of several such baths in various parts of the Thames is already under the consideration of the Committee. The proposal contemplates the eventual establishment of seven bathing places, to be situated at Woolwich, Greenwich, Ratchiff, Hungerford-bridge, Chelsea, and Hammersmith: and thus to place the means of bathing within reach of the whole population. At present, only a beginning is to be made, by the erection of a bath in front of the large pier on the Surrey side of the Charing-cross railway-bridge. This central situation, close to three railway stations, and within a quarter of a mile of the Strand and Charing-cross, is admirably adapted for the commencement of an experiment, the success of which entirely depends on the facility with which it can be made available by the public.

In many of the Continental towns floating baths are mere sheltered pools in the stream. A sort of sheepfold is sunk to a certain depth, platforms and covered dressing places are erected round it, and the bathers are as much in the actual stream as though they had plunged in from the bank. This system has its dangers, and many an adventurous traveller can tell of a dive out of the bath, or even of a perilous rise under the boards. It is obvious that in the Thames a bath must be something more than a penfold. It must have an artificial bottom, and there must be no chance or danger of getting out into the open stream even by the most adventurous diver. The method suggested to the Corporation is that of a large pontoon, floating a large iron reservoir, with a solid bottom, and not open to the flow of the stream. It is, in fact, to be a huge iron bath, with considerable depth at one end and shallow at the other, supplied with water from the river, immersed in the stream, but practically as distinct from the tidal flow, as though it were erected far away from the Thames. The water which flows into it is to pass through a filter to be arranged in the pontoon, capable of purifying about a million gallons a day. The bath proposed is a hundred and fifty feet long and thirty-five wide; is to hold about 200,000 gallons of water; and will thus allow about fifty feet of space, and nearly 2,000 gallons of water to each of the hundred and five persons who will be admitted at the same time. There is to be a constant change of the water, as about five times the contents of the bath are to be passed through it every day; and it is even proposed to add a small heating apparatus, of sufficient power to keep the whole of the water at the permanent temperature of about seventy-two degrees. The superstructure of the bath is to contain complete accommodation for a hundred and fifty persons, and some forty private baths; and though the surface is to be covered in with a roof of glass or iron, which will completely shelter it from the weather, there will be provision for ample ventilation.

We have, says the *Daily News*, some four-and-twenty baths in London, varying in size from the four or five square yards of the old Roman Bath in the Strand-lane to the six hundred of the Wenlock Swimming Bath and the six hundred and fifteen of the Lambeth Bath. These two baths are by far the largest in London, but the new Corporation Bath will be more than double their united area. If the whole scheme is carried out, and baths of this magnitude and character are placed at convenient distances all along the metropolitan course of the Thames, we shall have ample provision for bathing, and shall make our splendid river a source of health, exercise, and enjoyment to the people.

START'S HILL ESTATE, ORPINGTON.—Mr. J. Lovibond, the owner of this freehold estate, which contains nearly 100 acres, invited architects in September last to submit plans, in public competition, for laying out the estate. Several plans were received in answer to the invitation. The task of adjudication was left entirely to a committee of gentlemen. On their recommendation, Mr. Lovibond has awarded the first premium of £30 to the authors of the design bearing the motto "Comme-il-faut" (Mr. T. Batterbury, 106, Cannon-street, and Mr. J. Kiddle, 4, Elder-street, Spital-square), and the second premium of £10 to the author of the design "Bonheur" (Mr. Lewis Solomon, 17, Southampton-street, W.C.) Messrs. T. Batterbury and J. Kiddle consequently have been appointed surveyors to the estate.

Building Intelligence.

CHURCHES AND CHAPELS.

MANCHESTER.—The new church of S. Martin, German-street, Oldham-road, was consecrated on the 6th inst. by the Bishop of Manchester. The church has been built by the Diocesan Church Building Society, from funds bequeathed by the late Mr. Fallows, of the firm of Fallows and Keymer. The plans adopted were those of Messrs. Price and Linklater, Manchester, and the whole of the work has been carried out under their superintendence by Mr. James Herd, builder, of Clarence-street, Cheetham. The church consists of a nave 30ft. wide, and aisles and chancel. The main entrance is at German-street end of north aisle. A second entrance is provided from German-street into the south aisle, and each of these is protected by an inner wooden porch for the prevention of draughts. The font (of different coloured stones) is placed under the arch leading from the tower to the north aisle. The church contains 531 seats, of which 211 are appropriated and 320 are free. The cost, exclusive of the site, is about £3,000. The front next German-street and the tower are of pierpoint walling, with stone dressings and window and door tracery.

PROPOSED NEW CHURCH ON THE WEST HILL, HASTINGS.—A site on the north corner, formed by the junction of Plinlimmon-road with Priory-road, having been purchased, the construction of the proposed new church will be proceed with at once. The building, which is to be erected in the Early English style of architecture, will consist of lofty nave, north and south aisles, chancel, vestry, and organ chamber, with tower, 88ft. high to top of pinnacles, at the south-east corner of the church, through which will be the principal entrance, another entrance being at the west end of the nave. The roof will be open-timbered, and the internal walls lined with bricks and Bath stone dressings, the external facing being local blue stone, and Bath stone dressings. The church is to accommodate about 450 persons; and a contract has been entered into by Mr. John Howell for carrying out the works for the sum of £4,060. It is intended to furnish the tower with a clock and peal of bells, and an organ will also be provided. The designs for the building have been prepared by Messrs Jeffery and Skiller, architects, Hastings, and the entire cost will be defrayed through the munificence of Mrs. Mendham, a benevolent lady residing in the town.

SOUTHWARK.—Extensive alterations and additions are about to be effected at the Borough-road Congregational Church, under the direction of Messrs. Charles Grey, Searle and Son, architects, of Bloomsbury-place. The main works will consist in the construction of two new schoolrooms, ladies' room, ministers' vestry, partial reconstruction of galleries, erection of new platform and rostrum, new entrance porch, &c. The total outlay is estimated at £1,000.

S. PETER'S CHURCH, DRATTON, BERKS.—The chancel of this church having become very dilapidated, and having been "restored" some few years ago, which restoration (as is too frequently the case), deprived it of nearly all its interest, it was decided last year to rebuild it; and this has now been done, together with a new chancel aisle on the north side. The old triplet east window has been restored to its original position, and the new side windows have been made to correspond; the walls have been constructed of great thickness of local wall-stone; the new roof is of pitch pine of large scantlings, the outer stone dressings are of Ham Hill stone, and the roof is covered with the old plain tiles. The chancel aisle is of Perpendicular character, to correspond with the north aisle of the church; it is lighted by three-light windows filled with glazing of two tints in patterns. The roof is flat, of oak and chestnut, has an ornamental cornice and tie beams, after the manner of the old roofs, and is covered with lead; the tile pavements are from the manufactory of Mr. Godwin, of Lugwardine. The stone carving has been executed by Mr. Earp, and the ornamental iron-work by Mr. Lucy, of Oxford. All the works have been carried out from the designs, and from the immediate superintendence of the architect, Mr. Edwin Dolby, of Abingdon, at a cost of £1,100. There are some very beautiful alabaster figures in the church, which were discovered

some years ago while digging for a vault, and they would well repay a visit of inspection; the church being within an easy walk of either Stevenston or Abingdon stations. The figures appear to be of early 15th century work, and represent the Betrayal, the Scourging, the Crucifixion, and the Entombment of Our Lord, also the Adoration and Annunciation. They have traces of the original colouring, which appears to have been chiefly red, green, and gold. Much more remains to be done to this church, and if funds should permit, it is proposed to repair the Ladye Chapel, and to restore the figures, with a new framework, to what is supposed to have been their original position—viz., the reredos of the Ladye Chapel. New schools are also in contemplation for this village, from the designs of the same architect, and a scheme for building a vicarage-house is also on foot.

WINKLEIGH.—Several years back the chancel of All Saints' Church Winkleigh, Devon, was restored by Mr. Ewan Christian, and now the rest of the building has been almost entirely taken down, and is being rebuilt from the designs of Mr. John F. Gould, of Barnstaple. The north wall and the lower part of the tower are old, so also are the granite piers and arches of the arcade separating the nave from the north aisle, and about half the roof timbers—excepting these and a few other minor parts, all the work will be new. The upper part of the tower has been rebuilt and surmounted by carved pinnacles. It rises to a height of 80 feet, and has been further strengthened by new buttresses. These latter, as well as the belfry windows and the new windows of the church, are of Hatherleigh stone, the wall of the structure throughout being of local stone, quarried in the immediate neighbourhood. Middlecut stone, a warm, red material, is being introduced with good effect in the south porch and other parts of the building. The wall-plating, upon which the roof rests on the south side, and upon the outside of the church, is not a little curious from being of solid oak, projecting beyond the wall line and ornamented by carved paterae. This was an unique feature in the old church, and is seldom met with. The crestings of the roof, the copings, the saddle-stones, carved gurgyles, and other exterior carving, the crosses, &c., are all in Ham Hill stone. The roof, partly old, is of English oak, the angels, bosses, enriched wall-plating, cresting, paterae, &c., are all to be elaborately carved, such of the old examples as are available being carefully re-used. The stone and wood carving has been placed in the hands of Mr. Harry Hems, sculptor, of Exeter, Mr. J. Dendle, builder, of Barnstaple, has the contract for all the carpentering and joiners' work.

BUILDINGS.

ATHENÆUM, CAMDEN ROAD.—This building was opened on Saturday last, the 11th inst., by the Lord Mayor, the president of the Institution. The second portion, now completed, comprises on the ground-floor a reading-room, 40ft. by 25ft., and 21ft. high in clear, and two offices or libraries for books; on the mezzanine-floor, ladies' and gentlemen's retiring rooms, and on the first-floor a public room, 40ft. by 25ft., and 14ft. high in clear, and four smaller rooms. The basement, which extends throughout, is 9ft. high in clear, and in it are the keeper's rooms, heating chamber, and coal cellar. The staircase to the first-floor is 4ft. 6in. wide, and that to the basement 4ft. wide. The exterior of the building is very plain, owing to all the decorative features originally intended having been omitted, to reduce the cost. On the angle of the building is an illuminated clock. The contract for this portion of the building (exclusive of the clock) was entered into with Messrs. Gregory and Knight for £2,345, subject to an allowance in respect of the increased rate of wages. The architect is Mr. Frederick Meeson.

PENDLEBURY.—The first portion of the new Hospital for sick children at Pendlebury was opened on Thursday week. Messrs. Pennington and Bridgen, Manchester, are the architects. The administrative block is surmounted by a clock tower, rising to a height of 100ft. All the buildings are of plain but substantial character. The front pavilion, administrative block, and lodge are faced with yellow Ruabon bricks; all the cornices and chimney-tops have been executed in similar materials, interspersed with a few bands of chocolate glazed bricks. The stone, of

which a sparing use has been made, has been quarried in the locality. The other buildings are of common brick, with arches in stocks, earthenware or damp-proof courses being carried round all the walls. The floors of the pavilions are of oak. The internal walls are finished in Parian cement, and the windows glazed with plate glass. The floor of the main corridor is paved with patent concrete, with a border of Staffordshire tiles on each side. The corridors of the administrative block are fireproof, and, together with the vestibule and entrance hall, are laid with Minton's tiles. Mr. W. Southern, of Manchester and Salford, is the contractor for the entire building, including the boundary walls and fences. The total amount of the various contracts was £15,500.

REGENT'S PARK THEATRE.—A new theatre is being proceeded with, situate in Park-street, Gloucester-gate, Regent's-Park. The principal entrances are in Park-street, Gloucester-gate. Two properties have been purchased for same, making a frontage of 30ft. and 80ft. deep. The facade will be three stories in height, in the Italian style, with bold columns and foliated caps, which will mark the entrances. There are two entrances, one for boxes, stalls, and first circle, the other for pit. Above these are two conservatories or saloons, with glass roof for plants, 50ft. by 15ft.—one for ladies, the other for gentlemen. The theatre proper is 101ft. by 69ft. in width, and is arranged into three tiers. The first tier is reached by a grand staircase, with sunlights and chandeliers, with a broad double flight of stone stairs outside the theatre at the end of entrance. The conservatories are upon a level with first landing. There are three tiers of spacious boxes on either side of proscenium, and eight at the back of first tier, which are raised from level of balcony 2ft. 6in., making in all 20 boxes on this tier. There are balcony stalls and dress circle. The pit will accommodate 1,000. There are four rows of stalls. The two front rows of gallery tier will be partitioned off for amphitheatre. The lighting and ventilation and appliances to prevent fire are adopted, and the gas and water patent as lately (and for the first time applied in any building), used at Astley's Theatre, of which the architect is one of the patentees. The decorations will be in an elaborate style in carton pierre; the ceiling will be arranged with 16 star lights in a circle, and elegant cut-glass baskets or chandeliers with ample ventilation above, thus toning the glare of the gas. The gallery entrance is from Grove-street, and upon this site are erected dressing-rooms, &c. The decorators are Messrs. Pashley, Newton, Young and Co., Red Lion-square. The upholsterers are Messrs. Audas and Leggett, of Hull; the gasfitter Mr. Z. D. Berry, Regent-street, Westminster. The contractor for the whole is Mr. Edward Vaughan, of Birkbeck-road, Kingsland. The architect is Mr. J. T. Robinson.

WARWICK CASTLE.—During the past year considerable progress has been made in restoring the private apartments and Hall of Warwick Castle, which were destroyed by fire in December, 1871. The whole of the external walls have been repaired, and the partition walls of the domestic apartments are nearly completed, and the work of internal decoration will shortly be commenced. The baronial hall is also progressing satisfactorily, but the workmen have only just begun to restore the dining-room and the grand entrance-hall. At the east end of the hall two doorways have been discovered, with arched heads of the fourteenth century; but no trace remains of the rooms or corridor with which they must at some time have communicated. Four closed apertures have also been found in the south wall, overlooking the River Avon, corresponding with the windows in the external hall, which light the corridor which passes within it from the domestic to the state apartments. These will be opened out so as to light the upper part of the hall. Amid the debris carried out of the ruins of the hall, many relics of the armour which adorned its walls have been recovered. Notwithstanding the intense heat to which it was subjected, and the molten lead from the roof having poured down into the hall, it is believed that nearly the whole of the steel armour will be restored. The work has been intrusted to Mr. Syers, an experienced antiquarian armourer, who has already restored and recovered some of the most valued specimens. Among the number are Lord Broke's armour, in which he was killed at the siege of Lichfield; Cromwell's elaborately-embossed helmet, the Duke of Montrose's polished armour, a fluted suit of the time of Henry VII., and a variety of minor but valuable articles.

SCHOOLS.

HUDDERSFIELD.—On Monday the usual fortnightly meeting of the Huddersfield School Board was held. Tenders were sent in for the erection of the Lindley Oakes School, and the following were decided upon (in committee):—Masons, Dyson Brothers, Lindley; joiner, James Christie, Huddersfield; ironmonger, James Brook; slaters, Pycok and Sons, Leeds; plumbers, J. H. Taylor and Co., Huddersfield; plasterers, Longbottom and Son; painting, W. T. Earnshaw, Lindley; ventilation, Lawson and Hainsworth; clock and bell, Mr. J. W. Bell, at a total cost of £7,885 14s.

LONDON.—At a meeting of the London School Board on Wednesday, Mr. Charles Reed, M.P., presented the report of the Works Committee. In this there were several matters in connexion with the purchase of sites and the building of Board Schools, all showing the great amount of work carried out in committee. In addition was the following report on the new offices on the Thames Embankment:—"On the 26th of June the Board decided that four architects should be invited to send in competitive designs for the office to be erected on the Thames Embankment. The Works Committee were also instructed to make the necessary selection. In accordance with their instructions, the Committee invited four gentlemen to send in designs. The conditions and particulars were settled by the Board on the 28th of August, and the designs which were sent in at the close of November have now been carefully examined. In arriving at a conclusion, the Committee have not only considered how far the original conditions have been complied with, but have given especial weight to the amount of well-lighted floor space supplied by each architect, and to the estimated cost of the proposed building. On the whole, the committee have unanimously resolved to recommend that Mr. Bodley, whose plans are estimated to cost £19,800, be appointed to carry out his design, subject to the provision that a tender can be obtained from a responsible builder in accordance with the conditions under which the Board have hitherto employed other architects. They further recommend that Mr. Bodley's plans be referred back to them for such modification as they may consider necessary; and that they be instructed to draft specifications, to obtain tenders, and to bring up a contract to the Board for sealing." Mr. Freeman moved as an amendment that the outlay on the new offices be limited to the sum of £20,000. A little discussion followed, and the amendment was negatived, there being 9 for it and 19 against, several members not voting.

ARCHÆOLOGICAL.

ORIGIN OF SERPENT WORSHIP.—This subject was discussed at the last meeting of the Anthropological Institute, the paper read being by Mr. C. S. Wake. After referring to the existence of serpent worship in many different parts of the world, the author proceeded to consider the several ideas associated with the serpent among ancient and modern peoples. One of its chief characteristics, he considered, was its power over the wind and rain; another was its connection with health and good fortune, in which character it was the Agathodæmon. The serpent was also the symbol of life and immortality as well as wisdom. It was then shown that that animal was viewed by many uncultured peoples as the re-embodiment of a deceased ancestor, and that descent was actually traced by the Mexicans and various other peoples from a serpent. Serpent worship, as a developed religious system, originated, Mr. Wake thought, in Central Asia, the home of the great Scythic stock, from which the civilised races of the historical period sprang.

SOCIETY OF BIBLICAL ARCHÆOLOGY.—A meeting of this society was held on Tuesday week at the Society's rooms, Conduit-street. Dr. Birch occupied the chair. Several new members were elected, including the Right Hon. W. E. Gladstone, M.P. A paper by Captain Prideaux, Bombay Staff Corps, "On more recent Discoveries in South-West Arabia," was first read. The paper consisted of a carefully digested summary of the history and geography of the country of the Himyarites, from traditional Arabic literature, and the testimony of the coins and bronze inscriptions collected and translated by De Longperier and Halevy. The first portion of the paper was devoted to an examination relating to the capital, and likewise to the descent of the Shebean kings, whose seat of empire, the writer maintained, was not, as was generally supposed at Sana, but at a place de-

scribed as Dhu Raidan. Captain Prideaux endeavoured to identify some of the chief monarchs mentioned on the Himyaritic tablets with those referred to in Dean Vincent's "Periplus of the Erythraean Sea," by the help of the numismatic discoveries of De Luynes and De Voque. In the second portion of the essay the numerical system of the Himyarites was examined, and several inscriptions translated, and the paper concluded by a reference to the bronze tablets now in the British Museum, alleged to have been cleverly forged. Another paper, "On the Tomb of Joseph at Schechem," was read by Professor Donaldson. It contained a description of the present state of that interesting antiquity, derived from a very recent visit to the Holy Land. Professor Donaldson believed that the actual sepulchre was in a vault under the present Moslem structure, which is considerably out of repair, and is in no small degree injured by the subsequent erection of two Mahomedan tombs, which are also falling into decay. On the further side of the building are two memorial tablets, and a third, in English, recording the burial of Joseph, is about to be affixed, by the order of the late British Consul at Damascus.

DEATH OF A FRENCH ARCHÆOLOGIST.—The most eminent of French Egyptologists, M. Olivier Charles Camille Emmanuel, Vicomte de Rouge, Professor of Archaeology in the Collège de France, and keeper of the Egyptian Museum in the Louvre, died a week or two ago in Paris, at his residence in the Rue de Babylon. Having in early life a decided inclination for philology, he made frequent visits to the libraries of Paris, and devoted his leisure to acquiring a knowledge of the principal Oriental languages. After learning Hebrew and Arabic, curiosity led him to the study of hieroglyphics, which fascinated him so much that thenceforward he devoted himself exclusively to Egyptian antiquities. He patiently laboured in deciphering hieroglyphical inscriptions for some eight or nine years. Subsequently he was appointed Professor of Archaeology in the Collège de France, and in 1862 he was promoted to the rank of Officer of the Legion of Honour. The Vicomte de Rouge's works consist in great part of papers communicated to the Institute. He translated from the D'Orbigny papyrus in the British Museum the Egyptian romance of "The Two Brothers," which was written in the reign of Seti Meneptha, 3,000 years ago; and he also wrote an elaborate work on a stela of Rameses XII., which is preserved in the Bibliothèque Nationale at Paris, and which records the migration of the Moon-God Chonzu from Thebes to the country of Bakhtan, in Asia; but the great achievement of his life was the translation of the Sesostris Ballad, written by the contemporary poet Pindar, of Egyptian Thebes.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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J. R. WALKER.—We can't speak positively about the chance arches without seeing them.

E. B. T.—Not suitable—in fact not good enough. We must look after quality as well as quantity.

R. E. E.—Your epigram limps sadly.

THE NAMES of the successful and commended competitors in the "School Planning Competition" will be given next week.

Correspondence.

WOODEN HOUSES.

To the Editor of the BUILDING NEWS.

SIR,—Durability, as you so justly put it, is not the question; Greenstead Church, in Essex, has a wooden nave that dates from A.D. 1013. The question is safety. That an English gentleman should now adopt wood in preference to stone for his residence, and save £2,000, argues general hard-upishness; we will discard that motive, and ascribe it to eccentricity—an example not likely to be generally followed. The point is safety. Our ancestors, who lived chiefly in wooden houses, did very little by artificial light: the curfew tolled at 8 p.m., and we know from Chaucer that the night was passed in total darkness. For warmth they depended on rugs and flannel; and they did not smoke tobacco. *Caveat ignis.* I am, Sir, &c., A. H.

PROFESSIONAL EDUCATION.

SIR,—I have no doubt that the papers contributed to the BUILDING NEWS by Mr. Guillaume command a large amount of interest, and will be the means of suggesting much that is valuable to their readers. So far as these essays are directed against the hereditary abuses of educational systems, and so far as they advocate a more thoughtful and logical school of architecture, they deserve every support, and Mr. Guillaume is entitled to the thanks of all interested in the subject. But there are several points which appear to me to demand a little further reflection; and if I venture to express opinions adverse to those held by your contributor, I trust that I shall be understood to do so with the single desire of throwing further light, however little, upon a very complicated subject, and one that should by no means be dismissed without the most careful consideration that we can bestow upon it. I feel certain that the author of the articles in question will agree with me in this, and that any contribution that I can make to the full discussion of the subject will be welcomed by him, whether it coincide with his particular views or not.

There is, undoubtedly, much truth in the remarks which Mr. Guillaume has several times made regarding the sequence of the successive stages of educational development. Perception and observation are unquestionably the earliest mental exercises, and must precede and accompany every other form of activity, but he should remember that school teaching forms but a portion of any course of training, and that the first seven or eight years of life are spent in simple observation, and the acquisition of what he calls "fact knowledge." So that by the time a child is sent to school he is supposed to be capable of entering upon the second stage—"sign knowledge." When Mr. Guillaume says that "children are dragged through spelling books and artificial signs of knowledge before they really have the faintest idea of the objects themselves," I consider that he overstates the matter, and think that he will admit, upon reflection, that the shortest way to "the plain truths of geometry, mechanics, geology, and chemistry," which he implies ought to precede the spelling book, is through the triple porch of the three R's. Let it not be supposed that I consider present systems of education perfect, or, in some respects, even passable. I quite agree with much that Mr. Guillaume has said upon this subject, and I have a very lively recollection of the distaste that was excited in my own mind towards several subjects on account of the uninteresting, if not repulsive, manner in which they were presented. School histories, for instance, with their tables of kings and queens, dates and figures, are simply detestable, and I was surprised to discover, several years after leaving school, that the development of nations, languages, arts and religions, with the influences that led to these developments, were most fascinating studies.

It is, however, Mr. Guillaume's remarks upon architectural education that I wish to consider at present, and which I understand to be directed against draughtsmanship, and against the study of former periods of art. On the former subject he says, "In proportion to our instrumental perfection, our mental art power is diminished." From this sentence I conclude that he does not understand the words draughtsmanship in the same sense as the gentlemen whose writings he finds fault with. Architectural drawing, as I understand it, can no more be described as "instrumental perfection," than Raffaele's cartoons could be called geometrical diagrams.

"Mental art power" implies a power over form, a power over light and shade, and a power over colour, and these can be cultivated only by drawing. The great mediæval architects were probably sculptors, the architects of the Italian Renaissance were generally painters (and painting and carving are simply drawing with the brush or chisel), but it was left for the architects of this country to develop their artistic faculties with a straightedge and compasses, and to work out a piece of shading like a mathematical problem.

In another place Mr. Guillaume says, "To imagine that a knowledge of art or architecture can be given by drawing and copying old buildings and works of art, is about as ridiculous as teaching children natural history by mere description." Now if he will explain how children could be taught natural history without description, I shall endeavour to understand how architecture could be taught without drawing. If his argument is that architecture cannot be taught by drawing alone, or natural history by description alone, it is one that has never been disputed. Description is a necessary part of natural history, as drawing is a necessary part of architectural training; but, as everybody knows, the whole is greater than a part. When your contributor tells us that "Sir C. Wren and our Mediæval builders were not mere drawers," and when he says that "the power of design and that of drawing are distinct," he is undoubtedly correct, and I accept his definition of drawing as "the language of design." An architect who is not also a draughtsman is like a poet or philosopher who cannot express himself. A very magnificent thinker he may be, but he can give us no proof of it. He possesses no means of communication, and his powers are unproductive. He is like a steam-engine whose band has slipped off the pulley, and whose whole force is thrown away. It might reasonably be argued that a man could not be a great thinker without being able to express his thoughts, or a great architect without being also a draughtsman; but it cannot, I fancy, be said that language prevents thought, or draughtmanship design.

Mr. Guillaume's remarks are also directed against the study of former periods and former masters of art. He asks: "What avail is the instruction in the styles and periods of architecture or the value of studying old examples at all? Substantially none." It is difficult to see how he proposes to impart the principles of architectural design in any other way than by a study of the classics of architecture, ancient, mediæval, or modern. He tells us to go to Nature. "Nature is still open to us as of old, and as fresh as ever," to use his own words. Or in his quotations from Dr. Spurzheim: "The only criterion, then, of greater or less perfection in works of art is their resemblance to Nature." "Now if the ancients have brought forth master pieces in imitating Nature, why should not we do the same?" (I might diverge here to attack the former of these two quotations, an assertion which no name, however eminent, could induce me to accept). Let me refer Mr. Guillaume at this point to some remarks of his own, in reply to quotations brought forward a few weeks ago by another contributor. At page 417 he says: "They" (the quotations) "do not touch my argument at all. They apply to the imitative arts, not the creative, as architecture." Yet the foregoing quotations from Spurzheim are by Mr. Guillaume specially applied to architecture and to "fashionable architects." I could understand, if I could not agree with, the advice to painters and sculptors to study Nature alone: I cannot understand it to an architect. It applies "to the imitative arts; not the creative, as architecture."

The testimony of artists who have written upon art is, I believe, unanimous in asserting that there is but one way of attaining excellence in any art—by a devoted study of the greatest masters and the best periods. I am not at all sure that they have generally understood why it is so. They have simply felt it to be the case. They have seen that we cannot excel the great masters without first equalling them, and that we cannot equal them without first understanding them. And this understanding them is no easy matter, but demands the incessant study of years. These writers many very well be forgiven if they have not understood the philosophy of all this; for philosophers themselves have been divided, and indeed bewildered upon no subject so much as upon the philosophy of the Beautiful. The most absurd and contradictory theories

succeeded one another with surprising rapidity up till the period of the publication of Alison's celebrated "Essays on Taste." Former writers had treated the subject from a comparatively narrow point of view, and had asserted that it consisted in proportion or symmetry and so on, or, according to Sir Joshua Reynolds, it consisted in an absence of all exceptional characteristics. A beautiful individual of a class was a sort of average struck between all possible extremes, according to this theory. Alison, however, adopted a more general and comprehensive theory. He considered the beautiful even as extending beyond the fine arts—a beautiful theorem for example—and he brought forward the theory that beauty depended upon association. He was encountered by the most strenuous opposition, which indeed has not yet ceased, as there are still a few writers on the subject who refuse to admit his theory. But Mr. Guillaume will kindly correct me if I am wrong in believing that the association theory still holds its place as the generally accepted theory of the beautiful, and that, so far as we can see at present, it is not likely to be superseded by any other.

What I now wish to assert and what I should have wished to establish from different periods of architecture is this:—That association with the past is a necessary element of architectural beauty. I had intended to dwell upon this point, and I believe that I could illustrate it from any or every period of good architecture, but I have already so far exceeded the limits that I had intended for this letter that I cannot attempt to enter upon so large a subject. Let me only say, however, to prevent being misunderstood, that I am perfectly well aware of other necessary elements, and, it may be, more prominent ones. It may exist also in a greater, or less degree, and with a more or less remote past; all that I argue for, is its existence.

In conclusion, I must explain that I have assumed the ordinary distinction between nature and art in deference to the custom of every writer whose work I have encountered. I cannot do so, however, without protesting against the existence of any such distinction. Nature, in the fullest sense of the word, includes art. If we admit that man himself is a natural object, we cannot deny the title to all the productions of man. We can draw no line which shall separate a man's house from a bird's nest. We cannot say that a bird builds by instinct and a man by reason, because we cannot distinguish between instinct and reason, and the best authorities have pronounced them to be identical in kind and different only in degree. We cannot say that architecture is produced in accordance with certain laws, and is constantly undergoing change to adapt itself to altered circumstances, while in the productions of the lower animals the same forms are repeated generation after generation without change, for this is not the fact. The researches of naturalists have established that animals have a remarkable power of adapting themselves to altered circumstances. A bird designs its house under the same conditions that an architect designs his—viz., the particular requirements, the site selected, and the materials available, all these conditions being in both cases liable to fluctuation. And lastly, it cannot be said that the lower animals are insensible to beauty, for this is expressly denied by the very highest authority on the subject. Some kinds of birds, in particular, are said to be peculiarly sensitive to beauty of sound, of colour, and, there is every probability, of form; so that the utmost that can be urged on this point is the Scotch verdict of "Not proven." From the above it will appear that we do not possess a monopoly either of the useful or of the fine arts. The word "nature" then, if it include the productions of any animal, must include those of all. If artificial were the opposite of natural, as it is commonly assumed to be, it would be unreasonable to assert that the laws of nature ought to govern art. With this key to its meaning, it reads that the laws of nature ought to govern nature, which is simply a truism. The words nature and art are, however, very convenient in their ordinary acceptance, and there is no reason against retaining them provided that we clearly understand their real meaning. He who uses words without understanding them is like one who should make use of money in ignorance of its true value. If other people do not deceive him, he is certain to deceive himself.

T. L. W.

QUANTITIES.

SIR,—Mr. Fletcher's system of one uniform method for all trades of taking dimensions may be good in itself, but it is not customary in the profession so to treat dimensions—for instance, the deduction for door in his first form of a Dimension Book is the height by the width; whereas, quantity-surveyors would take the width by the height, and all doors would be so measured. Stonework again would be measured the length by the thickness or bed, by the height—brickwork would be measured as Mr. Fletcher suggests. It is also usual to take the digging for drains with the drains, and to bill it as drains of certain diameter, &c., and digging to an average depth of 3ft. or so, as the case may be, and not to measure it as a separate item, as Mr. Fletcher has it. Where the nature of the soil is not known, an item is inserted in the Excavator's Bill providing for any pumping or baling out that may be required. This protects the client from what might possibly be a heavy item, and also gives the builder an opportunity to put what price he likes against it. Of course, if the nature of the soil is known to the surveyor, he should, as Mr. Fletcher suggests, distinctly provide for pumps. In such a wall as Mr. Fletcher illustrates, the bottom course of footings would in some cases be taken as a double course—and not single, as shown by the sketch. I make these trifling observations, because I think that such articles as those on Quantities must be, as I said last week, pre-eminently technical. W. W.

SIR,—In reply to "A Student," I may mention it is the intention to go fully into all the matters he mentions. His letter has given me pleasure, as, judging therefrom, I believe him to be in earnest with his work. I trust he will, therefore, write to you again should any point arise on which he wishes information, or any suggestion that he may consider will render these articles more useful.

In reply to "W. W." I have to say that while desiring that every question may be put, and every inaccuracy (if any, as lawyers word it) may be pointed out, I am sorry that he should by his letter indicate such perfect confidence in his own ability to correct others, and yet be entirely in the wrong, and the correction inaccurate. I regret it, because some may see his letter and not see this reply, and so be misguided.

The specimen of Dimension Book is quite correct as it appeared in your columns. It is not usual (and therefore it would be incorrect to differ from the received custom) to state brickwork in mortar; it being always considered to be in mortar unless stated to be otherwise.—I am, Sir, &c., B. F.

FENESTRATION OF OCTAGONAL BELFRIES.

SIR,—Your article last week on "The Designs for Edinburgh Cathedral" contains some suggestive remarks on the question of the fenestration of octagonal belfries with pinnacles on the centre of their oblique faces. Having made an attempt some twelve months since, to work out this idea in a tower which is now being erected, I have felt an interest in the subject, and may perhaps be allowed to add two or three notes to those you have already given. The conclusion arrived at in last week's article seems to be the true one—namely, that with a plan of this sort it is better not to have windows on the oblique faces when internal effect does not demand them. In a four-pinnacled octagonal lantern tower visible from the inside of the church, a continuous range of lights is evidently desirable; but in a four-pinnacled belfry tower it is unnecessary, and better avoided. This seems to be a reasonable view of the matter; but it is worth observing that it was by no means the uniform one taken in the middle ages. The western towers at Coutances have the window-arcade carried all round their octagonal stage, just as the central lantern has; and Notre Dame, St. Lo, has a similar arrangement in a later style. The towers of Laon Cathedral, which may be regarded as highly original variations on the same general scheme, have also windows behind the turrets or their diagonal sides. S. Albin, Angers, on the contrary, has arches only on the cardinal faces; so also has Senlis; and in England, the west tower of Ely Cathedral. Mr. Brooks and Mr. Street, in the designs you published on November 29 and last

week respectively, have kept very close to the type at Angers; but the idea seems capable of development into other and even more striking forms.—I am, Sir, &c., JAMES CUBITT.

ARBITRATIONS.

SIR,—In the paper on "Arbitrations," read by Mr. Banister Fletcher, before the Royal Institute of British Architects on the 6th inst., and reported *ante*, p. 38, the author seems to have fallen into one very material error. He says, "the improper rejection of evidence tendered by either party, would set aside an award; and further, that with what the law called a "lay" arbitrator, improper admission of evidence would have the same effect. If, however, the arbitrator belonged to the legal profession, this would not have such effect." Without venturing to lay down a rule as to the effect of the improper admission or rejection of evidence in any such general terms as Mr. Fletcher does, I would point out that the statement, that more favour is shown by the courts to legal than to lay awards, is not correct. Such a distinction formerly existed, but this has long since been done away. Mr. Russell, in his treatise on Arbitration, p. 288, says, "It has been settled by repeated decisions that the awards of legal and of lay arbitrators will be treated by the courts of law on exactly the same principles." And a passage similar in effect occurs in my own work on Arbitration, p. 195.

However, considering the compression of the subject into so small a compass, the wonder is that Mr. Fletcher fell into so few errors; and my present object is rather to deal with the scheme projected by Mr. Saunders, than the paper read by Mr. Fletcher.

It may be professional prejudice on my part, but I certainly cannot indorse the severe things said by several speakers respecting arbitrations. Numerous cases, no doubt, occur in which references are dilatory and expensive; but my own experience is, that they are the exceptions, and that, as a rule, arbitration provides a speedy and comparatively inexpensive mode of settling differences not involving any very nice points of law. That the decision of the arbitrators should please all parties, can scarcely be expected. The verdict of a jury, or the decision of a court seldom does that. Moreover, the parties themselves are generally responsible for delays that may occur; they will nominate as arbitrators men whose time is so fully occupied with more lucrative matters that they have only rare intervals to devote to the hearings. If, then, arbitrations are satisfactory when properly conducted, the question arises whether or not some scheme cannot be devised by which present disadvantages shall be avoided. In Mr. Saunders's suggestion I think there is an indication of such a scheme, and the following further suggestions seem to me an expansion of his ideas, which might be worked into a practical shape by the Council of the Institute.

1.—Let the Institute nominate two persons, one an architect and surveyor, to be called the "lay arbitrator," the other a barrister or solicitor to be called the "legal arbitrator" of the Institute; the two to constitute a tribunal of reference. There would be little likelihood of their failing to come to an agreement upon any case; for, by tacit consent, the decision of all points of evidence and of law would be decided by the legal, and all points of fact, of surveyor's practice and other technical matters, would be decided by the lay arbitrator. The award would be drawn up by the legal arbitrator, so as to make it good in point of law.

2.—The Council could decide upon a certain scale of remuneration for the arbitrators, and draw up a code of rules for regulating references.

3.—These preliminaries being decided, it would only be necessary to insert in contracts a provision in the arbitration clause, that all differences and disputes should be referred to the legal and lay arbitrators of the Institute; and a further provision, that the rules of the Institute for the regulation of references in force at the date of such difference or dispute should be incorporated with, and be taken as part of the contract.

If it should be considered impracticable for two arbitrators to deal with disputes arising throughout the whole country, or inadvisable, on account of the expense consequent on arbitrators having to go to places far distant, or, on the other hand, for the parties and their witnesses to come

to London, districts could be decided upon, and two arbitrators be appointed for each of such districts.

The fear of trespassing at too great length upon your space, prevents my more than indicating in outline the scheme I suggest; but I hope it is done with sufficient clearness to show that in the direction I have pointed out will be found a remedy for the abuses which now exist.—I am, Sir, &c., J. H. REDMAN.

5, Essex-court, Temple, Jan. 13, 1873.

EDINBURGH CATHEDRAL COMPETITION.

SIR,—In the BUILDING NEWS of Friday last, in an article on the competitive designs for the Edinburgh Cathedral, you say—"We feel bound to claim no small portion of the merit due to the design which was sent in by Mr. Ross to help obtained in this metropolis, and therefore, so far as the school of thought from which this architectural work was derived, English architects have again proved their pre-eminence."

Your remark would imply that I had received special assistance in the preparation of my design over and above that which every professional man receives from his draughtsmen, and, in fact, that I sent in a design other than my own.

This is quite untrue. I cannot allow it pass unnoticed, and I most decidedly repudiate any such insinuation.

I neither spoke to nor otherwise consulted any London architect on the subject. The designs were prepared by myself, and worked out in detail in my own office here, under my own immediate direction and superintendence, by regularly paid draughtsmen, who, except one, were young men trained in my own office, never having been in any other employment.

The gentleman not trained by myself had been previously employed in London, and, I understand, would have been retained by another of the competitors for the Cathedral had he not been previously engaged by me.

Whilst on this subject, I would add that, in a practice of over twenty years, I never yet sent out a drawing from my office that was not *bona fide* designed and drawn therein; and I feel that it is ungenerous and unfair that insinuations and statements calculated to do me serious professional injury should be circulated. I now trust that in common justice you will publish this letter, and withdraw the statement of which I have such just cause of complaint.—I am, Sir, &c.,

ALEXANDER ROSS.

42, Union-street, Inverness,

14th January, 1872.

[We willingly insert the above letter, and Mr. Ross should be obliged to us for giving him an opportunity of disabusing the mind of the professional public on the matter. A kind of settled conviction had been come to in London that Mr. Ross had obtained essential professional assistance from a London architect, whose name was mentioned.—Ed.]

COMPETITIONS.

SIR,—Though not a competitor, allow me to thank you for your competitions; with regard to the next, as you invite suggestions, let me express the opinion that it should be of such a nature as to call forth and develop any latent inventive power in the competitors and be of some practical every-day use.

It is well known to those architects who have been called upon to design a retail shop, that it is a difficult problem to solve; the shopkeeper requires, naturally, as much show space and light as can be given, and the architect, resorting to a disguised iron lintel, finds his front above the plate glass apparently hung in the air, and it frequently happens that neither is satisfied. I would propose, therefore, a competition for two shop-fronts or stores complete, of such dimensions as may be determined upon—one of the ordinary building materials; the other, in front, entirely, or almost so, of iron.

The points to be considered in the award:—1st. Its suitability for the purpose, considering light, show space, access, convenience of show-rooms on ground and other floors, and safety from fire. 2nd. Stability in reality and in appearance, especially with regard to the main show window. 3rd. Proper treatment of materials used, and facility and cheapness of execution. 4th. The inventive power shown in the designs, and the beauty and harmony of forms used; and, 5th, the draughtsmanship shown. The competitors to design for one or both, the time made as long as possible, and the competitors invited to invent a new style, instead of putting in bits and scraps of Mediaeval buildings from their measured drawings, for modern shop-fronts; and the prize a handsomely bound copy of all the designs, with an appropriate title page.—I am, Sir, &c., J. S. FAIRFAX, Architect.

Offices: Wheeling, W. Va.; Zanesville, O., United States. Dec. 30, 1872.

COMPETITION FOR STATUE, FOUNTAIN, LAMPS, &c., DERBY.

SIR,—In common with your correspondent "Anxious Competitor," I should be glad to hear something definite respecting the above competition. Rumour says that most of the money collected for the purpose has been spent by the patriotic people of Derby in entertaining the Prince and Princess of Wales on their last visit. Whether there is any truth in the report, I do not know; but I fully agree with your correspondent in thinking that it is high time that something was settled.—I am, Sir, &c., January 14, 1873.

ANOTHER COMPETITOR.

MR. TRICKETT AND SANDSTONE.

SIR,—Mr. Trickett kindly offers to convince any one who will take a walk with him in London of the superior advantages of sandstone over limestone as a building material.

As this will be rather troublesome for him if half a dozen or more should accept his offer at different times, would it not simplify the matter if he would kindly give us the names of the buildings he would take us to?—I am, Sir, &c., H. T.

THE BUXTON MEMORIAL, WESTMINSTER.

SIR,—Being in Great George-street, yesterday, after an absence of a few years, I was grieved to observe the present neglected state of the above work.

As it now stands, it is rather a type of forgetfulness than a memorial of good men. Although only about five years old, it looks fifty or more. The shafts of beautiful marble are fast decaying, the mosaics are scarcely visible from the accumulation of soot, and the stonework is in a filthy state for want of cleaning down.

As I attribute this state of things to want of proper care, I venture to inquire, through your columns, if anybody is responsible for it? Surely, the Government or Board of Works would take the beautiful little monument under their charge, if requested in due form. It cannot be denied that the public buildings deserve as much care, and are as fairly entitled to share in the expenditure of our money, as the public parks, which, from proper attention, are a source of general delight and a credit to the country.—I am, Sir, &c., AN ARCHITECT.

AN EXAMPLE WORTH FOLLOWING.

SIR,—I received last week's publication of the BUILDING NEWS, direct from the office. I receive regularly a copy through a bookseller here. I have therefore handed the copy to another party, which may be of use to you.—I am, Sir, &c., W. J. GRAY. Ivy-place, Berwick-on-Tweed, January 11, 1873.

QUANTITIES.

SIR,—I, with your correspondent of last week, am glad to see that you are about to publish a series of articles on the above subject from the able pen of Mr. Fletcher. I need only say that if they are as explanatory as his recent tables on "Dilapidations," they will not only commend themselves to your readers, but to the profession at large.

The methods recently adopted by you, in introducing subjects really practical, a course pursued by neither of the other professional papers, must, I am convinced, render the BUILDING NEWS the more welcome to the large body of architectural students, and your further addition of illustrations, should meet with the approbation of us all.—I am, Sir, &c.,

WILLIAM R. WALLIS.

172, Euston-road, N.W.

"THE BUILDING NEWS."

EXTRACTS FROM CORRESPONDENCE.

"Such an agreeable change, and the praiseworthy and excellent spirit therein evinced, cannot possibly fail to be appreciated by all who read the BUILDING NEWS, or who take any interest in the subjects on which it treats."—S. TREVAIL, Par, Cornwall.

"I am highly gratified with the improved state of the BUILDING NEWS, and I think the change cannot fail to be appreciated by every one."—SIDNEY E. STEVENSON, Nottingham.

"As an old subscriber, allow me to express my satisfaction at your new year's alteration."—EDWIN NORTHISH, Lustleigh House, Cambridge Gardens, Notting Hill, W.

"A most satisfactory new year's greeting. Your publication is now certainly the largest, and in my opinion the cheapest and best, paper of its class now published."—J. W. WATSON, Ryde, Isle of Wight.

"The BUILDING NEWS is really going on apace. I think last week's number a splendid one—Street's and Shaw's in one number!"—THOS. BATTERBURY, 106 Cannon-street.

"I take this opportunity to express my great satisfaction in the enlargement of your valuable journal, and as many of your subscribers are not architects, I would suggest the occasional insertion of illustrations of general subjects, such as gates, both of wood and iron, gateways, summer house, &c.—R. C. DOBBS, 1, Charlesworth-road, Dublin.

The Earl of Devon has accepted the post of President of the Annual Congress of the Royal Archaeological Institute, to be held in Exeter in the ensuing summer.

Intercommunication.

QUESTIONS.

[2758].—**Lighting St. James's, Piccadilly.**—I am building a large hall for public meetings in connection with a church. The minister was lately in London—had been in St. James's, Piccadilly, and was greatly pleased with how it was lighted. If any of the correspondents to these columns will kindly instruct me how it is lighted—the arrangements of pipes, and the manner in which the lights are extinguished, &c., I shall be most grateful.—**LIGHT.**

[2759].—**A Good Stone Colour.**—Would you or any of your readers kindly advise me as to the best preparation to be used in colouring a good stone colour, a large newly cemented building?—**PLASTERER.**

[2760].—**Cracked Ceilings.**—Could any of your readers inform me the cause of numerous small cracks in all directions in plastering? The span not more than 15 ft., joists 4 in. x 2 in., 14 in. apart, centre to centre, 2 in. x 3 in. piece nailed to every joist, and hung to ridge of roof, lathed, rendered, floated, and set. A remedy for this would greatly oblige.—**CHIPS.**

[2761].—**Royal Northern Agricultural Society's Competition.**—Can any of your Scotch readers kindly inform me if any decision has been arrived at in the above? At the same time I must add my thanks to the many you have received, for the improvement you have made in the **BUILDING NEWS.**—Yours truly, **ENQUIRER.**

WATER SUPPLY AND SANITARY MATTERS.

LEAMINGTON.—The outcry raised a few months ago respecting the state of the Leamington town water is likely to be followed by great results. At a special meeting of the Leamington Board, on Tuesday, it was stated that the artesian boring, since commenced, has led to a supply being obtained from the rock 180 ft. below the surface, the purity and softness of which are believed to be unsurpassed. An eminent geologist considers the spring which has been tapped derives its supply from Snowdon. The Board decided to forward samples for analysis.

LEGAL INTELLIGENCE.

PAYMENTS TO BUILDERS.—FAIRHALL AND WEEKS v. APSLEY.—The plaintiffs in this case (heard in the Lord Mayor's Court recently, before the Deputy-Recorder) are builders, carrying on business in Bartholomew-close, and it seems they gave defendant an estimate for certain work for £47, which formed the first part of the claim. The work was done, and no complaint was made in regard to it. There was another item, amounting to £9, 1s. 4d., which had been paid into court. The plaintiffs had been paid in various sums, £36, which left £11 due to them. The whole question was what had been paid? The defendant maintained that the plaintiffs had not credited him with certain payments. He gave a list of the amounts paid. The Deputy-Recorder, in putting the case to the jury, said he thought the defendant ought to have pleaded payment on the record, if he sought to discharge himself altogether. According to the accounts of the plaintiffs there was £8 due to them. The defendant must prove affirmatively that he paid this money, and he had produced his book, showing that this had been done. The verdict was for the defendant.

COURT OF BANKRUPTCY.—LIQUIDATION CASES.—Liquidation petitions have been presented, and first meetings of creditors have been held as follows:—*Re* William Jackson, contractor, Great George-street, Westminster. On the 16th January, at 2 o'clock, at the offices of Messrs. Hart, Brothers, 57, Moorgate-street, City. Solicitor for the petitioner: Mr. A. E. Sydney, 46, Finsbury-circus.—*Re* Benjamin Stone, of Milton-road, Herne-hill, Dulwich, builder, late of Westminster-bridge-road. On the 13th January, at 10 o'clock, at the office of Mr. G. D. Cooke, solicitor, 20, Devereux-court, Temple.

ERRORS IN "QUANTITIES."—**GREEN v. GOUGH.**—In his case, heard in the Lord Mayor's Court recently, before the Deputy-Recorder, the plaintiff was a quantity surveyor. Mr. Kemp, in opening the case, said that plaintiff had been engaged to take out certain quantities for certain work which had reference to a Welsh chapel in the Southwark Bridge-road and three houses, and the claim amounted to £67, 8s. Defendant had paid £35 by bill of exchange, which he gave to the plaintiff, and whilst the bill of exchange was running, the plaintiff applied for the residue of his claim, which comprised cost of lithography and stationery. The defendant said he could not pay any more money until the bill had been met. The bill was dishonoured, but was subsequently met. Defendant paid £3 on account, and promised to pay the balance. When this action was brought, it was said that there was a mistake about the claim of the plaintiff. If there was any mistake, it arose in this way—that there was some other work in the tender with which the defendant had nothing to do. Mr. Ford, for defendant, said that a blunder had been made in taking out the quantities upon which the contract was based. The estimate was given on 491 cubic feet of stone. In carrying out the contract, it was found that 1,100 feet of stone had been used. The value of the difference was a loss to the defendant, whose tender (£1,600) for the building had been accepted. This was answered by the plaintiff saying that there was more stone put into the building than was necessary. Mr. Ford submitted that, under the circumstances, the plaintiff could not recover, and cited a case in support of this contention. Mr. A. L. Buzzard, surveyor, said he had measured the drawings to ascertain the quantity of Bath stone required; it was 1,067 ft., and 1,132 feet had been used. By Mr. Kemp: He could not say whether less brick had been used than had been allowed by the plaintiff. There had been more stone used than was given in the specification. Mr. Jas. Ivin, mason, said that no more stone had been used in the building than was necessary. Mr. H. F. Cross, also a mason, gave similar evidence. Mr. Kemp, "in going

to the jury, said that the amount of the bill of exchange had almost paid for the work of the plaintiff on the chapel, but his friend had not alluded to the houses, and therefore that part of the claim of the plaintiff had not been defended. They had been running their head against the chapel, which had little to do with the case. The Deputy-Recorder, in summing up, said that if the plaintiff had made anything like the error spoken of, he would not be likely to recover any more than he had already been paid. The alleged mistake was so gross that it aggravated the difficulty of the counsel of the defendant having to make it probable that such an error should have been made. One side of the building was like the other, and if the quantities had not been doubled, would account for the mistake made. The plaintiff would not admit that a single foot had been miscalculated, considering the materials he had before him to determine what stone should be used. On the other side, the defendant, who is a practical builder, and who was supported by witnesses, said that a much larger quantity of stone had been employed than sent by the quantities. The difficulty was increased by the circumstance that all the Bath stone appeared in the front. The point for the jury to consider was, Who was wrong? Had Mr. Green been wrong, or had the defendant been wrong in employing a mason, and paying him (as he had done) by the cubic foot, allowing him to put (and this, of course, would be to the man's advantage) more stone into the building than had been provided for by the architect? If the plaintiff had intended to mislead the defendant, and the defendant had been a loser in consequence, then, he thought, the plaintiff would not be entitled to recover.—The jury found for the plaintiff for £32, 8s.

Our Office Table.

WOMEN AS ARCHITECTS.—The *Globe* thinks that it is certainly curious that the branch of Art which, above all others, comes home to women is that from which women have hitherto kept clear. Architecture is as much the business of women as men, and yet, in all the generations of female painters, female musicians, and female poets, there have been no female architects. There may be many reasons, but the demand which architecture makes for masculine qualities cannot, in these days of womanly ambition, be taken as one of them. The only type of female architect known to the world is that represented by Miss Brooke in "Middlemarch." But she did not draw her plans for improved cottages professionally, even though she probably avoided the error of that illustrious male amateur, Balzac, who, when he planned a country house for himself, forgot the necessity of a staircase. A suggestion has been thrown out on the other side of the Atlantic to the effect that women would make excellent architects, with special reference to interior decoration. Certainly the grandest of all the arts does not flourish so marvellously in male hands that we should be justified in preventing women from trying to beat us in an open field. Perhaps their acquaintance with domestic requirements and their instinctive good taste might give us buildings that would be fairly comfortable. It might be interesting, moreover, if some lady could be induced "to give us her idea" as that eminent male architect, Mr. Pecksniff would put it, of a design for the Law courts that we are to have one of these days.

THE USE OF FRESCO IN CHURCH DECORATION.—Mr. Poynter has completed the upper and larger portion of the fresco which he has in hand in St. Stephen's Church, South Dulwich. This work is a pure fresco—a very rare thing in this country. Mr. Poynter believes that fresco may be successfully employed in England, and in this church, and on a sufficient scale, is determined to try what he can do. As a proof that, under proper conditions, fresco may be successfully employed in England, the *Athenæum* instances a fresco, painted by Mr. F. Madox Brown so long ago as 1844, and which was exhibited at Westminster Hall in that year,—remains to this day as fresh as ever. Another fresco, by Mr. Cave Thomas, which was painted many years ago, has not changed, although it has been severely tried.

RELAPSING FEVER.—This disease, says the Medical Officer of Health for Marylebone, in his last monthly circular, is reported to have again broken out in the metropolis, more particularly in the southern districts, and is said to be spreading. "Up to the present time I have received no information of any case having occurred in S. Marylebone, but as it is not improbable that there shortly may be, and as the disease is highly contagious, I have thought it desirable to have the hospitals in the parochial stone-yard made ready for the reception of patients suffering from it; and I have no doubt that, should I have occasion

to apply to the Vestry for permission to use them for that purpose, my application will be readily granted."

SOCIETY OF ANTIQUARIES OF LONDON.—Yesterday this Society opened an exhibition of Bronze Implements and Weapons, in continuation of the two exhibitions of Stone Implements Palæolithic and Neolithic respectively, with which it has illustrated the life and habits of the prehistoric man. Upwards of 1,000 implements have been collected, not only from the British islands, but from the continent of Europe and from Asia. Most curious of all are some specimens recently found in India, of a type and size hitherto unknown in our museums. The collection will remain open until the 30th inst. inclusive. The hours of admission will be from 11 to 4. Tickets can be procured at the Society's apartments, Somerset-house. At the ordinary meeting of the 23rd, at 8.30 p.m., Mr. John Evans, F.R.S., F.S.A., will read a paper on "Implements of the Bronze Period," and on the 30th inst. Mr. A. W. Franks will discourse on "Oriental Bronzes." This evening none but Fellows will be admitted.

LIVERPOOL.—At the meeting of the Liverpool School Board on Monday, on the recommendation of the sites and buildings committee, it was resolved that, subject to such modifications as the Education Department may deem desirable, the plans bearing the motto "Knowledge is power" be adopted for the school to be erected on the Roscommon-street site, the estimated cost being £4,900; that the following architects or firms be invited to submit competition plans each for one of the sites in Penton-street, Ashfield-street, and Beaufort-street, viz., Messrs. Reade and Goodison, Messrs. Cooke and Reeve, Mr. G. E. Grayson, "A.D. 1872," "Hope," "Ad rem," "Stet fortuna domus," "Maxima puero debetur reverentia," "Ilex," and "Con amore"—the committee to allot to each the site for which he is to compete, nominating one of the previously successful competitors to each site; and that Mr. G. E. Grayson and Mr. T. Cook be respectively invited to examine the site at the North Corporation School, and to submit competitive plans and estimates for accommodating 500 infants. A recommendation to purchase the reversion of the land in Ashfield-street (2500 yards) at the price fixed by the finance committee of the town council, namely £300, was also agreed to.

CHIPS.

A memorial window has just been placed in Lutton church to the memory of the late C. B. Taylor, Esq. The window is the workmanship of Messrs. Heaton, Butler, and Bayne, Garrick-street, Covent-Garden, London.

It is proposed to lay out a new cemetery at Burnham, Somerset, and Mr. Down, architect, of Weston-super-Mare, has been appointed to report upon the scheme.

Messrs. Llewellyns and James, of Bristol, have just cast two large bells for the parish church, Glastonbury. Their weights are respectively 14 cwt. and 22 cwt., the smaller of the two being a maiden bell.

The new museum of copies of pictures by the old masters has been nearly completed at the Palace of Industry, Paris, and will shortly be opened to the public.

A new carillon machine erected in the tower of Worcester Cathedral was completed on Saturday week. It has been constructed by Messrs. Gillett and Bland, of Croydon.

The *Chicago Tribune* says that there are more wooden buildings in that city now than before the fire.

The death is announced of Mr. John Jay, the well known contractor, who carried out a considerable portion of the Metropolitan Railway, and many undertakings of a gigantic character, not only in the metropolis, but in various parts of the United Kingdom.

A vacancy having occurred on the board of directors of the National Freehold Land Society, Mr. W. E. Whittingham (son of the late secretary) has been nominated to fill the office. The election will take place at the annual meeting on the 7th of February.

The cost of the Indus Valley State Railway, the length of which will be 211 miles, had been estimated by Major Bonus, R.E., Officiating Engineer-in-Chief, to be 80,828,488 rupees, or 37,906 rupees per mile.

The Madras Government has sanctioned a system of tramways for Madras, and the work has been entrusted to a London company.

A memorial of the late Bishop Waldegrave has been erected in Carlisle Cathedral, in the south

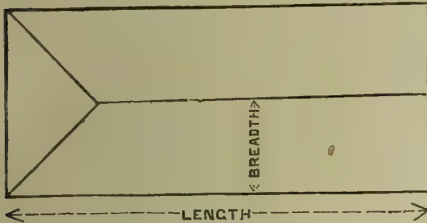
THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 24, 1873.

QUANTITIES.—IV.

TILES.

IN measuring tiling, whether plain, pan, or ornamental, take the extreme length of eaves from out to out, by the breadth from eaves to ridge, thus :—



and twice this, if the building is rectangular, will give the superficial area of tiling.

If the building is hipped at both or at one end, as in the sketch, the dimensions will still be taken as above from out to out, as whether the roof be hipped or gabled, the superficial area will be about the same; and, of course, this plan materially shortens the labour.

The following allowances in the measurement of plain and pantiling must be made upon the net superficial area of the tiling.

In Plain Tiling :—

	Inches.
For eaves	4 extra.
„ Dripping do.	6 „
„ Cuttings, hips, &c. ...	3 „
„ Valleys... ..	12 „

In Pantiling :—

For cutting to hips, splays, &c., at per foot run, described as “Splayed, cutting and waste.”	
„ „ to hips and ridges at per foot run.	

Take the filletings at per foot run, describing whether in cement or mortar. Also, the pointing to verge. Number the hip hooks and T nails, and state in how many oils they are to be painted.

To ascertain the length of the hip rafter there are two or three methods, but the following is perhaps the simplest and best.

Make the hip line on the roof plan the base of a right-angled triangle, the perpendicular of which is the height of the roof as delineated on the elevation, and the hypotenuse will be the length of the hip or valley. Taking the example of the plan of roof given, of which A B is the hip, make B C at right angles to a A B, and the same length as the roof is high. Then A C will be the required length of the hip.

TABLE III.

This Table has a double use : it shows the order of taking this trade, and the method of measurement.

Plain tiling	At per square of 100ft. superficial.
Pan tiling	„
Ridge tiles	At per foot run.
Hip tiles	„
Valley tiles	„
Plain tile creasing	„
Mitres to hips and ridges	At per No.
Hip and T hooks	„

SLATES.

In measuring slating, take the length by the breadth, the latter being taken from the edge of the eaves to the top of ridge as in the tiles. Add to which whatever appears of the lower course of slates. Thus supposing the slates to be countesses (20 by 12) and laid to a 2in. lap, the bottom course will show 8in. This would be the required addition to add to the measurement.

Allowance for hips and valleys is thus made. Take the length by 6in. wide on each side, and add to it the measurement as an allowance for cutting and waste, the hip being measured as described in tiles. In addition, make an allowance of 6in. wide by the length for all irregular cuttings; as, for example, to angle chimneys. Make deductions as they appear.

Where the slating is laid circular it must be kept separate from the straight, and described accordingly. It is measured similarly to the straight, with the same allowances.

Be careful to state the description of slating used, with the size (whether duchesses, countesses, &c., &c.), also specify the lap, also the quality of nails, whether copper, zinc, &c., and the number to each slate.

It may be advisable here to give the size of slates generally in use—

	In.	In.	In.	In.
Queens ...	36	by 24	Countesses 20 by 10	
Imperials ...	30	„ 24	Viscountesses 18 „ 9	
Princesses ...	24	„ 14	Ladies ... 16 „ 8	
Duchesses ...	24	„ 12	Doubles ... 13 „ 6	

NOTE.—Of these, the Duchess and Countess are the more commonly used. Of course, it will be necessary to keep the different descriptions of slating separate; also to state whether fancy slating—slating laid diagonally being so-called.* Should the slating be required to be cut in any form, a sketch would the better exemplify the description, and should be given to enable the contractors to estimate with greater certainty. Slate ridges and cresting are measured at per foot run. State whether set in red-lead, putty, and screws, &c. Slate hips are measured at per foot run, as will be seen by perusal of the Table IV. Measure all filletings, and state whether in lime and hair mortar or cement. These are billed with the bricklayer's work as before described.

SLATE DAMP COURSE.—Take the length by the width, and state whether laid double, and if bedded in cement.

SLATE CREASING.—In taking this item it is necessary to state if in cement.

SLATE SHELVES.—Take the length by the width and include in such measurement any portion let into walls.

The edges, where rubbed down or rounded, to be taken at per foot run, and described how finished.

Rebates, grooves, tongues, &c., are also measured at per foot run. If the joints be cemented with red-lead or putty, it must be stated.

The cutting and pinning into wall is also taken at per foot run. See Table IV.

SLATE CISTERNS are usually numbered, stating the description of slating with the thickness required for sides and bottom, and the capacity of water required in gallons. It is advisable also to give the inside or net dimensions of the cistern, as where the bottom is thicker than the sides, as is customary, it will be impossible to form a correct estimate where this not done. Describe how it is to be put together, specifying the bolts and nuts. All holes for plumber are taken at per number “extra.” It should be also stated if fixed, as otherwise this will be afterwards charged as “extra.”

SLATE SINKS.—Give the dimensions, length, breadth, and depth, and full description, stating if fixed, including cutting and pinning into wall, &c. All holes are to be taken as “extra.” If rebated, it must be stated, as it is an “extra.” See the Table as to how measured.

* I avoid all questions of reasons as to whether it should be so called. I desire only to deal at present with that which exists.

SLATE PAVING.—It is necessary to describe as to the finishing to surface whether rubbed, &c., and if the edges are sawn or rubbed, they will be measured separately at per foot run.

SLATE SKIRTINGS.—Take the length and describe the width and thickness of the slate, including all screws, and drilling holes.

SLATE LOUVRES.—In taking these it is necessary to state the depth and thickness of slate, and the surfaces if planed &c., including edges. Number the fair ends, and the fitting to stone or other grooves.

Labour on surfaces, as planing, rubbing, enamelling, is to be taken at per foot superficial.

Chimney pieces are usually numbered and a price affixed; the price and value thereof differing almost as much as in the case of marble.

The fixing is taken under the head of “Bricklayer.”

TABLE IV.

This Table has a double use : it shows the order of taking this trade, and the method of measurement.

Slating	At per square of 100ft. sup.
Slate ridging	„ „ foot run.
„ hips	„ „
Slate damp course	At per foot super.
„ Shelves	„ „
„ Paving	„ „
Slate creasing	At per foot run. „
„ Louvres	„ „
„ Skirtings	„ „
Labour to planing to surface,	At per ft. sup.
„ to edges, grooves, } rebates, &c., }	„ „ run.
Slate cisterns,	At per number.
„ sinks	„ „
Cutting holes for } plumber (extra) }	„ „

In concluding this trade I would mention a “short way” to find the quantity of slates required. Should the reader wish to find the amount of slates necessary to cover any given area—take the length the third slate covers the first from the length of the slate, and divide the remainder by two. Multiply the result by the width of the slate, and the product will be the number of square inches of the surface of a single slate. The total area of the roof divided by this number will give the total of slates required.

MANCHESTER ARCHITECTS ON THE COMPETITIONS QUESTION.

IN a leading article of our No. 938 we called the attention of our readers to the comments on the Quantities question contained in the last issued report of the Manchester Society of Architects, and intimated there was a possibility of our again noticing that report. The close of the very important competition for the Cathedral at Edinburgh has once more roused the professional body to a consideration of the old, old tale—the unsatisfactory condition of architectural competitions—and as the report of the Manchester Society goes pretty fully into the question, and, moreover, suggests a hitherto unusual course of dealing with it, we cannot do better than give further publicity to it. We shall confine ourselves to what the Society has to say of one phase of the question—the excessive costliness to architects of the competition system, which has of late years degenerated into a mere contest of purses—each competing architect straining his ingenuity to discover, not how he may out-design, but how he may out-draw his brethren who are competing against him. One would imagine that this evil was more common to open, than to limited, competitions; yet the very reverse is the fact. Sixty architects entering uninvited (individually) into a public competition have not the means of communicating with one another, and of arranging beforehand the preliminaries of a professional tournament. They may well be excused for giving themselves up to the maxim, “All means are fair in love or war.” But what shall we say of a

dozen, or even (as at Edinburgh) half-a-dozen, architects, known to each other, and invited, each with a fixed honorarium, to compete for a building? Were it half-a-dozen contractors, we should hear of their sensibly meeting beforehand and arranging some of the preliminaries; if it were but the selection of a surveyor to supply them with satisfactory quantities or "schedules," duly lithographed (not written), so that each builder might be restricted to a pure and simple task of pricing one uniform estimate. Nay, even the very wording of the form of tender is rigidly settled on beforehand. The contest is, in fact, a pitting against one another of mere ratio prices, even though the competing builders be, not six only, but sixteen. But how do our architects act? They keep jealously aloof from each other, and, let the honorarium be ever so liberal, hardly a man of the "ruck"—to apply a sporting phrase—will hesitate to spend twice or thrice the sum in out-drawing, out-painting, out-modelling, or out-gilding his antagonists. The competition for the Courts of Law afforded a notable case in proof of our remark; and the recent competition in Edinburgh forms no exception to the rule, that may be confidently laid down, that a limited competition with an honorarium is even a worse architectural evil than the very worst open competition that can be devised. In the case of the Edinburgh Cathedral the honorarium to each competitor was £100. Will any man aver that a good, useful, intelligible design for a £65,000 cathedral cannot be "got up" for £100? No one will surely say that such a design might not after (say six months') careful study as a design, be adequately drawn out on, let us say, one single sheet of drawing-paper, folded letter-wise, thus, and sent off by book-post for two pence:

I	D	H
U	A	E
F	B	G

A would be the plan of the principal floor, with B, C, D, and E its four elevations developed around it, while F, G, H, and I would give a committee no fewer than four sections; the entire set of nine drawings so placed as to considerably aid a non-professional committee in reading the respective designs, to say nothing of the time saved to any professional referee called in. It would be impossible to expend more than twenty guineas at most in "getting up," as the phrase is, these nine drawings on one sheet of paper, and the balance of the honorarium would not leave too much for the six months' general consideration of the designer.

Were some such system as this to become general—say by a strike of architects, the poorest and worst-paid men in the world, chiefly by their own fault—the public would really get designs, when they inaugurated a competition, while, as it is, they only get drawings of inordinate costliness. Our architects would have to think more, and draw and spend less. Our public buildings would be infinitely more original in conception if we could only restrict the competing architects to designing, just as competing builders are restricted to pricing.

In the celebrated limited competition for the Law Courts, the honorarium paid by Government to each of the ten competitors was £800—a handsome payment for what was wanted—a general design for the buildings. If any two of the competitors pocketed a farthing of his £800, we are unconscious of the fact. It was,

for the rejected architects, a really disastrous speculation, in which some of them must have lost from £300 to £500. As to the Edinburgh Cathedral Competition, the £100 honorarium was the veriest bagatelle. Many of the designs must have cost thrice the money. In this case, oddly enough, the conditions contained the following clause:—

"All drawings required at present are to be of the character of sketches; not detailed working drawings."

as to which we need only refer our readers to the exquisitely detailed geometrical drawings we have engraved as illustrative of Mr. Street's design, and ask them to say, if they are, as even specially retained architects, in the habit of supplying their own paying clients with more elaborate contract drawings. Mr. Street's drawings will surely do much to break up the existing system of competition altogether; for if every architect is to turn out for mere competition purposes a set of complete contract drawings, who but a madman will compete?

We have had so much of our own to say on this question of cost, or of speculation, that we have left till the end of our article the quotation we intended to give from the report of the Manchester Society of Architects. Here it is, and it quite sustains us in our denunciation of the existing cruel system of architectural competition. It speaks of—

"the suggestions made by this Society that in important public competitions the intending competitors should be invited in the first instance to send in merely sketch plans, &c., to a small scale, and that from them, if necessary, a limited number should be chosen, whose authors should be requested to send in more elaborated designs. The result of this plan, adopted on the recommendation of this Society by the Corporation of Manchester in their competition for the Town-hall, was sufficient to convince any one having any knowledge of building that a second competition, or, indeed, any competition involving the production of artistically and expensively got up perspectives, &c., is entirely unnecessary, and that the architect might very easily be selected from the sketch designs."

We can only say, after giving expression to our own ideas on this important question, no truer words were ever penned than these observations of the Manchester Society of Architects. Why should our architects be mulcted of such enormous sums as the profession have been known to expend in some notorious competitions? Why but because, as eels are used to being skinned, and have been popularly said to like it, our architects resemble these slippery creatures, and live contentedly upon their losses. It is a state of things very adverse to the true progress of art, and little calculated to impress the outside public with a very exalted idea of a modern English architect.

S. S.

ARCHITECTURAL ASSOCIATION.

THE Architectural Association commenced its fortnightly visits to works in progress and buildings of architectural interest on Saturday afternoon last, when about seventy of the members visited Goldsmiths' Hall, Gresham-street, and the new Post Office buildings in St. Martin's-le-Grand. The members met at half-past two o'clock at

GOLDSMITHS' HALL,

where they were received by Mr. Hesketh, the architect to the Goldsmiths' Company. The principal point of attraction in this fine and palatial structure was the new hall and staircase, recently reconstructed, in the most costly and beautiful marbles procurable, by Messrs. Burke and Co., of Regent-street, from the designs and under the direction of Mr. Hesketh, the Company's architect. A brief description of the work appeared in the *Building News* of March 8, 1872 (Vol. XXII., p. 194), and the work was there spoken of as a specimen of good materials and careful execution, although there is nothing specially remarkable in the design. The colours generally contrast with good effect, and it may therefore be useful if we give a list of the several architectural members of the work, with the name of the marble in which each is executed, and the quarries or country from which each variety of marble is procured. The capitals of columns and pilasters

are in alabaster, from the Fauld quarries, Tetbury, Staffordshire; the shafts of columns and pilasters are in Griotte de Flandres, from the province of Namur, Belgium; the stiles of wall lining are in Vein marble, from Carrara, Italy; the panels of wall lining are in Pavonazzi, from a quarry near Carrara; the mouldings are in Bleu Fleuri, from Aspin, near Bagneres de Bigorre, Pyrenees; the capping of dado and of balustrade are in Bardilla, from Massa, Italy; the balusters are in alabaster, from the Fauld quarries; the die of dado is in Vert de Corse, from Corsica; the niche is in Devonshire, from Ipplepen, near Newton, Devon; the panels on walls of staircase and the pedestals on staircase are in Sienna, from Sienna, Italy; the mouldings of panels are in Bleu Fleuri, from Aspin; the plinths and base of dado are in Brèche de Waulsort, from Hainault, Belgium; the plinths to rake of stairs and to hall are also in Brèche de Waulsort, from the same place; the steps, landings, and floor are in Sicilian, from Carrara; the green bands in floors are in Coppau Vert, from Bagneres de Bigorre; the upper wall lining in hall is of Devonshire, from Plymouth; the lower walling of hall is in Vert de Corse, from Corsica; the impost and archivolts are in Vein, from Carrara; the pedestals of candelabra are in onyx, from Algiers; and the plinths of candelabra pedestals are in Brèche de Waulsort, from Hainault. This combination of beautiful marbles makes a very effective and stately grand staircase; but Mr. Hesketh said that he had the utmost difficulty in selecting the marbles, inasmuch as the marble masons, either ignorantly or wilfully, give anything but the right names to the different varieties. The four lunettes which light the staircase from the top are glazed with plain ground glass, the white surface of which is agreeably broken up and relieved by elegantly-designed grilles placed on the interior. These grilles have the appearance of light iron castings, but Mr. Hesketh said that, in order not to endanger the marble work, he had had them made in carton pierre. The handsome chandelier which now hangs in the centre is an adaptation of one which formerly hung in the hall, but which had for years been hidden away. Mr. Hesketh next conducted the visitors through the noble suite of apartments, some of which have recently been redecorated by Mr. Hesketh. The ceilings of some of these rooms are said to be reproductions of Inigo Jones's work; at any rate, the general opinion was that if they are not so, they strikingly accorded with the work of that great master. Very little of the decorative features of this princely suite of rooms could be seen, as the walls were swathed in protective linen coverings. On the motion of Mr. Mathews, the President of the Association, a hearty vote of thanks was accorded to Mr. Hesketh for his kindness in conducting the visitors over the hall, and the visitors then proceeded to

THE NEW POST OFFICE BUILDINGS.

Here the visitors were met by Mr. James Williams, of Her Majesty's Office of works, from whose designs and under whose superintendence this large and stately pile is now drawing towards completion. The building is a parallelogram on plan, having frontages of 286ft. each to St. Martin's-le-Grand and Bath-street, and of 144ft. each to Newgate-street and Angel-street. It stands on a base of grey Cornwall granite, rising 4ft. above the ground line, and the whole of the fronts have been executed in Portland stone, which, to all appearance, is a very satisfactory sample of that useful building material; indeed, Mr. Williams said on Saturday that he did not know of a better piece of Portland stone work anywhere. In reply to a question by one of the visitors, he said that no one was sent down to the quarries to select the stone, nor did he think that such a plan was ever desirable, for it took out of the architect's hands the power to reject stones which were found during the working to be faulty. He reserved this right of selection or rejection to himself, therefore, because although a block at the quarry might seem to have the right ring about it, it might, in working, be found to be very defective; and if the person at the quarry had passed such a block, the architect could not refuse to use it unless at a great sacrifice. The building is four stories in height, exclusive of the basement, the total height from the ground line being 84ft. It was originally intended to effect a communication between the basement of the new building and that of the old General Post Office (*Smirke's chef-d'œuvre*, now so sadly disfigured by the barn-like structure over the pediment) by a subway beneath

S. Martin's-le-Grand; but Mr. Williams stated that it has been decided to abandon this, on account of the great expense (£7,000 or £8,000) which would be entailed in diverting the sewer. The contractor for the building is Mr. Brass, of Old-street, S. Luke's, the amount of whose tender was £129,718. The work was to have been completed by Christmas last, but the recent strike and other causes have delayed the work, so that, in Mr. Williams's opinion, it will be probably a twelve-month hence before the Telegraph Department (by which the building will be almost entirely occupied) will be settled in its new quarters. It was originally intended to concentrate in the new building the various branches of the Post Office which are at present scattered about in separate buildings. It was proposed to remove to the new building the business of the Post Office Savings Bank Department, at present temporarily located in S. Paul's Churchyard; the Money Order business, from the existing Chief Money Order Office in Aldersgate-street; the Dead Letter Office, from its temporary quarters over the Metropolitan Railway Station, in Aldersgate-street; and the Registered Letter business, from the chief office on the other side of St. Martin's-le-Grand; but this will be impossible, owing to the enormous extension of the telegraphic business. The requirements of the postal and allied services would seem to demand the erection of another block of buildings of at least equal capacity to either of the two large piles which stand on either side of St. Martin's-le-Grand; but until this accommodation is provided, the Money Order business will continue to be carried on at the existing office in Aldersgate-street, while the Savings Bank business will be removed from S. Paul's Churchyard to the premises which will be vacated (on the completion of the new buildings) by the Telegraph Department in Founder's-court, Lothbury. The Registered Letter business will remain where it is, and probably the Dead Letter business. The new building will be principally occupied by the Telegraph Department, the rest of the space being devoted to offices connected with the administrative department of the Postal service at large, such offices being removed from the existing General Post Office, so as to devote the latter building almost entirely to the sorting of letters and newspapers. The fine central hall of the latter building has been for some time closed, in order to meet the exigencies of the service, and thus what many persons considered to be a most valuable feature of the building has been destroyed. Mr. Williams said on Saturday that he had expected a great public outcry about this, but no objection was offered by the public against it, probably because as a visitor suggested, the public were not consulted in the matter. The central hall in the new building, which is somewhat ornately treated, was intended to have been devoted to the purposes of a large public office for the transaction of such postal business as the sale of stamps, registry of letters, granting of money orders, and the receipt of telegraph messages for transmission. This part of the scheme has been abandoned, however, owing to the great space which will have to be devoted to the Telegraph Department, and Mr. Williams thought it likely that a small public office to serve the purposes enumerated would be opened at the old building on the opposite side of S. Martin's-le-Grand, the central hall, or what was to have been the public office of the new building, being occupied as a general clerks' office, room being provided for about 80 clerks. The visitors to the building on Saturday afternoon first proceeded to the basement, which is lofty, and in considerable portions very well lighted, particularly at the Newgate-street end, where an irregular slice of space between the line of the old buildings and that of the new structure is devoted to an open area sunk to the level of the basement floors, skirted on the Newgate-street side by an open balustrade similar to that at the west front of Somers House. The best lighted of these basement rooms will be appropriated as clerks' rooms, while those which are not so well lighted will be utilised as storerooms for the engineers of the Telegraphs Department. Newgate-street has not been widened. While in the basement, the construction of the floors above was pointed out. It is entirely of iron and concrete, and is a somewhat novel adaptation of the Fox and Barrett and kindred systems of flooring. The principal rolled iron joists are about 20in. deep, and are placed about 6ft. apart. At right angles to, and resting upon the bottom flanges of these principal joists are smaller joists about 12in. deep of a \perp section.

These smaller joists are placed about 12in. apart, and cleats or boards having been temporarily secured to the under side of the primary joists, the concrete is filled in from the top to the depth of 6in., and when it has set, may be said to consist of narrow slips of solid concrete supported on the flanges of the secondary joists, and with their under surfaces flush or on a level with the under surface of the principal joists. This mode of construction has the advantage of allowing the plaster of the ceilings beneath to be put direct on to the under surface of the floor construction, and the concrete of course offers the best possible key for the plastering. The whole of the building stands upon a bed of concrete 6ft. deep, it having been thought desirable, on account of the massiveness of the structure, to go to this extra expense, notwithstanding that there was found to be a very good gravel "bottom." Wooden joists and boards rest upon the tops of the principal rolled joists to form the floors of the rooms, and Yorkshire flags for the corridors. The space intervening between the top of the concrete and the floor will be found convenient for laying the gas and water pipes, and telegraph wires, of which latter there will be some thousands brought into the building. In the corridors the main gas and water pipes will be laid in a channel running along one side, and this channel will be covered by a pierced and movable iron grating. There will be hydrants in the corridors every 20ft., so as to afford the means of rapidly flooding the building in case of fire. There will be no hot-water apparatus or any special provision of the kind for warming the building. The rooms will be warmed by ordinary stoves, while for the staircases and corridors it is thought that ample warmth will be provided from the large quantity of gas which will always be burning, especially in the basement. Nor is there any special provision made for ventilation, which will be effected merely by windows and by means of open skylights, &c., above the staircase wells. The corridors communicate direct with all the staircases, and Mr. Williams said it was found in the existing Post Office buildings on the other side of the road, this mode of ventilation was found amply sufficient. The concrete used throughout is composed of broken brick and stone, hard shingle, smiths' ashes, and Aberthaw lime, in the following proportions: 3 of broken brick and stone, 1 of coarse gravel, 1 of hard smiths' ashes, 1 of clinkers, and 1 of ground Aberthaw lime. Mr. Williams said that this made the best concrete he had ever seen; on trying to cut through it, it was found to be like cast-iron. The pieces of broken brick and stone used for the concrete of floors should never be much larger than a good-sized chestnut. Recently, when the greater part of the work had been done, a new and ingenious machine had been employed for breaking up this material, which it did with great facility and regularity. The building is, as before stated, five stories in height, and the staircases are arranged in pairs, there being separate staircases for the heads of departments, &c., and for subordinate officials and workpeople, the latter staircase having two turns, however, where the former only has one. By this means a small piece of what may be called mezzanine floor is obtained on the minor staircase on which to place a row of waterclosets for the workpeople, &c., the waterclosets for the heads of departments being immediately beneath these, but approached from the principal staircase. Thus, although there are only five stories to the building, there are ten stories or tiers of waterclosets in connection with each of the main staircases. On the third floor is a large room, 80ft. by 60ft. in the clear, originally intended as a ledger-room for the Savings Bank Department, but now intended to be devoted to the engineers of the Telegraph Department. On the floor above is the instrument-room, where 800 female operators will be accommodated. This room occupies the greater portion of the floor space of the top story of the building, and is lofty and well-lighted. At one end of this vast apartment will be the testing-room, for testing the lines of wires when necessary. The messages from the chief district offices, such as Charing Cross, Lombard-street, &c., will not be "wired" to S. Martin's-le-Grand; they will be sent in "carriers" along pneumatic tubes, which will be brought direct into this room. The lower portion of one of the small quadrangles will be covered with a glass roof, to afford shelter to the engines and boilers which will be used for exhausting the air from the pneumatic tubes, and a chimney shaft will be carried up in the centre to a height rather greater than that of the main building. Before the visitors left the building, Mr. Williams directed

attention to the machinery used for working the stone and granite, and said that the coping of the granite balustrade had been worked with mouldings on both sides simultaneously, and with great rapidity, by one of the machines. Thanks having been given to Mr. Williams for his courtesy, the visitors left the building, having spent a most profitable and interesting afternoon.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary general meeting of this Institute, on Monday evening last, Professor Kerr in the chair, after the minutes had been read and confirmed, and the other routine business transacted, Mr. Alexander Crawford, of 15, East-parade, Leeds, was elected a Fellow, and Mr. R. Morrison Marnock, of 3, Verulam-buildings, Gray's Inn, an Associate.

Mr. SEDDOX called attention to a new trap, the invention of Mr. Glegg. Mr. Seddon said, that this was the most perfect trap he had seen, and had, he believed, been rather extensively used by Messrs. Corbett and McClymont on their extensive building estate at West Brompton. The principal advantage of the trap was that it contained a much larger body of water than any other trap, and that when any faecal or other offensive matter was conveyed into the trap it was immediately discharged therefrom.

Mr. GLEGG, the inventor and patentee, having made a few remarks explanatory of his invention, a brief discussion ensued on the question, Mr. COCKERELL failing to see the advantages of the trap over the ones ordinarily used, and Mr. THOMAS MORRIS, who described himself as "the champion of the soil-pipe," contending that to effectually guard against the irruption of sewer gas into a house (which was, of course, one of the objects of the new trap), there was nothing better than ventilating the soil pipe at a sufficiently safe distance above the roof of the house.

Mr. H. H. STATHAM, of Liverpool, Associate, then read a long and elaborate paper entitled "Architecture Practically Considered in Relation to Music." The paper was of a very practical character, and entered into the questions of what forms, dimensions, and materials could be best employed in structures intended to be devoted to various classes of musical performances. Acoustically, the author had arrived at substantially the same conclusions as those laid down by Mr. Roger Smith in his little work on Acoustics. We hope to give an abstract of the paper in our next issue, together with some notes of the discussion which ensued.

SCIENTIFIC ART.

MR. W. CAVE THOMAS, in his application to the Vice-Chancellor of the University of Cambridge, in relation to the Chair of Fine Art, says:—"I do not desire the Chair of Fine Art at Cambridge alone for the position and honour which it confers, though these are of the highest, but because Cambridge is the English centre of mathematical study, and, therefore, the seat of learning from which a science of taste, of aesthetics, founded on a mathematical basis, should be enunciated. I say a science, for I have long felt that discourse upon art and taste should be rescued from that misty verbiage which has for many a day, not only puzzled the clear-headed in England, but throughout Europe.

"It may appear presumptuous on my part to suppose myself capable of substituting clearness for obscurity, light for darkness, of pointing out the fixed and stable amidst the fluctuating; but receiving as I did some degree of scientific training before I adopted art as a profession, I was astonished to find our art-literature utterly deficient in scientific method and logical precision. These defects appeared to me to be so glaring, that I thereupon resolved to bring the floating and tangled mass of empirical knowledge into natural sequence and order. This resolve alone would not, perhaps, have carried me very far towards the successful accomplishment of the work I set myself to do, had not a providential thought led me to build upon a quantitative basis, and thus ultimately to gain a complete mastery of my subject.

"It is very commonly but erroneously supposed, that the principles of art must be evolved by some different method than the laws of physical phenomena; that they are in fact inscrutable,

shadowy, and free from any hard and fast rule. This is most unfortunate for art progress. The true principles of art may be obtained by a strictly inductive method, by careful observation and experiment, by a method as strict indeed as that pursued in the study of any other class of phenomena; the difference merely being, that in the one case we observe and test external phenomena, whilst in the other we have to observe and test the phenomena of our own inner sentient being. Every great work of art is the result of induction, the fruition of careful observation and experiment from which the painter or sculptor has learnt to eliminate what is variable, what is abnormal, and to present the spectator with those more general, central, or immutable truths of the two worlds of external and human nature of which he must equally be the student."

CONSTANT WATER SUPPLY.

THE regulations for the constant supply of water submitted by the water companies of the metropolis, and approved by the Board of Trade, formed the subject of discussion at the last meeting of the Lambeth Vestry, and a resolution was agreed to affirming "That the regulations made for the constant supply of water are not only oppressive, but vexatious and conflicting as against owners and consumers, in relation to the prescribed fittings required under the Metropolitan Water Act, and that in relation to constant supply, it appears difficult whether the same can be obtained without considerable difficulty and enormous expense being incurred. Legislation on this important subject is difficult and ambiguous, and the interests of the owners or consumers have been overborne and sacrificed to the powerfully-vested interests of the water companies within the metropolitan area." At the same meeting the medical officer of health reported the existence of a number of cases of typhus fever, and an analysis of the waters of the companies supplying the district has shown that although somewhat improved, they were on the occasion of the examination unfit for domestic use unless thoroughly filtered, and there was still much to be desired in the direction of a really satisfactory water supply. At the last meeting of the Shore-ditch Vestry, the Sanitary Committee reported that having considered the Board of Trade regulations, they had come to the conclusion, "that the regulations are unnecessarily expensive, and totally inapplicable to the class of houses for the benefit of whose inhabitants they were intended." The Mile-end Vestry have also unanimously adopted the following resolution:—"That, notwithstanding the advantages which may be expected to arise from a constant supply of water in this district, the regulations adopted by the Board of Trade are so unsatisfactory, and would lead to such an enormous expense, and be a source of such annoyance to consumers, that the Vestry hope the Metropolitan Board will resist them, even to refusing a constant supply of water on such vexatious conditions." The Whitechapel District Board of Works have resolved, "That, to comply with the regulations with regard to the fittings for a constant supply of water as a retrospective measure will entail costs so excessive as to become oppressive." The Local Boards of Limehouse, St. George's-in-the-East, and the East of London generally have passed similar resolutions.

THE LATE WILLIAM WOOD DEANE

WAS born the 3rd March, 1825, at Islington; received a classical education under Bishop Jackson at the Grammar School; was articled to Mr. Herbert Williams, architect, on 7th September, 1842. On 13th January, 1844, he was admitted a student at the Royal Academy, and obtained the silver medal in December of the same year. He also became a student of the Royal Institute of British Architects, and obtained prizes there in 1844 and 1845. After serving his articles he assisted Mr. Mocatta, and obtained some premiums in competition. He travelled in France, Germany, and Italy for two years, returned to England at the latter end of 1851, and took the late Alfred Bailey into partnership. During their partnership they built Langham Chambers. After their separation, in 1855, he built some houses and studios, and built a new stone shop-front for Messrs. Dickinson, the photographers of Bond-street; but being averse to the business part of his profession, and being

without patronage, he mainly occupied himself with making designs, and drawing and colouring views of new and proposed buildings for other architects, and in occasionally drawing on wood for the illustrated papers. He eventually abandoned architecture for painting. He was elected Associate in 1862, and Member in 1868, of the Institute of Painters in Water Colours, from which he migrated in 1870 to the Old Society. He also exhibited at the Dudley Gallery, and at the Royal Academy. He was attacked with disease of the liver in 1870, and died at his residence, 6A, King Henry's-road, N.W., on the 18th inst.

It is rarely that we have to deplore the loss of one equally skilled in architecture and painting, and one, too, cut off at the very height of his powers. It is too true that those only who were his personal intimates could appreciate those talents for architecture that were denied a fitting career. Had he possessed a fortune or a patron, he might have embellished London with his works; for no man ever had a more brilliant invention, a nicer feeling for exquisite proportion, a greater mastery over detail, nor a more perfect and cultivated appreciation of the scope and meaning of his art; but after a fruitless essay of ten years he turned to painting, where no patronage but skill was required to get competence and fame.

All who are interested in the arts know his charming expositions of the architecture and landscapes of Europe, from the slated houses of the old French towns, glistening with the rain, to the yellow skies of Seville winking in the heat. The loss of the man is even more deplored by those who knew him than the loss of the artist, for it was difficult to know whether one was more attracted by the fine points of his character than by the brilliancy of his conversation. "Take him for all in all, we ne'er shall look upon his like again."

SCHOOLS OF ART.

NOTTINGHAM.—On Wednesday week, Mr. Cole, C.B., distributed the prizes at the annual meeting of the Nottingham School of Art. Thanks to the manner in which it is supported, and the efforts of Mr. J. S. Rawle, the head master, the Nottingham School has for the fifth year headed the lists in the Government examinations, and has obtained a greater number of prizes than any other school in the kingdom. Mr. Cole, in concluding the remarks which he addressed to the students, observed, that next April he would have completed fifty years of public service, from which it was his intention to retire. More than twenty years ago Lord Granville, then Vice-President of the Board of Trade, asked him to undertake the superintendence of the Schools of Design. During that period he had served under statesmen of all parties. Mr. Labouchere, afterwards Lord Taunton; Mr. Henley, who was the first to insist that the artisans of this country should have means of learning geometrical drawing; Mr. Cardwell, who enlarged the Department of Art into Science and Art; Lord Stanley of Alderley, who transferred the Museum from Marlborough House to the South Kensington Museum, then founded by the Prince Consort; the late Marquis of Salisbury, who instituted the present successful system of science instruction; Earl Granville, who first began the permanent buildings for South Kensington Museum, and started the idea of the Bethnal Green Museum, which his successor, the Duke of Buckingham, carried into practical effect, who also caused the new Science Schools to be built; and the Duke of Marlborough, who induced Mr. Disraeli's government to make the most liberal and profitable investments of public money in purchasing works of art. Since the year 1852, he had witnessed the conversion of twenty limp Schools of Design into one hundred and twenty flourishing Schools of Art. Five hundred night classes for drawing have been established for artisans. One hundred and eighty thousand boys and girls are now learning elementary drawing. Twelve hundred and fifty schools and classes for science instruction have spontaneously sprung up. The South Kensington Museum has been securely founded as a national centre for consulting the best works of Science and Art, and as a storehouse for circulating art objects throughout the kingdom. Whilst this museum itself has been visited by more than twelve millions of visitors, it has circulated objects of art to one hundred and ninety-five localities

holding exhibitions, to which more than four millions of local visitors have contributed above ninety-three thousand pounds.

STOKE-ON-TRENT.—On Friday week the new class rooms at the School of Science and Art were formally opened by Sir Smith-Child, Bart., M.P. The Department of Science and Art lent a collection of pictures, by Mulready, Constable, Collins, Thurnau, and other artists. In opening the conversazione, Mr. Smith-Child said it was not necessary for him to remind them that they had met in a building erected as a memorial of the late Herbert Minton, who was deeply esteemed not only by himself (the Chairman), but by every one in Stoke, and, indeed, by everyone in the Staffordshire Potteries, and they had met to promote the interests of the School of Science and Art—objects which Herbert Minton during his lifetime had so much at heart. It would have been a shabby memorial if the building were in debt; but happily it was free from debt, and the School of Science and Art was free from rent. The building was honoured by being inscribed with the name of Herbert Minton, a man who in his lifetime had his hand ever open to assist every work of public good or private charity—a man whose heart beat in generous sympathy with every good object presented to him for his approval. He alluded to the fact that Burslem had established an excellent institution in honour of Josiah Wedgwood, who did his best to promote science and art and the manufactures of the district, and said Stoke acted rightly in honouring Herbert Minton. He hoped both institutions would flourish, and that the rising generation would make full use of the advantages which such institutions were designed to afford.

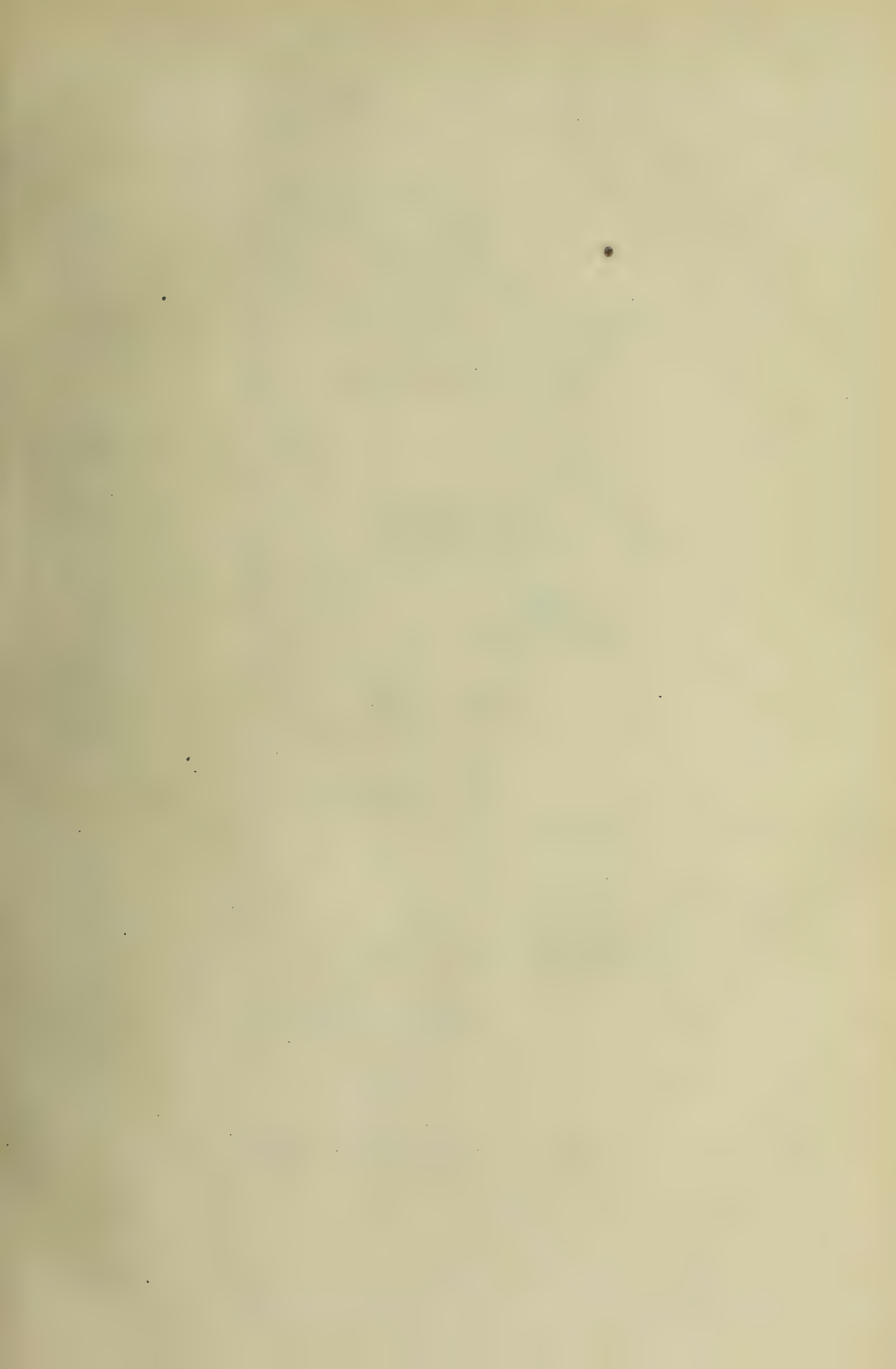
SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—This society, which was founded upwards of fourteen years ago for the cultivation of the fine arts, held its first Conversazione of the session, at the gallery of the Society of British Artists, in Suffolk-street, Pall Mall, on Thursday evening, the 16th instant. The winter exhibition of pictures now at the gallery proved highly interesting to the members and their friends, among whom we noticed Sir M. Digby Wyatt, F.S.A., M.A.; Alfred Clint, Esq.; the Governor of Trinidad; Drs. Hyde Clarke, Karl Blind, Guidal, and Cassall; Captains Mercier, Oldfield, and Savory; Messrs. Martin Tupper, Ludovici, Levien, Dicksee, Lionel Cohen, Girardot, and many others well known in the art and literary world. The Chairman of the Council, Major Britten, and Mr. George Browning, the Honorary Secretary, supported by Messrs. Edmeston, Atkinson, Houston, Phené, Rogers, and other members of the Council, received the guests on their arrival. Selections of vocal and instrumental music from Verdi, Donizetti, Rossini, Meyerbeer, and other composers, were given during the evening (under the direction of Mr. Alfred Gilbert, R.A. Mus.), which passed off in a highly satisfactory and agreeable manner.

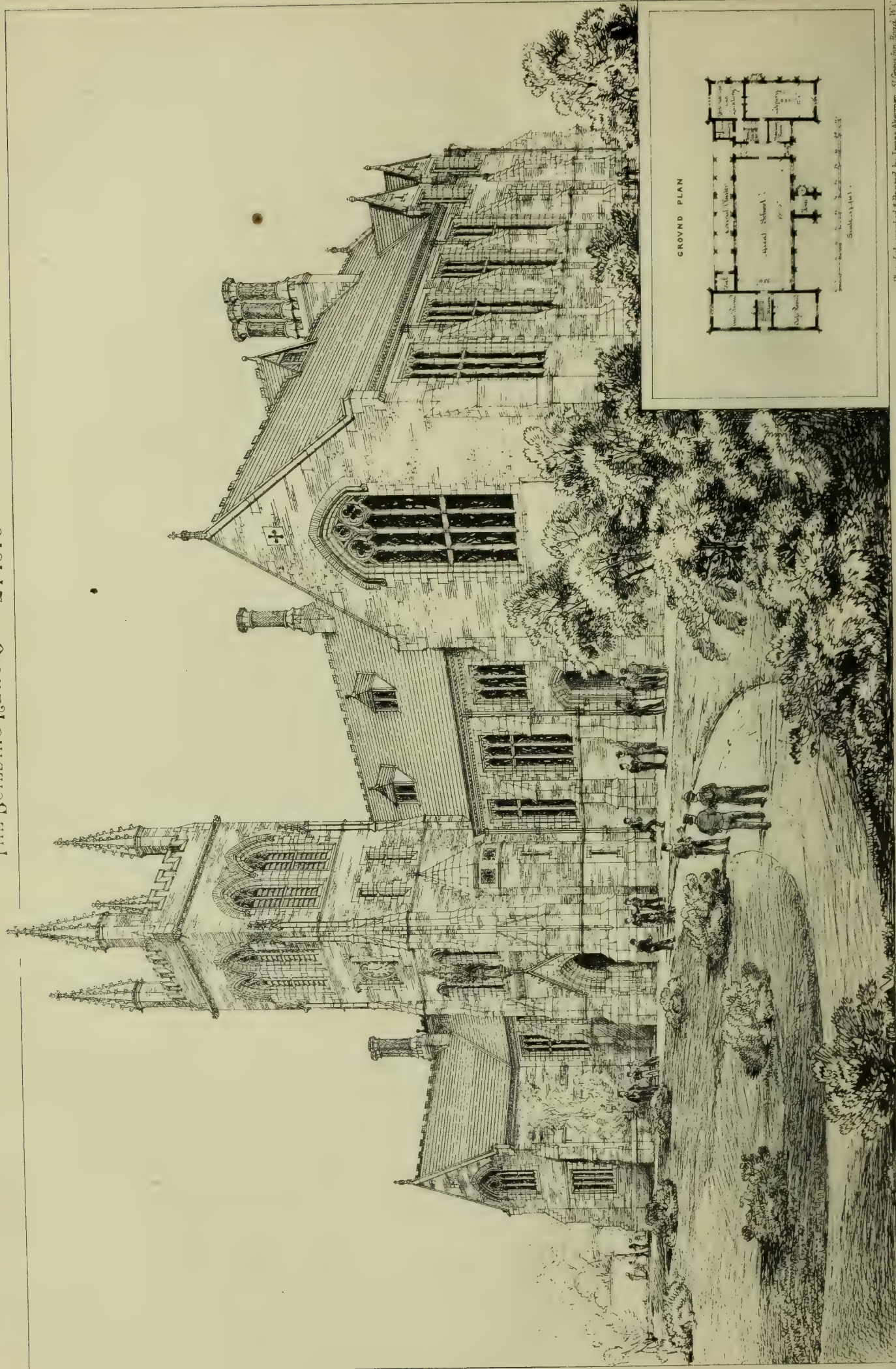
THE SLADE PROFESSORSHIP OF FINE ARTS.—Mr. John Ruskin, M.A., LL.D., Honorary Student of Christ Church, and Honorary Fellow of Corpus Christi College, has been re-elected to the important office of Slade Professor of Fine Arts without opposition. Mr. Ruskin was originally elected in 1869, in the pursuance of the will of Mr. Felix Slade, who left a sum of £12,000, Reduced Three per Cent. Annuities for the endowment of the professorship. The election is made by a board of seven—viz., three curators of the University galleries, Bodley's librarian, the President of the Royal Academy of London, the President of the University College, London, and one other, appointed by Mr. Slade's executors.

A Philadelphia manufacturer is preparing a plan, for a column 1,000 feet high, to be constructed entirely of iron, in open work, from the summit of which the grounds of the Centennial Exposition are to be illuminated by means of a Drummond light. If adopted, it will be the loftiest monument in the world.

Mr. W. B. Wallis has been appointed a junior Examiner in H.M. Office of Works. There were thirty competitors. The salary is £150 per annum, rising to £300.

A new church school has been erected at Taunton. The style is Gothic, the materials local stone with brick dressings. The building, which will accommodate 120 persons, was designed by Mr. J. H. Spencer.

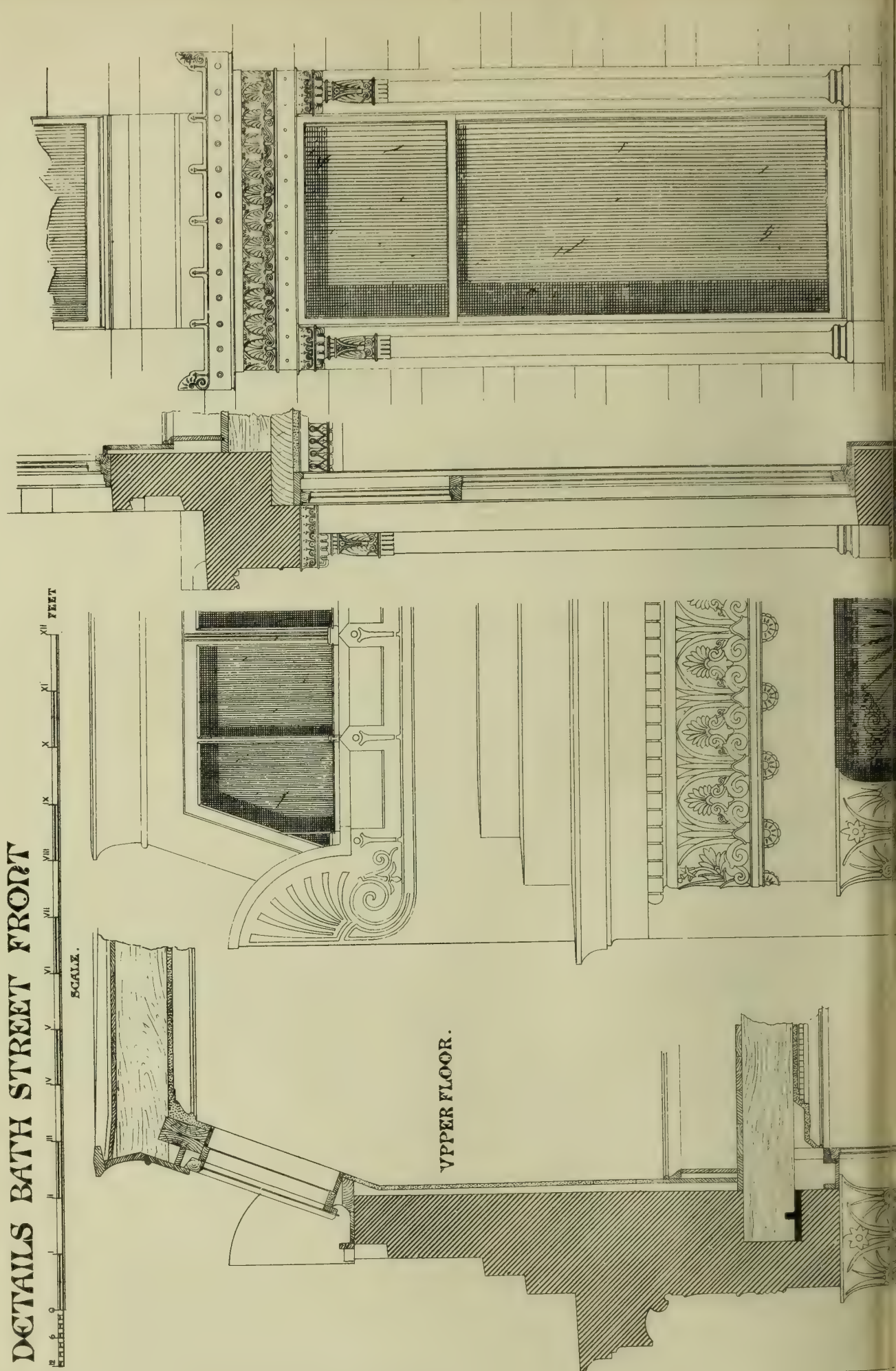




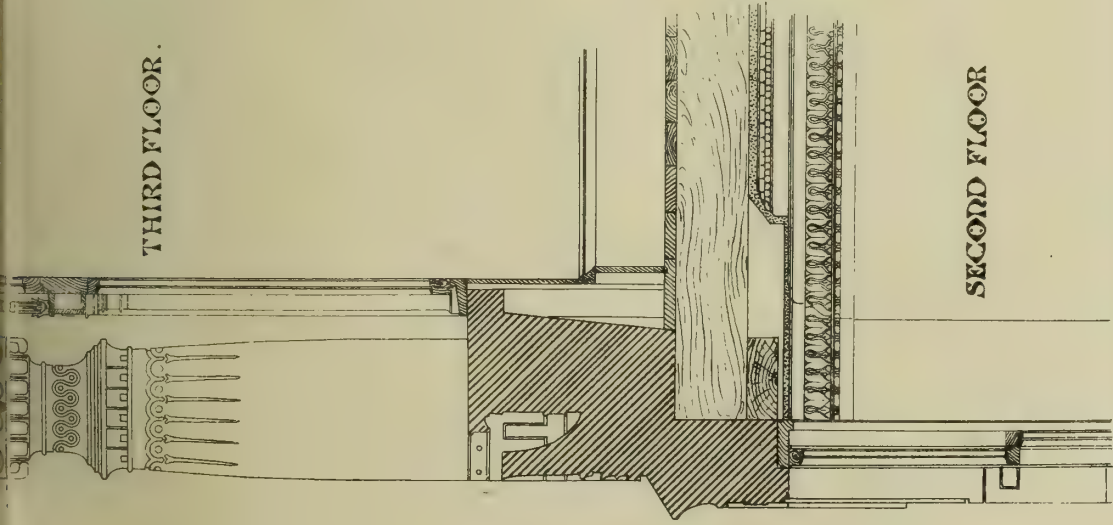
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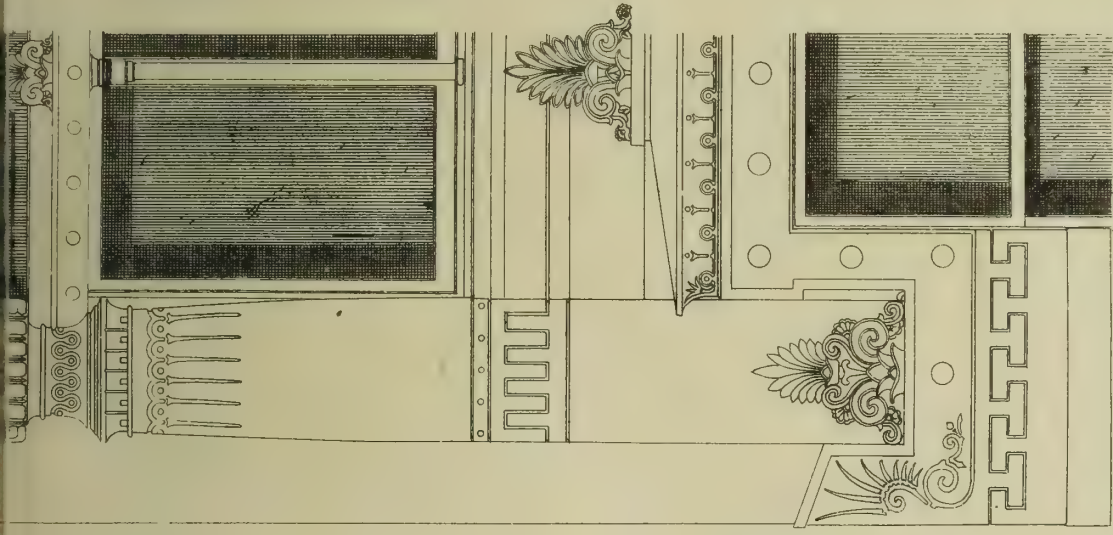
SCALE.



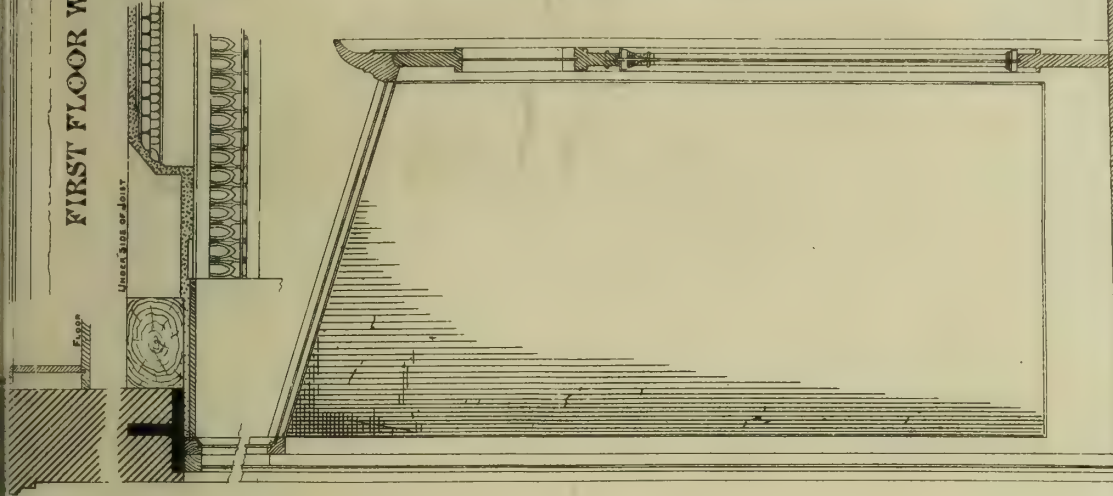
UPPER FLOOR.



THIRD FLOOR.

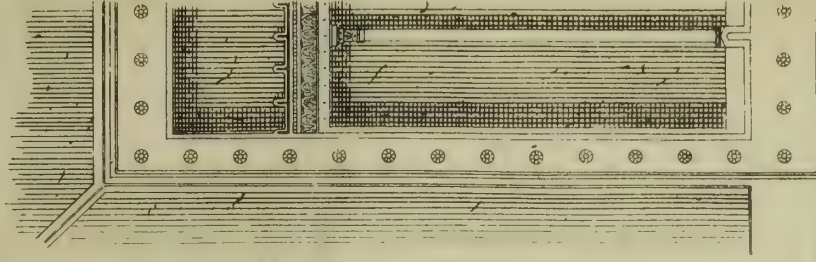


SECOND FLOOR



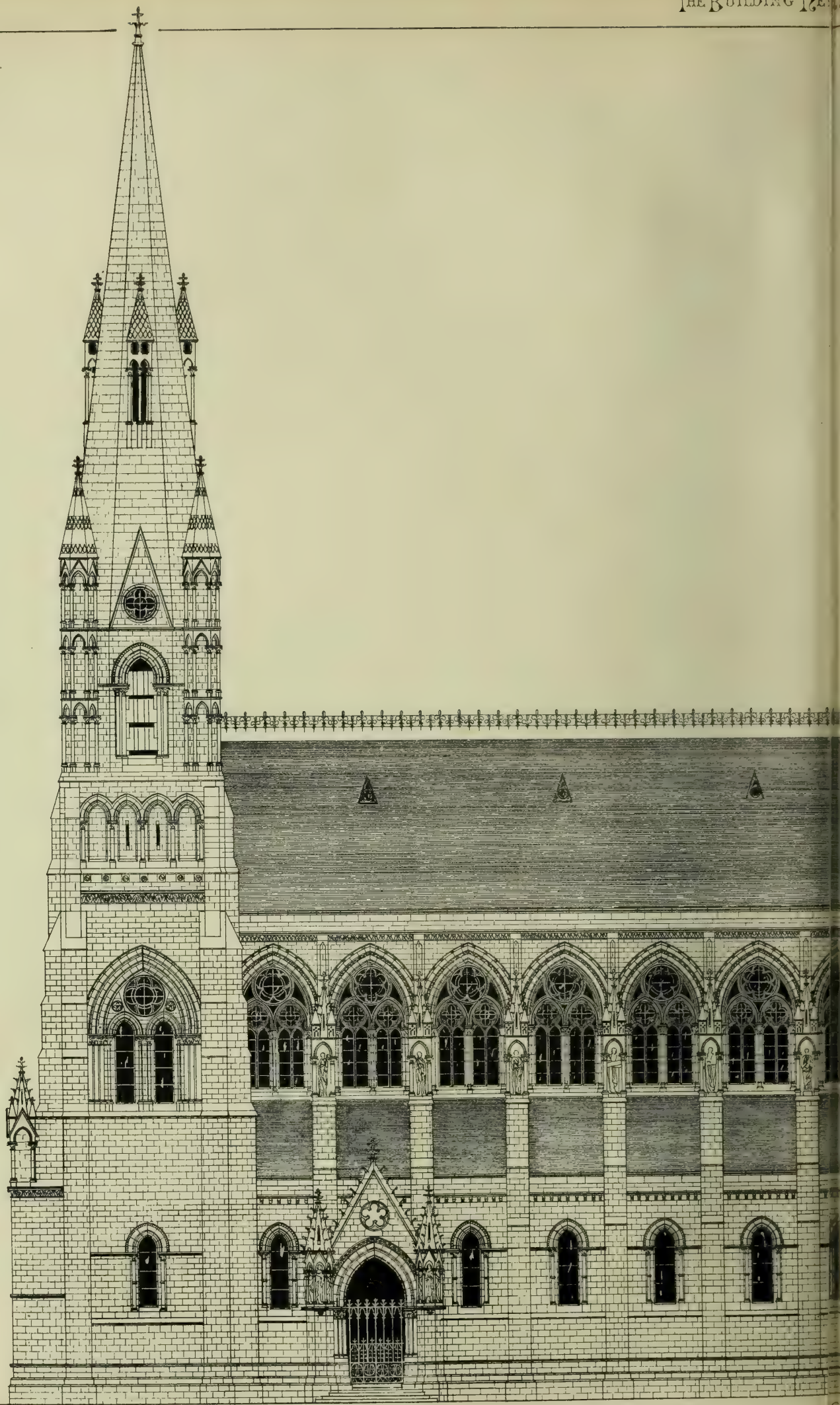
FIRST FLOOR WINDOWS

SHOP DOORS



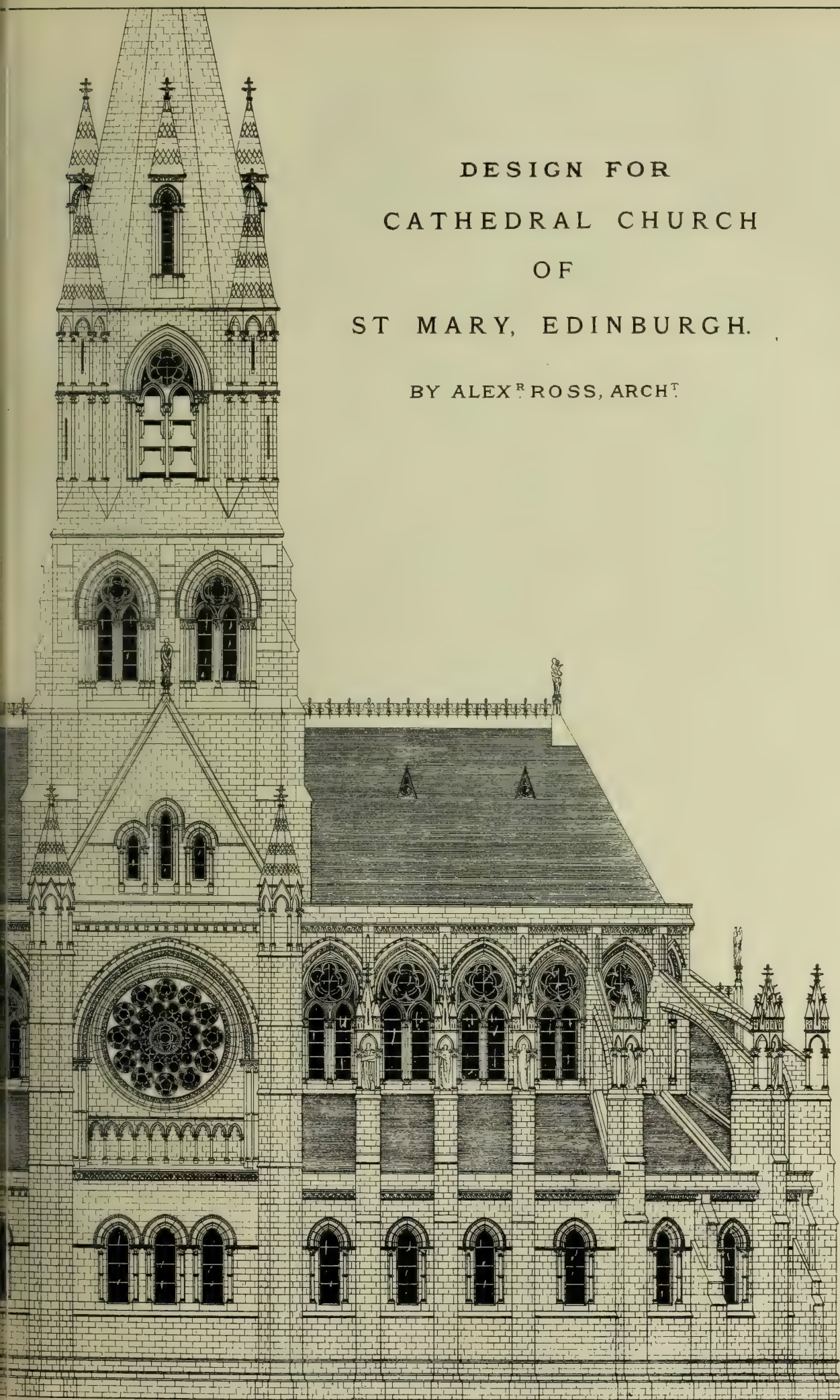
SHOPS AND WAREHOUSES: BATH STREET: GLASGOW: A. & G. THOMSON: ARCH^{TS}.

FIDELITAS.

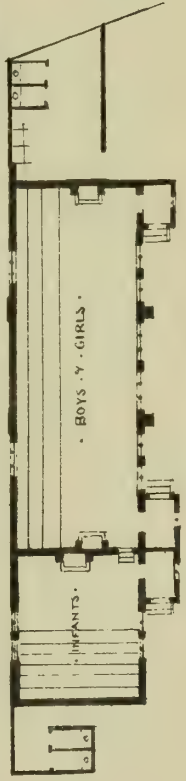
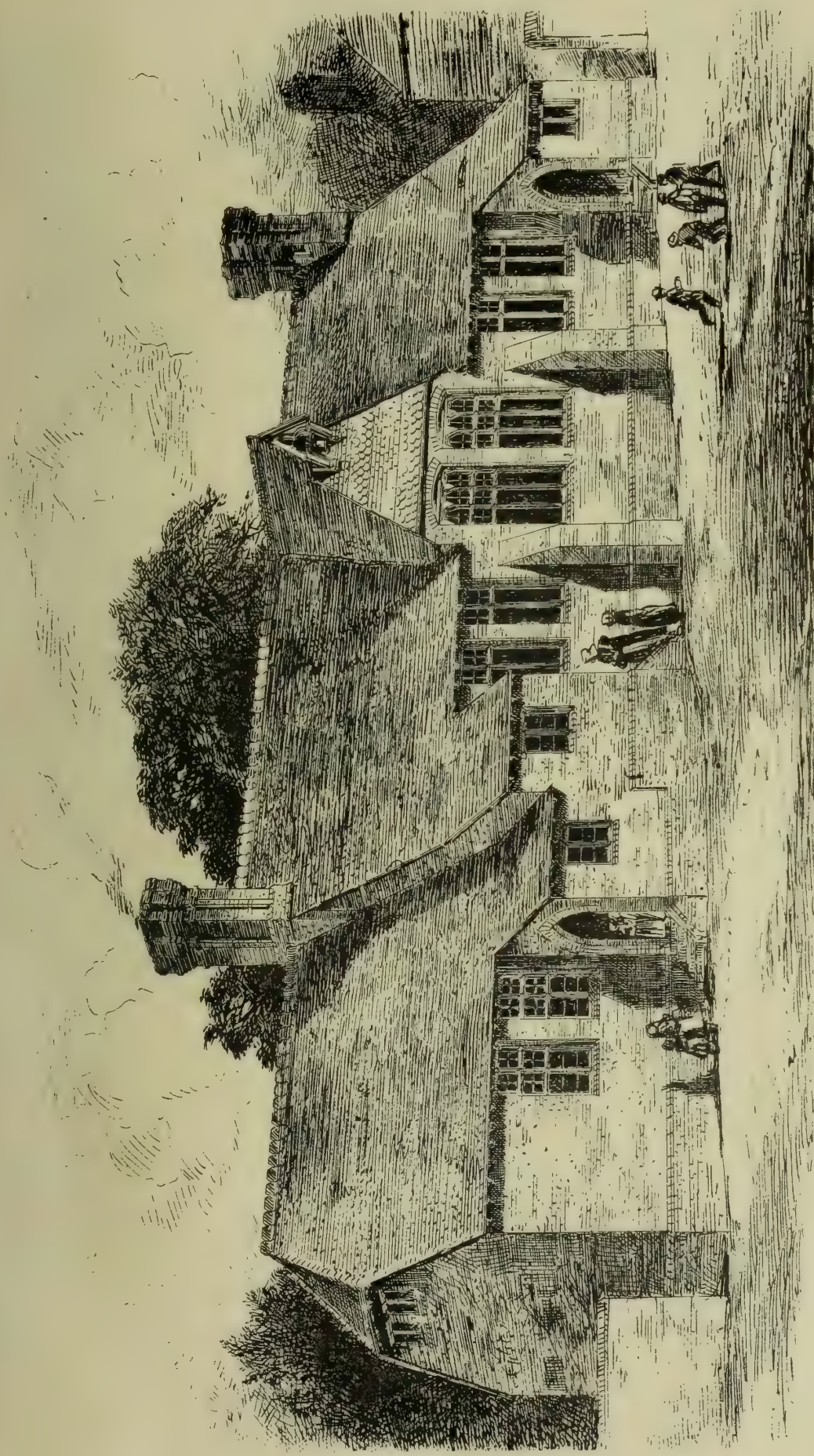


DESIGN FOR
CATHEDRAL CHURCH
OF
ST MARY, EDINBURGH.

BY ALEX^R ROSS, ARCH^T



South Elevation:



Scale of Feet. 0 10 20 30 40 50

NEW NATIONAL SCHOOLS • FLETCHING • SUSSEX •
E. F. C. CLARKE • ARCHT.

Photolithographed & Printed by Lane, Avenue, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 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OUR LITHOGRAPHIC ILLUSTRATIONS.

STREET ARCHITECTURE IN GLASGOW.

We, in No. 908, gave under this heading an elevation of a house in Bath-Street, Glasgow, from designs by Messrs. Alexander & George Thomson, of that city, the well-known architects in Greek. Among our illustrations in the present issue are several of its details. The building is interesting in showing an adaptation of Greek architecture to such comparatively humble subjects as shops and counting-houses, and also the plasticity of the style in the hands of those who know how to use it.

DESIGN FOR EDINBURGH CATHEDRAL.

One of our double-page illustrations represents one of the elevations of Mr. Alexander Ross's design for this Cathedral, about which so much has been recently said. An opinion, based on rumour, prevailed in London that Mr. Ross had received essential professional assistance in making his design. In our criticism of the various competitive designs, a fortnight since, we echoed what rumour reported; and last week we inserted a letter from Mr. Ross, flatly contradicting such report. Mr. Ross has written us since, thanking us for inserting his letter, but at the same time complaining that we aggravated the original offence by repeating what rumour reported. We are sorry if we have in any way wounded Mr. Ross's feelings, or said anything that militates against his professional reputation. The reason why we repeated in the second article what Mr. Ross says was incorrect in the first was that the two articles were intended in the first place to be inserted as one, but on account of press of matter the article was divided into two; and Mr. Ross's letter arriving only just when we were going to press, the objectionable passages in the second article were overlooked. We elsewhere insert some letters on the matter in dispute. We must add, however, that the impression still prevails that Mr. Ross was essentially assisted in the preparation of his designs. We intend giving in a future number some other illustrations, with plan of Mr. Ross's design.

NEW NATIONAL SCHOOL AT FLETCHING.

We give with this impression an illustration of a national school recently erected at the village of Fletching, in Sussex, from designs by Mr. Edward Francis Clarke, architect, London. The building is of local red brick, roofed with brown and red tiles. Mr. Peerless, of Eastbourne, was the contractor.

WHITGIFT HOSPITAL SCHOOLS.

The hospital which gives the name to these schools was founded by John Whitgift, Lord Archbishop of Canterbury, in the year A.D. 1596. The property of the charity having greatly increased in value, the surplus funds have been expended from time to time on schemes sanctioned by the Charity Commissioners. The building, of which we now give an illustration, was erected by the Governors three years ago, "for the education of the sons of respectable tradesmen, professional men, and gentlemen of humble means." It is a day school only. The cost was about £12,000, including fittings and warming apparatus. The material is red brick, with Bath stone dressings. The architect is Mr. Arthur W. Blomfield, M.A.; and Messrs. Mansfield and Price were the builders.

An Examination, under the Metropolitan Building Act, 1855, will be held at the Institute, on Thursday the 30th, and Friday the 31st inst. Candidates for Certificates of Competency to act as District Surveyors are required to submit their applications (in accordance with a Form to be previously obtained at the Institute.)

The new stables just completed for Messrs. Spiers and Pond in Charlotte-street, Blackfriars, have been paved throughout with Claridge's Patent Asphalt.

YORKSHIRE ARCHITECTURAL SOCIETY.

THE annual meeting of the Yorkshire Architectural Society was held on the 9th inst. under the presidency of the Dean of York. The report stated that for the first time for several years the committee had to report the loss of many members by death or resignation, without any increase in numbers. The finances, however, were in a satisfactory condition, and there was a large balance in hand. Referring to what was said last year concerning the publication of *fac similes* of ancient stained glass in the Minster, the committee had to regret that circumstances prevented its progress, so that nothing had been done, although they were very far from giving up the hope that ultimately some steps would be taken for the furtherance of the work. The report next referred to the excursion of the year to Barnard Castle and the inspection of objects of antiquarian interest in the neighbourhood, and concluded by a reference to the progress of the works connected with the restoration of the south transept of York Minster, which, under the able direction of Mr. Street, was being rapidly placed in a safe condition. The officers and committee were re-elected for the ensuing year, and W. D. Husband, Esq., and Mr. Bradley, Precentor's Court, were admitted members of the society. The Rev. G. Ormsby, vicar of Fishlake, read an interesting paper on "Yorkshire Churches and Yorkshire Wills." The paper entered into a variety of details as to the bequests left to churches at York, Beverley, Ripon, Hull, and various other sacred fabrics in several parts of the three ridings, in the fourteenth, fifteenth, and sixteenth centuries, the bequests varying in amount, 1s., 3s. 4d., and 13s. 4d. being the sums most commonly left; but larger amounts in some cases had been bequeathed. The Rev. George Rowe, Principal of the York Diocesan Training College, read a paper on the West Window of St. Martin's Church, Coney-street, York.

THE PRESERVATION OF IRON.

AT a meeting of the Civil and Mechanical Engineers' Society on the 3rd inst., Mr. W. Meakin read a paper "On the Preservation of Iron," in which he reviewed the various means adopted for the purpose, such as (1) the application of paints, cements, &c.; (2) the application of lacquers, oils, &c., and the enamelling processes; and (3) the protection gained by the metals, as galvanising, plating, &c. The necessity of considering iron as a perishable material, and of taking every possible means of guarding it from unnoticed destruction, was strongly pointed by some examples of modern works in which corrosion appeared to be invited. The principles laid down as desirable were (1) to use the iron in the most compact masses possible; (2) to avoid all lodging-places for water, and to arrange for its draining off all parts as quickly as possible; and (3) to require every piece of ironwork to be completely secured by a protective covering before leaving the factory. The present maintenance of so much of the old ironwork was ascribed to the careful "facing" each part received on completion, by being brushed over with various drying oils, and exposed for a considerable time to the "thick smokes" of a wood fire. Thus was formed that "skin" on the iron which all practical men were so unwilling to disturb, though often from a mistaken idea of its superior strength; and this principle of forming a foundation-coat of a resinous or tarry nature, burnt on to the surface of the iron by a heat much greater than that to which it would be subsequently exposed, was strongly recommended for general re-adoption. A discussion followed, in which Messrs. G. Usill, C. Kingsford, E. Perrett, W. F. Butler, C. J. Samuda, E. H. Brewster, and the President (Mr. C. W. Whitaker) took part.

RENDERING WOOD INCOMBUSTIBLE.

A NEW method is proposed by Mr. D. O. Macomber of rendering wood incandescent. Various attempts have been before this made to protect wood against the action of fire, but these have hitherto been confined to the exterior surface of the wood operated upon. A coating of silicic acid has been painted over the wood, but this has served little other end but to blunt the tools of the carpenter. Mr. Macomber's proposal is to withdraw the natural juices from the newly-cut wood, and to supply their place by chemical fluids which will render the wood

throughout impervious to the action of fire. What Mr. Macomber means by this is that the wood will not be liable to feed flames, for no power on earth can prevent wood smouldering when exposed to fire. A contemporary suggests to Mr. Macomber that his invention has been anticipated by many a housemaid who daily, during the present moist winter, has laid the morning "fire" (as she facetiously calls it) with wood which possesses all the qualities which he proposes to produce by his invention. It will smoulder, but flame it most assuredly will not.

LAVA AS A BUILDING MATERIAL.

THE Lavas are extensively used in many parts of the Continent for building purposes. They are generally highly silicated, the principal rock of the kind, known as trachyte, containing 50-67 per cent. of silica. This term is generally adopted for volcanic rocks having a rough felspathic base formed of sanidine, oligoclase, with augite and mica, silica, or hornblende. When it contains crystals or grains of free quartz or sanidine, it becomes trachyte or porphyry. Trachyte is, as a rule, of a light grey colour, occurring in sheets or thick beds alternating with basalt, or, as in the district of Auvergne, forming the central cones of volcanoes. The lavas of Central France have been employed from the time of the Romans in churches and bridges; while that of Andernach, obtained from subterranean caverns at Niedermendig, is now chiefly used for the well-known millstones, and is exported to all parts of Europe and Britain. The utilisation of the lava rocks for this purpose is of very ancient date, the corn-mills found at Pompeii being formed of ancient lava-sheets obtained from Vesuvius.

THE BUILDING ACT.

ON Monday afternoon last Dr. John Liddle, Medical Officer of Health for Whitechapel, read before the Health Section of the Social Science Association an able paper "On the Defects in the Sanitary Provisions of the Building Act, 18 and 19 Vict., c. 122, with a few Suggestions for their amendment." After some introductory observations, the author said:—I shall confine my remarks to the two points indicated in the title which I have chosen, namely, "The Defects in the Sanitary Provisions of the Building Act, with Suggestions for their Amendment;" for were I to occupy your time in bringing before you an account of the wretched condition of the abodes of the poor, and the evil consequences arising therefrom in their social, physical, and religious condition, I should not only be following in the steps of many noble and learned men who have recently delivered powerful and rhetorical public addresses on this topic, but from which little or no practical benefit has resulted; for while the evils from bad house accommodation have been graphically pointed out, the orators have been silent regarding the practical remedies required for abating the evils which surround the poorer classes. It is only by taking down gradually all those houses which are unfit for habitation that any permanent benefit will accrue to the public health; but the difficulties which are in the way of so dealing with the numerous unhealthy houses are so great, owing to the reluctance of local boards to confiscate property (which they are enabled to do under the provisions of the Artisans and Labourers' Dwellings Act), that they are unwilling to have recourse to their powers. The Artisans and Labourers' Dwellings Act may, however, be subsequently so modified as to enable local boards to demolish all houses which are unfit for habitation, without doing injustice to any party.

The healthy housing of the population is the foundation of all sanitary improvements; for unless stringent laws are passed to prevent the erection of unhealthy dwellings, the numerous statutes relating to the public health will be of comparatively little benefit. The radical defect in the Building Act is, that it is not complete in itself, but other Acts of Parliament are incorporated with it; and hence an unnecessary amount of trouble is imposed upon builders in having to consult the district surveyor in some matters relating to the building of a house and the local board in others; and no one authority seems to be responsible for seeing that a house is so constructed as to be fit for habitation.

The first sanitary defect in the Building Act which I shall mention is contained in the first schedule annexed to the Act. In the first para-

graph of this schedule it is provided that every building shall be inclosed with walls constructed of brick, stone, or other hard and incombustible substances, and the foundations shall rest either on the solid ground or upon concrete, or upon other solid substructure. At first sight this paragraph may appear to afford ample security for the proper and healthy condition of the foundation of a dwelling-house, but as builders are exceedingly clever in driving through an Act of Parliament, the simple rules, as laid down, are not always observed. The words "solid ground" are so vague, that a temptation is offered to the builder to evade the intention of this provision; and solid ground may mean, in his opinion, ground which is made of such miscellaneous articles as are found in those places where the public are invited to deposit dry rubbish. As to the use of concrete, which is required by the Act to be used for the foundation, not a word is said either about the kind of concrete, or the thickness of the concrete on which the foundation of the house is to be laid. I may here remark that no rules are laid down as to the quality of the bricks which are to be used in laying the foundation of a dwelling-house; and hence it not unfrequently happens that old and worn-out bricks, which have done duty in the formation of sewers, and which have become saturated with filth of all kinds, are made to serve again, on the score of economy, for the foundations of dwelling-houses. Again, no provision is made for the insertion between one of the layers of bricks of a layer of slate or of some other impervious material for the prevention of the rising of damp in the walls.

The second sanitary defect that I shall notice is, that no provision is made for the proper making up of the roads and for the efficient drainage, both deep and superficial, before any dwelling-house is permitted to be occupied. Under existing arrangements, houses are often built in swampy places, which houses, when completed, are announced as ready to be let for habitation. Such houses are frequently disease-traps. They are no sooner occupied than the unfortunate tenants begin to lose their health, and many of them consequently become a burden upon the ratepayers.

The fourth sanitary defect is the entire omission from the Act of all mention of drainage, and other necessary appurtenances to a house; such as the water-closet or privy, water supply, ventilation of the basement floors, and ventilation of the drains.

The fifth sanitary defect is in the 29th section, which is as follows: "Every building used or intended to be used as a dwelling-house, unless all the rooms can be lighted and ventilated from a street or alley adjoining, shall have in the rear, or on the side thereof, an open space exclusively belonging thereto, of the extent at least of one hundred square feet." The object of this section is obviously to secure a sufficient open space for the ventilation of such rooms as cannot be ventilated from the street, and a square space of 10ft. by 10ft. might be adequate for the purpose; but as a hundred square feet is also 10ft. by 1ft., it is manifest that a space so provided, although in accordance with the provisions of the Act, is useless for the purpose of ventilation; besides, the section does not provide for a window being made to open out into that space. All sorts of schemes are adopted by builders to defeat the intention of this section, and unfortunately most of such schemes are successful, as several cases which have come under my notice in the Whitechapel district amply prove. It is certainly a difficult matter so to frame a clause that shall be both effective for proper ventilation, and which cannot be evaded either in letter or in spirit. It has been suggested to me by a district surveyor of considerable experience, that the 100ft. super. at the rear of a house should be, say, two-thirds of the width of the house, by an even depth. In valuable shop property this gentleman observes, "back yards cannot be left, but the space—100ft.—should be provided above the level of the shop."

The sixth defect is that the Act does not provide an open space at the back or side of every house, and that windows shall be made to open out into this open space, so that every house shall have a thorough ventilation. The enactment of such a clause would prohibit the further building of houses back to back, which is certainly a most abominable and unhealthy proceeding.

The seventh defect is, that the valuable section of the Building Act of 1844, relating to parapet walls, is omitted in the present Act. That the framers of the Building Act of 1844 were more alive to the advantages of sanitary science than

were the framers of the present Building Act is manifest from the following observations, which are made in the preamble of that Act. It is stated in the preamble of the Act of 1844, that "Inasmuch as in many parts of the metropolis and neighbourhood thereof, the drainage of the houses is so imperfect as to endanger the health of the inhabitants, it is expedient to make provision for facilitating and promoting the improvement of such drainage. And forasmuch as by reason of the narrowness of streets, lanes, and alleys, and the want of a thoroughfare in many places, the due ventilation of crowded neighbourhoods is often impeded, and the health of the inhabitants thereby endangered, and from the close contiguity of the opposite houses the risk of accident by fire is extended, it is expedient to make provision with regard to the streets and other ways of the metropolis for securing a sufficient width thereof. And forasmuch as many buildings and parts of buildings, unfit for dwellings, are used for that purpose, whereby disease is engendered, fostered, and propagated, it is expedient to discourage and prohibit such use thereof." It would be well to affix a similar preamble to the contemplated new Building Act.

The eighth sanitary defect is the non-provision of eaves gutters to a house. From the absence of efficient eaves gutters, it is no uncommon thing to find that the water from the roof has penetrated through the wall of the house, thus rendering it damp and unhealthy.

The ninth sanitary defect is, that the Act does not provide that every room in a dwelling-house shall be of such a size and so constructed as to be fit for habitation.

The tenth defect is, that no effectual provision is made for the speedy egress of the people when assembled in large numbers in places of public entertainment; neither is any provision made for the proper ventilation of such buildings. It is true that the Metropolis Local Management Act gives direction to the medical officer of health for the district to point out the most efficient modes for the ventilation of churches, chapels, schools, lodging-houses, and other public edifices; but no power appears to be given to the local boards to enforce the recommendations of that officer; and hence very little attention has been given to this matter.

The eleventh sanitary defect is that no provision is made with regard to entrances to alleys, so that every new court shall be made a thoroughfare. In the Building Act of 1844 it was made imperative upon the builder of an alley to provide two entrances thereto (thereby preventing the formation of *culs de sac*), each opening being at the least of the full width of the alley, and one of the two, at the least, open from the ground upwards. The evil of allowing the making of new courts and alleys without sufficient ventilation is provided for to a certain extent by the bye laws of the Metropolitan Board; but the bye laws do not require that there shall be two entrances to any newly-built alley, and certainly too much in this matter is left to the discretion of the Metropolitan Board.

The twelfth and last sanitary defect that I shall point out on this occasion is, that the width of a new street is not made to be dependent on the height of the buildings to be erected on either side of such street. In the Building Act of 1844 it was required that every newly-formed street shall be of the width of forty feet at the least; but if the buildings fronting any street be more than forty feet high from the level of the street, then such street must be of a width equal, at the least, to the height of the buildings above such level.

Having thus briefly enumerated the principal sanitary defects in the Building Act, I submit the following suggestions as amendments. A Building Act should, in the first place, provide:—

1. That no house in any new street shall be occupied as a dwelling-house unless a sewer had been constructed along such street, and a communication by a properly constructed and ventilated drain made from the house to the sewer. The ventilation of the house drain, into which usually passes the soil-pipe of the water-closet, may, as I am informed by Mr. S. W. Iron, the surveyor to the board of the Whitechapel district, be easily carried out by fixing a small pipe in the upper part of the soil-pipe, and carrying the same above the roof of the house.

2. That before any house is permitted to be occupied, the roads and footways shall be paved, and the surface drainage properly provided for.

3. That before the building of any new house

is commenced, plans of the drainage and of all the sanitary arrangements of the house shall be submitted for approval to the local board. This board shall be invested with power to compel the builder of any new house within the district so to alter his plans, if necessary, for the healthy occupation of the house, as the board under the advice of its officers shall direct.

4. It shall likewise be made compulsory upon every builder to provide a separate water-closet or privy, and ashpit for each house within the curtilage of the house. This provision would prevent the erection of public privies in courts occupied by the poorer classes, which are now, for the most part, public nuisances, and injurious to the health of the people.

5. That during the progress of the building of any house, the surveyor to the local board shall be required to inspect the foundation thereof; and if such surveyor be of opinion that the materials which are being used for such foundation are not proper for the purpose, he shall make known his objections to the builder, and shall report the same to the board. This report having been made, the board shall have power to prevent the use of all such improper materials.

6. That the walls and foundations of every house shall be so constructed as to prevent the rise of damp.

7. That every new house shall at all times have at the rear an open space of sufficient extent for the thorough ventilation of the staircases and passages. The extent of the open space to be determined by the Act (say 100 square feet), but the plan of this open space shall be approved by the local board, before the builder is allowed to complete the building.

8. That the floors of every house shall be properly ventilated, and that the floors of the basement shall not be laid upon the bare ground.

9. That the back yards of every new house, and of the houses now in existence, shall not be built upon without the sanction of the local board; and in no instance shall the open space in the rear be less than 100 square feet, and so arranged with regard to the house as to be sufficient, in the opinion of the local board, for the purpose of ventilation.

10. That all old buildings, such as warehouses, stables, &c., shall not be converted into dwelling-houses, unless the plans as regards all the sanitary arrangements shall have been submitted to, and approved of by, the local board.

11. That the same law as regards the width of new courts and alleys shall be applied to old courts, when any of the houses therein have been pulled down; for, if it be deemed necessary that new courts shall be, for the purposes of health, of a certain width, it is equally as necessary for the public health that the old courts should be equally as wide.

12. In order that every new street shall have an adequate supply of sun-light, which is so essential to health, the buildings on either side of the street shall not be permitted to exceed in height the width of the street. This regulation would be of the utmost importance in courts which are not thoroughfares, but such is the desire of owners of property to make the most out of it (and unfortunately such a proceeding is sanctioned by the Legislature), that they are perfectly regardless of the rights of the public to breathe the pure air of heaven and enjoying the light of the sun.

13. That in consequence of danger to the public while walking along the streets by the falling of snow or slates from the roof of any house unprovided with a parapet wall, no new house shall be considered as completed unless the same is provided with a parapet wall.

14. That every house shall be provided with eaves gutters and stack pipes. No house shall be allowed to be occupied unless there shall be a passage leading from the front door to the back yard; and unless the staircase leading to every room shall open into a landing, so that each room in every house shall be distinct and separate from the other rooms. Under present arrangements it is not uncommon to find that builders, on the score of economy, build houses with the front door opening direct from the sitting-room on the ground floor into the street, and the stairs leading to the upper rooms opening directly into and forming a part of the lower room, so that the foul air of the lower room is ventilated by means of the staircase into the room above. Such a faulty arrangement also destroys the privacy and comfort of families, by converting rooms so arranged into thoroughfares. There are some houses in the Whitechapel district in which the

tenants of one room are obliged to carry all their filth through their neighbour's room before it can be thrown into the privy or drain in the back yard. This proceeding is not only highly indecent, but in case of epidemic disease is dangerous to health, the germs of disease being frequently contained and given off in the excrement of the sick.

15. That no house shall be permitted to be occupied, unless the person letting such house shall have a certificate, signed by the surveyor and medical officer of health to the local board, that the same is fit for healthy occupation, which certificate shall be shown to every incoming tenant.

16. That in consequence of numerous unhealthy houses, which are continually being built in the suburbs of London, and also in other large cities and towns, and the suburbs thereof, the area of the new Building Act shall be extended to all large towns and populous cities in England, and that the carrying out of all the sanitary arrangements of habitable buildings shall be entrusted to the local boards, who by their several officers would be able to superintend the erection of all houses.

17. That the Building Act shall contain a section to give power to the local board to purchase such property, at a moderate compensation, as has been condemned under the Artisans and Labourers' Dwellings Act by the medical officer and surveyor of the local board.

18. That in all cases of dispute between the local board and the builder, in regard to plans of drainage and other sanitary provisions, power of appeal to a competent authority shall be given.

In conclusion, permit me most respectfully to urge upon this Association the desirability of forming, with as little delay as possible, a deputation to the Local Government Board, and urging upon its notice the pressing necessity of the Government bringing in such a Bill as shall effectually prevent the further erection of unhealthy houses; for so long as houses unfit for habitation are allowed to be built, the labours of the sanitary officers will be comparatively of little avail, and the public will continue to suffer from many diseases which are preventable.

A very important discussion ensued, of which we will give a condensed report next week. The speakers were the Chairman (Colonel Beresford, M.P.), Dr. Hardwicke, Mr. Holland, Mr. George Godwin, Dr. Ross, Mr. Edwin Chadwick, Mr. Baldwin Latham, Professor Donaldson, Mr. J. P. Seddon, Mr. Harry Oliver, Mr. Thomas Morris, and Mr. Banister Fletcher.

DIOCESAN ARCHITECTS IN IRELAND.

THE following appointments have been made under the new state of things by the Diocesan Councils in Ireland:—Dioceses of Down, Connor, Dromore—Thos. Drew, F.R.I.A.I.; Tuam, Meath—R. B. Phillips, C.E.; Limerick, S. Cox, C.E.; Killala, Achonry, Cashel, Emly, Ardfer, Aghadoe—J. F. Fuller, F.R.I.B.A.; Cork, Cloyne, Ross—W. H. Hill, C.E.; and Glendalough, G. Henderson, F.R.I.A.I. There still remain several dioceses vacant.

INSTITUTION OF SURVEYORS.—At the ordinary general meeting, held on Monday, January 13th, the following names were read and passed to be balloted for on February 10th, 1873. As Members—John Morgan Davies, Froodvale, Llandilo, Carmarthenshire; Henry Drew, Exeter; Richard Gouthwaite, Lumby, near South Milford, Yorkshire; Thomas Miller Rickman, 8, Montague-street, Russell-square, W.C.; John Woodcock, 20, Darlington-street, Wolverhampton. As Associate—Walter Feilde Ingram, 25, Gresham-street, E.C. The following candidate was balloted for and declared duly elected. As member—Robert Castle, Merton-street, Oxford.

THE BOSTON FIRE.—The Mayor of Boston, in the course of his annual Message, refers to the recent great fire in that city, and says that the number of buildings destroyed was 776, of which 67 were wooden structures, the others being of brick or of stone. The buildings destroyed were assessed for taxation purposes at 13,591,000 dols., but he estimates that it will cost at least 18,000,000 dols. to replace them. The personal property destroyed was valued at 60,000,000 dols., so that the total loss is about 78 million dols. Fourteen persons are known to have lost their lives, including seven firemen.

Building Intelligence.

CHURCHES AND CHAPELS.

HADNAL, SHROPSHIRE.—The parish church has been reopened after restoration. The improvements comprise the removal of the gallery and pews, and of the plaster from the walls, which have been repaired and pointed internally, dressed stone being substituted for plaster in the window-jambes, heads, and sills. New boarded and quarry floors and a warming apparatus have been provided, and the nave is fitted with open seats of pitch pine. A trench has been formed round the church, and the churchyard has been properly drained. The contractors were Messrs. Bowdler and Darlington; the warming apparatus was supplied by Mr. W. Dodwell. Mr. E. Haycock was the architect. The outlay has been £321.

INCORPORATED SOCIETY FOR PROMOTING THE ENLARGEMENT, BUILDING, AND REPAIRING OF CHURCHES AND CHAPELS.—This society held its usual monthly meeting on Monday, at the society's house, 7, Whitehall, S.W. Grants of money were made in aid of the following objects, viz.:—Building a new church at Dafen, in the parish of Llanelly, Carmarthen; rebuilding on a new site the church at Poulton, near Cricklade; improving the church at Bognor, Sussex; and enlarging or otherwise increasing the accommodation in the churches at Dyserth, near Rhyl; Earnley, near Chichester; Efeneclyd, near Ruthin; Gorleston, near Yarmouth; Maidstone S. Stephen's; Medbourne, near Market Harborough; Meerbrook, near Leek, Stafford; Mothvey, near Llandovery, Carmarthen; New Quay, near St. Columb Minor, Cornwall; Saddington, Leicester; Salgarth, Brecon; and Tooting Parish Church, Surrey; under urgent circumstances the grants formerly made towards building the church at Llanelly, and towards enlarging and restoring the churches at Downe, Kent; and Gough-square, Holy Trinity, London, were each increased. Grants were also made from the School-church and Mission-house Fund towards building school or mission churches at Cwmfelin near Gellgae, Glamorgan; Jarro-won-Tyne, Durham; Moutnessing, S. Giles, Essex; and Royton, near Oldham, Lancashire.

YORK MINSTER.—The restoration of the south transept of York Minster is proceeding in a satisfactory manner. The instructions given to the clerk of the works, Mr. Bradley, by G. E. Street, Esq., architect, on his last visit to York, are being strictly carried out. The rebuilding of the second half of the east wall of the transept is progressing towards completion, the workmen being now engaged in the fixing of the arches. The whole of the new masonry is being laid in with Portland cement of the best quality. The preliminary steps are being taken for supporting the weight of the roof on the west side whilst the wall is being rebuilt, a work which will be commenced in the spring. When these walls are finished, and the roof completed, the most difficult part of the works will then be accomplished, and the remainder of the restoration will be, comparatively speaking, of easy execution.

BUILDINGS.

MINSTERLEY.—A Vicarage has been built for this parish, principally at the expense of the Marquis of Bath, who also gave the site, and of the Ecclesiastical Commissioners, who made a liberal grant. It consists of drawing-room, dining-room, study, kitchen, &c., and six bedrooms, and is built of red brick, relieved with bands of white and black. Yellow Grinshill stone has been used for the heads, mullions, and sills to windows. The roof is tiled. The work has been carried out by Messrs. Bowdler and Darlington, under the direction of Mr. Edward Haycock, Architect, Shrewsbury, at a cost of about £1,100.

MINSTERLEY HALL, SHROPSHIRE.—This fine old Manor-House has been lately restored, by the Marquis of Bath. The timber framing, exposed to view on the removal of the plaster which covered the exterior, has been replaced with new oak where decayed, and 9in. brick-work, plastered, has been used for the filling in, adding thereby considerably to the comfort of the occupiers of the house. Windows with oak frames, mullions, and transoms have been substituted for plain sashes where the latter had been inserted. The moulded barge boards, hip-knobs and brackets are exact reproductions of the old, which were decayed. The west or principal front

consists of three wide and lofty gables, with a lower and richer one at the north side running through to the east front, and probably of earlier date. On the east or garden front the two large dormers, of which the valley pieces indicated their size and position, have been restored. The roofs have been covered with Ridge Hill tiles. Internally the panelling has been continued round the hall and the screen opened out. Other improvements and necessary repairs have also been carried out. Mr. Haycock, of Shrewsbury, was the architect; the contractors being Messrs. Bowdler and Darlington.

NORTHALLERTON.—A new market is erecting at Northallerton. On the ground floor are—a covered market, 60ft. by 32ft.; seven shops; and entrance hall and staircase to the large hall. The floor of the market will be formed with Dennett's patent arching carried on iron girders and columns. The first floor contains a large hall, 72ft. by 32ft. A gallery is carried across one end, and the platform, with semi-circular recess behind, is placed across the other. Behind the platform are retiring rooms, &c. The large hall will be a handsome room, with a panelled waggon-headed ceiling, divided by carved and moulded trusses and ribs, the panels being decorated in colour. It is calculated to seat upwards of 600 people. The buildings are of brick, with stone dressings, and the style adopted is Italian, freely treated. The architects are Messrs. Ross and Lamb, of Darlington.

SCHOOLS.

AMERSHAM.—A New National School is to be erected at Amersham, Bucks, to accommodate 284 children, and an infant school at Woodrow, in the same parish for 30. The commission has been entrusted to Mr. Arthur Vernon, Architect, High Wycombe.

BUCKS.—Two New National Schools, with class rooms and teachers' residences at Great Missenden and Lee, Bucks, were on Thursday, the 16th inst., opened by the Duke of Buckingham and Chandos. The buildings are intended to supply the educational wants of Great Missenden parish, under the national system. The school-rooms accommodate together 210 scholars. They are of brick and stone, in Early Gothic design, with uncoloured brickwork inside. The cost of school-rooms only has been about £4 per head, and the total expenditure somewhat under £1,500. The contractor was Mr. F. Taylor, of Uxbridge, and the architect, Mr. Arthur Vernon, of High Wycombe. The whole of the works under the contract were executed at about £25 under the stipulated sum.

"BUILDING NEWS" SCHOOL-PLANNING COMPETITION.

THE following are the authors of the plans referred to last week in the report by the referees in this competition:—

"We Live to Learn," Fred. Sampson, Grove-terrace, Kirkgate, Wakefield; "Nunquam Exspes," Ed. Street, Ellington-square, Barnsbury; "R. R. R." (on a shield), John Gibson, Market-street, Malton; "R. R. R.," John Sanson, 25 Offord-road, London, N.; "An Advanced Infant," Francis W. Edwards, Wellington Chambers, Westgate, Bradford, Yorks; "Creo," Hy. Higgins, junr., 177 S. Vincent-street, Glasgow; "Schule Laddie," L. G. Summers, Duke-street, New Basford, Nottingham; "Light," Charles H. Flack, 3 Albert-villas, Commercial-road, Peckham; "Utility," Daniel Grant, Preston, Lancashire; "Educate—Liberate," M. B. Adams, 7 Gloucester-place, Brighton; "Fides," Fowler and Street, 32 Fleet-street, London; "Lux," W. O. Fellow, 1 Hill's Buildings, Exeter; "Pro Patria," Jas. Ledingham, 29 Hanover-square, Bradford, Yorks; "Qua Vere Verum," Arnold W. Kershaw, Gomersal, Leeds; "Spectemur Agendo," S. H. Fowler Jones, 3 Low Ousegate, York; "Tempora Mutantur," Geo. Coutts, 24 John-street, Aberdeen; "This it is, and Nothing More," W. Brown, Messrs. Salmon, Son, and Ritchie, 141 West George-street, Glasgow; "Three Compasses," Frederick Thompson, 22 Old Burlington-street, W.; "Vivo in Spe," no name; "K," no name; "Excelsior," H. G. McLachlan, 17 Redcliffe-street, S.W.; "Two Heads are better than One," Alfred S. F. Kerby, Walter J. N. Millard, pupils at Goutly and Gibbins, architects, Brighton; "What Will Be, Will Be," Entwistle and Stead, 3 Maudland Bank, Preston, Lancashire; "Laborare Est Orare," Ernest Odgers, 12 St. Michael's-terrace, Plymouth; "Spes," Charles Tombs, 19 Duke-street, Leamington; "Honoris Causa," W. D. Church, 3 Isabella-road, Upper Homerton; "Robur," W. Robinson, 101 Forest-road, Dalston; "Ausus Sum," James McLaren (Beard and Thomas), 201 West George-street, Glasgow; "Spero," Herbert Isett (at Hope and Jardine's), 18 Exchange buildings, Bradford; "Valeat Quantum Valere Potest," J. Mountford Hay, 2 Princes-street, Bath; "A School for Scandal," W. F. Flockhart (at Mr. McLeod's), 161 Hope-street, Glasgow; "Points," W. A. Hebbler, 45

* Not "Ergo," as stated last week.

Renfrew-road, Kennington-Jane; "The Brilliant Star," E. H. Banner, Park Lodge, Princess-park, Liverpool; "Tempus Fugit," J. M. Porter, 10 Grove-place, Clay-place-lane, Leeds; "Trefoll," John Johnson, 68 Castle-street, Forfar.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for "Situations Wanted" are inserted at a charge of one shilling for the first twenty-four words, and sixpence for every succeeding eight words.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—A. H. B.—J. M.D.—T. W.—J. P. F.—A. R.—W. E. D.—E. T. S.—W. C. J.—A. R.—S. and S.—J. P. jun.—J. B. R.—B. R.—C. G. M.—G. A. F.—G. A. C.—H. and Sons.—R. E. E.—Rev. Dr. A.—E. and J. M.—W. B. and Sons.—C. G. and Co.—S. O.—J. H. and Co.—G. M. and Co.—Junius.—E. W. G.—W. and B.—J. P. S.—A. R.

On account of the Index taking up 24 columns of this week's number, many articles, reports, and letters are left over.

J. E. T.—Conditions of BUILDING NEWS Church Planning Competition will be given in our next number.

W. W.—Your letter on Quantities next week.

"THE Measurement of Timber" next week.

Mr. GILDARD, Glasgow, in a letter says, "Mr. Ross is a man who seems to have found himself famous about as suddenly as Byron did." But by whose assistance? This question now demands a definitive answer.

J. SMITH, Droitwich.—Your agent misinformed you. The number for January 10 is NOT out of print.

A NEW SUBSCRIBER.—We do not attempt to advise in matters involving technical law. Our opinion is that you would be entitled in equity to make the windows.

WILLIAM WEBBER.—Not now.

C. F.—Your Intercommunication query is an advertisement.

W. R. W.—The annual subscription to the Architectural Association is 10s. 6d. You must be the best judge whether it would pay to have books sent 300 miles.

SUBSCRIBER.—You say "Do not inundate us with author-praised unsuccessful designs." We shall not inundate you with such designs, but shall occasionally give them. Our experience teaches us that certain unsuccessful designs possess more merit than successful ones. Because a design is executed, or about to be executed, is no guarantee of its excellence. We think that when a suggestion like the above is made, the suggester should inclose his name and address, so that the Editor might know who is addressing him.

Correspondence.

ART AND DESIGN.

To the Editor of the BUILDING NEWS.

SIR,—As this subject has attracted much attention of late, through Sir Arthur Helps's observations thereon at Portsmouth, in these words—"Let us get rid of inaccuracy, &c.," it should also be shown in the Press, by your kindness, that inaccuracy commences in our schools of art by pupils not holding the pencil aright, as seen in the Bath Forum School of Art, where some 60 boys were instructed, and only one or so held the pencil right, according to a surgeon holding the dissecting knife, as an example of the scientific mode of holding the pencil and pen. Other inaccuracies exist in the pattern of nothing for pupils to copy, whereas Nature is full of examples that are worthy of notice, such as are represented in drawings from nature from the microscope by Leeuwenhoek, wherein the first lessons in drawing in parallel, horizontal, and perpendicular lines are available, besides in patterns for artistic work. Furthermore, the performances of celebrated artists in our weekly periodicals and other works show sad falling away from Hogarth's criticism of art and design. The question now

is, should Science and Nature be neglected in preference to men's crude notions of the present day? Again, the drill is introduced into schools. Wherefore should pupils be suffered to lounge and appear careless of their work, whilst elegance and gracefulness of the person, and freedom of the thumb, fingers, and wrist would add to the well-being of every pupil. Again, teachers of drawing expect their students to draw straight lines, which they cannot draw themselves, and which do not exist in nature. With these preliminaries, is it too much to suggest a discussion of the subject, in private and public meetings, to consider, before we commit further inroads in inefficiencies, whilst some ten or more objects from nature are ready for examination to supersede present plans? Let us get rid of rubbish instead of cherishing "oily talk" from the Privy Council amidst the national disgrace in artistic drawing.—I am, Sir, &c.,

WILLIAM PARKER, M.R.C.S.

11, Southcot-place, Bath, 18th January, 1873.

THE EDINBURGH CATHEDRAL DESIGNS.

SIR,—Your remarks last week, and the rumours which have been afloat in the profession as to the authorship of Mr. Ross's design for the Edinburgh Cathedral, have been met with a decided and impetuous contradiction from that gentleman himself, in his letter published in your last issue. Without discussing the grounds upon which the opinion had been formed that Mr. Ross's design was not altogether his own, in justice to the gentleman whom Mr. Ross admits he specially engaged for the work, some reply should be made to his letter.

In engaging special assistance, without public acknowledgment, for such a competition, Mr. Ross only did what many architects are in the habit of doing; and however much, in the interests of art, such a custom may be deprecated, yet the practice is not so uncommon as to render it open to serious criticism.

Mr. Ross's letter implies that his design was prepared by himself, and worked out entirely under his own direction; that he alone is its author, and that to him only should be awarded any praise it may deserve.

This emphatic repudiation of all external assistance on a work so important, and in the face of general opinion, must be my excuse for stating that I was one of a few gentlemen who saw the original sketches for the design in the office of a London architect, Mr. Geo. Freeth Roper, before they were submitted to Mr. Ross. These sketches of Mr. Roper's were almost identical with the design as exhibited, and therefore, to quote your own language, "we do not think we wrong Mr. Ross by attributing much of the credit due to the able set of drawings sent in in his name to extraneous and English influences."

I enclose my card.—I am, Sir, &c.,

"CUI HONOR, HONOREM."

January 21st, 1873.

[We have received confirmatory evidence of the substantial accuracy of the statements made in the above letter.—ED.]

ARBITRATIONS.

SIR,—I have read with pleasure Mr. Redman's letter to you, and I only write to ask him if he does not think clause 1 of his suggestions would necessitate some alteration in the *submission*. His proposition is, that by tacit consent the legal arbitrator is to decide the legal points, the architect and surveyor all points of fact. Would not the case *Little v. Newton*, 5 Jur. 246, indicate that authority must not without consent be delegated by the lay to the legal arbitrator, or *vice versa*? It appears to me that either the law must be altered, or the *submission* would have to be in a special form.

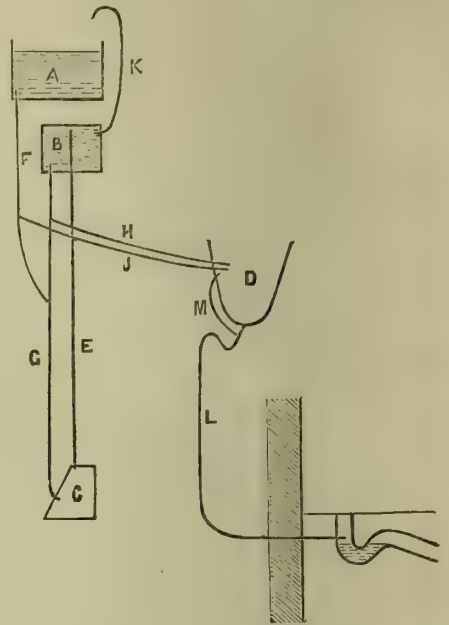
With regard to the favour shown to the legal arbitrator, he is quite correct. I am glad to find that the case referred to has been overruled by more recent decisions. It is an immaterial point in my paper, the object being to indicate what we have to do; and I venture to think, though we now stand on equal footing with the legal profession, there is little doubt our awards in courts of law will still be more closely scrutinised than theirs.—I am, Sir, &c.,

BANISTER FLETCHER.

FITTING UP BATHS.

SIR,—I send you a sketch of what I consider an improvement upon the principles advocated by your correspondent "H. K.," in last week's BUILDING NEWS.

The advantages are, firstly, by placing the hot water cistern immediately beneath the cold water cistern, the latter will be prevented from freezing; secondly, by connecting the feed-pipe from cold water cistern with the return circulating pipe, at a point below the hot water supply to bath, instead of connecting it with the hot water cistern direct, the water in the latter will remain hot as long as you continue to draw from it, because the cold water must pass through the boiler before it can get into the hot water cistern; whereas



A, cold water cistern; B, hot water closed circulating cistern; C, boiler; D, bath; E, hot water flow pipe; F, supply or feed pipe; G, return circulating pipe from B to C; H, hot water supply to bath; J, cold water supply to bath; K, air pipe; L, waste from bath; M, overflow from bath.

in "H. K.'s" system the moment water is drawn off from the hot water cistern, the cold water will begin to flow in, and will immediately mix with, and lower the temperature of the hot water, and by the time the bath is half filled, the water will be found to have cooled very much.

For all purposes where only a small quantity of hot water is required, such as for chamber purposes, I would draw off from the flow-pipe direct, because hot water would be procurable immediately after the circulation commenced, which is of great importance in the early morning, and that could not be done, if drawn through the cistern, until the whole body of water in it had become heated.—I am, Sir, &c., W. WATKINS.

THE "BUILDING NEWS" IN EDINBURGH.

SIR,—I am sorry to find that the able efforts that you are making to place in the hands of your subscribers a more than first-class paper at the cheapest rate, are not better seconded by your Edinburgh agent. You only charge 4s. 9d. for one quarter's subscription, postage free; Messrs. Robertson and Scott, your agents here, charge 5s. for the same length of time, and that within easy delivery distance, too. They thus place your paper (at least as far as price is concerned), at a slight disadvantage with its contemporaries.

I went up and complained to Messrs. R. and S., but a gentleman (Mr. Scott, I think) assured me that it was only the usual charge, and that he knew no more about it. Of course, Sir, it would be presumptuous in me to advise you, yet I cannot help thinking that either you don't do justly in underselling your agents, or that your agents don't do fairly by you.

In your Edinburgh correspondent's report you noticed that Mr. Hay was the architect of some houses in Forrester-road. As there are two Mr. Hays, architects, in this town, allow me to supplement the report by saying that Mr. J. C. Hay was the architect of the buildings in question.

You have made your valuable paper more valuable still by the additional illustrations, and no one, I am sure, can grudge your price.—I am, Sir, &c.,

10, Raeburn-place, Edinburgh, JOHN McLAREN.
14th January, 1873.

[In answer to this, we can only say, that we have no particular agent in Edinburgh, or anywhere else, as we treat all agents and booksellers everywhere alike. The BUILDING NEWS is published every Friday morning, and we supply the trade at 3s. per dozen, giving 13 copies for 12, or less than 3d. each; and we see no reason why Mr. McLaren should not have his copy, either by calling at his agent's, or having it delivered to him for 4d. on Saturday morning. This is done in Penzance

in Dublin, in Belfast, and in Glasgow, and we know of no reason why it may not be done in Edinburgh.—
Ed. B. N.]

ST. MARY'S CATHEDRAL, EDINBURGH.

SIR,—I have read, with much pain, the leaders in the two last numbers of your journal reflecting upon the professional character of Mr. Alexander Ross, one of the architects in the recent competition for the Cathedral in Edinburgh. I have read, with something more than surprise, the severest of these reflections in the very number of the BUILDING NEWS in which you publish Mr. Ross's letter, vindicating himself from the charges contained in the previous number. In fairness to yourself, I am bound to infer that you only received Mr. Ross's letter after your leader was in type, and too late to allow of your withdrawing it. I trust, however, that you will allow me, who have known Mr. Ross intimately for nearly 20 years, to offer to your readers a few facts, which may serve to prove the utter groundlessness of the calumnious charges brought against him. I have not asked Mr. Ross's permission to write to you, nor is he aware of my intention to do so, but I cannot remain silent in the presence of slanders reflecting upon a friend, and upon one of the most honourable and high-minded men in the profession to which he belongs.

I saw the first rough pencil sketch—indeed, he made it at my request, and in my presence—of the design which Mr. Ross was planning for the Edinburgh Cathedral, shortly after he was made aware that he was to be one of the three Scotch competitors for the Cathedral. The design which he eventually submitted to the Trustees, under the motto of "Fidelitas," corresponds in every one of its leading features with that first rough pencil sketch. I watched with the greatest interest, the progress of his work, the whole of which was carried on in his own house, and not a single line of it drawn in London or elsewhere. After a tour of a few weeks in France, Germany, and Italy, he resumed his work, which was considerably impeded by the changes necessarily consequent upon the addition of £20,000 offered by the Trustees beyond the £45,000 originally fixed by them for the cost of the Cathedral. During my own absence from home the progress of the work was watched with the liveliest interest by many of Mr. Ross's private friends and brother architects resident here, and I returned in time to see the last touches given to a work which I had watched, I might almost say, from its first conception. The only person besides Mr. Ross's own clerks, whom, after some months, I saw employed upon the work, was the professional draughtsman whom he had engaged in London.

I am at a loss to understand the statement which you make in the note appended to Mr. Ross's letter, in which you justify your own remarks by saying that the report of his dishonourable conduct was generally credited by the profession. I can only say, sir, that the refutation of the calumny against Mr. Ross, which I now send to you, is but a repetition of the refutation of this very calumny which I sent so long ago as the month of September, when a rumour of it first reached me, and which I had every reason to believe would have been made known to the profession.—I am, Sir, &c.,

ROBERT EDEN, Bishop of Moray, &c., Primus.
Hedgefield House, Inverness, Jan. 20, 1873.

"BUILDING NEWS" SCHOOL-PLANNING COMPETITION.

SIR,—The arbitrators say, in their report on my design, "We regret that the author of this design has made four windows on ground floor, one on first, and one on second, obtain light from adjoining properties. This is so fatal a defect in a building for a town site that it shuts out the design for any chance of competing for a prize."

If you will turn to the BUILDING NEWS of the 13th September, page 212, you will find that the question is asked by "E. H. B." whether competitors can light their building from the yards marked at the back of the site, and the answer is, "Yes." Before I saw this, I had naturally arranged my plans without any windows on those sides, but finding that by availing myself of this concession I could obtain a slightly more economical building, I immediately took advantage of it. The "fatal defect" is therefore entirely due to a condition laid down by you. I therefore rely on you taking such steps on behalf of my design as I am sure your sense of justice will dictate.— I am, Sir, &c.

Jan. 17, 1873.

R. R. R.

SIR,—If not considered premature, I should like to make a few remarks respecting the design to which the third premium has been awarded.

Under the head of economy the report of the judges says—"The general style of the treatment is more expensive than ought to have been resorted to for a building to be estimated at 5d. per foot. I ask, have these gentlemen judged my design by a London or provincial standard of prices? I do not think any stipulation as to locality was named in the original instructions. Very effective buildings may be erected in this district from 2d. to 4d. per foot, and these, too, for domestic purposes, with all the internal fittings and finishes which are not required in a school block, and I think in this part of the country my design could be thoroughly carried out for the sum. I will just remark that while the two designs that take precedence of mine have several defective points of arrangement

pointed out, no fault of this nature is found with design No. 3, and that while too little ventilation is as bad as too much, still it is only a point to be in a great measure surmised, and that my design might in reality prove all that is considered desirable in this particular.

The report bears testimony to the painstaking character of Messrs. Fletcher and Smith's task, and I most cheerfully render them my tribute of thanks.

I am, Sir, &c.,

THE AUTHOR OF DESIGN R. R. R. (on a Shield.)
Malton, Jan. 21st, 1873.

Intercommunication.

QUESTIONS.

[2762].—Bookkeeping for Plumber and Decorator.—Will any reader of the BUILDING NEWS inform me of the best method of book-keeping for a plumber and decorator?—PLUMBER.

[2763].—Work on Timber.—Will any one kindly inform me where I can get a good book on timber, telling me what the various kinds are used for, and how to know them? I shall thank any one for such information.—W. R. W.

[2764].—Pocket-books for Builders.—I should be obliged to any of your readers to inform me where I can obtain a small work of tables on English and foreign timber, fit for the waistcoat pocket, and also builders' time books, commencing on Saturday, and books for entering quantities, all properly ruled.—R. M.

[2765].—Architects' Charges.—In the BUILDING NEWS for January 3rd you publish the schedule of rules for professional practice and charges of architects as sanctioned by the Royal Institute. On reading them down I find there is no mention made as to the commission an architect should charge on works having been superintended in the ordinary way, and measured and valued at the completion, in addition to the plans and specifications. Can "B. F." or some one kindly inform me what is the usual commission charged in such a case?—ARCHITECT.

[2766].—Preserving Zinc.—I have lately been covering some flats and verandahs with zinc. Could any of your numerous readers inform me whether paint will preserve the zinc? If so, would white lead paint or anticorrosion be the best to use?—SUBSCRIBER.

[2767].—Draught in Church.—Can any of your numerous readers suggest a plan to remedy the following evil?—In a new church, lately erected, when the congregation has assembled there is a fearful draught, so much so that the candles very quickly flicker away; but when empty there is no draught, and the candles burn very steadily. The necessary information will be esteemed.—C. B. F., Builder.

LEGAL INTELLIGENCE.

A SEWAGE NUISANCE.—APPLICATION FOR EXTENSION OF TIME.—BROUGHTON V. THE CREWE LOCAL BOARD OF HEALTH.—The Crewe Local Board of Health are under injunction in this suit to restrain them from discharging the sewage of that town in such a manner as to commit a nuisance, but the injunction was directed by the Court not to be put in force for a time, in order to enable the Board to take measures to dispose of the sewage satisfactorily. The Board accordingly began to construct a sewage farm under the direction of Mr. Hope, but the time given them having expired without their having been able to complete their works, they applied on Saturday week for a further extension of time, which was given them by arrangement till Easter.

STATUES, MEMORIALS, &c.

WHITLEY.—Considerable progress has been made with the statue of the late Algernon, Duke of Northumberland, K.G., intended to be placed in the Prudhoe Memorial Convalescent Home at Whitley. Mr. Joseph Beall sculptor, Byker-hill, to whom the work was entrusted, has just completed the plaster model, executed after a design approved of by the committee. The duke is attired in the uniform of an admiral of the Royal Navy. The statue will be executed in stone obtained from the Ketton Quarries, in Rutlandshire.

LAND AND BUILDING SOCIETIES.

TUNBRIDGE WELLS.—PERMANENT BENEFIT BUILDING SOCIETY.—The shareholders of this institution held their 22nd annual meeting on the 13th inst. The report and balance-sheet were passed as highly satisfactory, and gratuities—one of 12 guineas to the directors for their careful management, and another of 10 guineas to the secretary—were voted. A resolution was passed appointing the directors as a committee to deal with the subject, and the resolution was accompanied by a recommendation that a bonus of 30s. per share per annum for the time which each has been in force, shall be placed to the credit of each shareholder respectively, to be paid on realisation, withdrawal, or redemption, and then, with the usual vote of thanks to the chairman, the business terminated.

A contract has been entered into by the Municipality of Buenos Ayres with the Mutual Gas Consumers' Company for the lighting of not less than 4200 lamps at about £10. 15s. per year per lamp, for ten years. Mr. George Bower, of S. Neot's, is the contractor, and already the buildings are far advanced, as it is stipulated that 2,000 of the lamps must be lit by March, 1874.

CHIPS.

At the annual distribution of prizes of the Nottingham School of Art on Wednesday week, Mr. Cole, C.B. announced his intention, after 50 years of public service, of resigning his post in connection with the South Kensington Museum.

A number of scientific gentlemen and others interested in the purification of rivers met on Thursday week in Edinburgh, and after an interesting preliminary discussion, appointed a committee to inquire into the subject of river pollution in Scotland, and prepare a report on the best methods extant by which defiled streams may be purified.

All applications, with the necessary drawings for the Pugin Studentship, must be sent into the Rooms of the Institute on or before Saturday, the 25th inst., and those for the Institute Medals and Prizes on or before Friday, the 31st inst., 1873, carriage and all expenses paid.

The public distribution of prizes in connection with the Glasgow School of Art and Haldane Academy took place on Tuesday night in the Corporation Galleries, Sauchiehall Street, Glasgow.

On Tuesday a new Wesleyan chapel was opened at West Hartlepool. The total cost has been £6,000. The building is in the Corinthian style, and the architects are Messrs. Hill and Swann, of Leeds.

Trade News.

TENDERS.

CATERHAM, Surrey.—For additional building and recreation-hall to the Metropolitan Asylum for Imbeciles, for the Metropolitan Asylum Board. Messrs. John Giles and Gough, architects. Quantities by Mr. C. W. Goode.

Sheffield	£14,980 0 0
Ward	14,589 0 0
Shirbourne	14,100 0 0
Fish	14,100 0 0
Wright Brothers	13,565 0 0
Mansbridge	13,550 0 0
Bullivant	13,495 0 0
Higgs	13,300 0 0
Rankin	13,170 0 0
Wilson	12,675 0 0
Henshaw (accepted)	12,493 0 0

ESSEX.—For the erection of schools and residence, Forth End, Great Waltham. Mr. Frank Whitmore, architect.

Smith and Holland (accepted).....£890
ESSEX.—For restoration of roof, Marshbury Church. Mr. Frank Whitmore, architect.

Dorset (accepted).....£174 10 0
HASTINGS.—For pair semi-detached villas. Mr. George Stooke, architect, Notting-hill, W. Quantities supplied.

Tapper.....£2900 0 0
Cousins (accepted).....2620 0 0
LONDON.—For the erection of a house on the Anson Estate, in Ca-tton-road, Tufnell-park, for Mr. J. P. Woulfe Mr. G. Truett, architect.

R. Ball (accepted).....£979
MONMOUTHSHIRE.—For new schools for the Lantarnam School Board, near Pontypool. Mr. Lansdowne, architect, Newport.

J. Needs.....£2149
W. Jones.....2137
F. Christopher.....2049
Parfit.....1935

SYDENHAM.—For alterations and additions to house and shop, for Mr. John Smith. Messrs. Tolley and Dale, architects.

Contract No. 1.	No. 2.	Total.
Burchell.....£579 10	£160	£739 10
Amer.....525 0	185	710 0
Hollidge.....528 0	147	675 0
Thomas (accepted).....520 0	150	670 0

TWICKENHAM.—For completing two houses, Isleworth-road. Mr. Wm. C. Banks, architect.

Farthing.....£788 0 0
Vaughan.....745 0 0
Story.....700 0 0

ASHTON & GREEN,

Slate, Iron and Marble Merchants and Quarry Agents.—ROOFING SLATES—Bangor, Blue, Red, and Green. Blue, Portmadoc, and Whitland Abbey Green. The new "Permanent" Green, weight the same as Bangor and uniformity of cleavage equal. Marble and Kna-melled Slate Chimney-pieces. Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s SPECIAL RED RIDGE TILES. Large Show of all Goods at 14 and 15, Bury-street, St. Mary Axe, London, E.C. Drawings and Prices upon application accompanying trade card.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—ARCHITECTURAL ASSOCIATION.—"On Professional Practice." Lecture VI. By Mr. T. Roger Smith. 8 p.m.

INSTITUTION OF SURVEYORS.—Discussion on Mr. Sturge's paper "On the Prices of Agricultural Produce, Labour, and Rent." 8 p.m.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—"On Cylindrical or Columnar Foundations in Concrete, Brickwork, and Stonework." By Mr. John Milroy, Associate. 8 p.m.

WEDNESDAY.—SOCIETY OF ARTS.—"On Guilds and their Functions." By Mr. J. Yeats. 8 p.m.

ARCHITECTURAL ASSOCIATION.—Meeting of Elementary Class of Design. Subject: Details of Porch; scale, 1 in. to 1 ft. 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—Meeting of Class of Construction and Practice. Subject: "Plasterer." Visitor for the evening: Mr. Gilbert B. Redgrave. 6.30 p.m.—Meeting of Class of Design. Subject: "Campanile (civil)." 8 p.m.

COMPETITIONS OPEN.

THE CARLISLE DIOCESAN CHURCH EXTENSION SOCIETY, January 31, 1873.—For plans for a mountain chapel, suitable for 100 persons. Two prizes of twenty and fifteen guineas for the best designs. This competition is open to architects residing in Cumberland, Westmoreland, and Lancashire only.—Rev. Canon Shipman, Vicarage, Asparilla, Cumberland; and Rev. Canon Stock, Rectory, Windermere.

CHESTER UNION, February 1, 1873.—For designs and estimates for a new workhouse to accommodate 500 male and female inmates, with the requisite offices, &c. Premium of £100 for the best, and £50 for the second best design.—Mr. William Keartland, Clerk to the Guardians, Chester.

THE CONFERENCE COMMITTEE ON COMPETITIONS will be glad to receive, from provincial architects, the earliest possible notice of proposed competitions, in order that the committee may, in sufficient time, transmit to the promoters of such competitions, for their guidance, copies of the regulations passed at the General Conference of 1872. Communications to be addressed to the Secretary of the Committee on Competitions, 9, Conduit-street, Hanover-square, W.

THE FROME DISTRICT AGRICULTURAL SOCIETY.—Feb. 20.—For adapting a field near Frome for the purposes of a Cheese, Corn, and Cattle Market, and for the erection of suitable buildings. Premiums of £20 and £5 for first and second best designs.—Messrs. Crutwell and Daniell, Solicitors, Frome.

THE NORTHAMPTON SCHOOL BOARD, January 27, 1873.—For designs for two new schools, with class-rooms and out-offices. One of the schools is to be built in Spring-lane, and is to accommodate 650 children; the other in Vernon-terrace, and is to accommodate 500 children. The architect whose design shall be selected will be appointed to superintend the erection of the buildings.—Mr. J. B. Hensman, Solicitor, Northampton; Offices of the Board, 6, St. Giles-street.

VIENNA, December 31.—For designs for a monument to the memory of the late Vice-Admiral Tegethoff. Prizes of £300, £200, and £100 to be awarded to the three best designs.—The Committee of the Tegethoff Monument, Vienna.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tiler, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY, January 31, 1873.—For Dowston's pumps and water-closets.—Mr. F. W. Rowsell, Superintendent of Contracts, Admiralty, Whitehall, S.W.

BEAUFORT, Feb. 3.—For the erection of a school at Beaufort-hill, to accommodate 189 children. Mr. Llew. P. Jones, Victoria-road, Ebbw Vale, Monmouthshire.

BIRDBROOK (Essex), Jan. 25.—For the erection of a school to accommodate 77 children. Mr. J. C. Curtis, Clerk to Birdbrook School Board, Baythorne End, near Halstead, Essex.

BRISTOL, Jan. 30.—For the construction of about 4756 yards of street tramways. Frederick Ashmead, engineer, No. 13, Prince-street, Bristol.

BROMSGROVE, Jan. 27.—For laying out and embellishing the Cemetery. Mr. H. Barrat, Clerk to the Burial Board, Bromsgrove.

CUCKFIELD (Sussex), Feb. 7.—For proposed alterations and additions to the Workhouse and premises at the Cuckfield Union.—Mr. E. Waugh, Clerk to the Board, Cuckfield.

DUBLIN, Feb. 5.—For lowering and widening Essex-bridge. N. Proud, Secretary, Port and Docks, Office, Dublin.

ELLAND (Yorkshire), Feb. 3.—For the erection of a fire-proof worsted mill and shed, with engine and boiler house, offices, and mill chimney. Mr. T. W. Hellewell, architect, Brighouse.

FRANKFORD-ON-THÉ-MAINE, Feb. 12.—For the construction of about 846 lineal metres 4ft. 6in. by 3ft.; 975 lineal metres 3ft. 6in. by 2ft. 4in.; 5,396 lineal metres 3ft. by 2ft. brick sewers; and 102 lineal metres 12in. pipe sewer, and other works. Board of Works, Frankfort-on-the-Maine.

GILDERSOME (near Leeds), Jan. 28.—For the erection of Board schools, school cleaners' houses, and fencing.—Samuel Crowther, Clerk to the School Board.

GLENMUIK, Feb. 1.—For the construction of 3,000 to 4,000 yards of sunk fencing.—Mr. Milne Forrester, Glenmuik.

GLOUCESTER, Feb. 5.—For the supply of 200 pieces of oak timber, suitable for checking-posts on the canal Henry Waddy, secretary, Canal Office, Gloucester.

HANLEY (Staffordshire), Feb. 3.—For the supply of blue paving bricks. Mr. J. Lobley, Borough Surveyor, Corporation Offices, Hanley.

HEREFORD, Feb. 1.—For building a pig and poultry farm steading, with dwelling-house, store-rooms, &c. Thos. Nicholson, F.I.B.A., architect, Hereford.

KEIGHLEY, Feb. 13.—For making a new survey and finished plans of the district, to a scale of 30ft. to an inch. Henry Alty, C.E., Engineer to the Local Board, Keighley.

LEICESTER, Feb. 1.—For the supply of 150 yards of wrought iron fencing. Mr. E. L. Stephens, Borough Surveyor, Corporation Office, Silver-street, Leicester.

LONG SUTTON SCHOOL BOARD, Jan. 28.—For the erection of new school room.—J. Wright, Clerk to the Board.

LITTLETON (near Evesham), Feb. 3.—For the erection of a new school and teacher's residence.—Mr. George Hunt, architect, Evesham.

MARCH, Feb. 13.—For the erection of boys', girls', and infants' schools and class-rooms, for the accommodation of 500 children, and residences for the master and mistress. Mumford and Townsend, architects, No. 3, York-row, Wisbech.

MIDLAND RAILWAY, Feb. 4.—For alteration to the refreshment rooms and other works at the Derby Station.—J. Williams, secretary, Derby.

MIDLAND RAILWAY, Feb. 4.—For bricklaying, excavating, &c., adjoining Whitecross-street.—Engineers Office, Goods Station, St. Pancras.

MIDLAND RAILWAY, Feb. 4.—For general works, &c., at Sheffield.—J. Williams, Midland Railway, Derby.

MIDDLESBROUGH, Jan. 31.—For the erection of the Denmark-street Schools, to accommodate 1,000 children, with teacher's houses, &c. John T. Belk, Clerk to the School Board, Corporation Hall, Middlesbrough.

MIDDLESBROUGH SCHOOL BOARD, Jan. 31.—For the erection of a school in East-street.—Mr. W. H. Blessy, architect, Exchange-place, Middlesbrough.

NEWCASTLE-ON-TYNE, Feb. 21.—For the erection of the Bell-terrace schools. Alfred Goddard, Clerk to the School Board.

ROCHDALE, Feb. 13.—For the erection of a new workhouse at Darnley, near Rochdale.—John Holgate, Clerk to the Guardians, Acker-street, Rochdale.

SALE, Jan. 29.—For sewerage, curbing, and channelling Thorn-grove.—Henry Dixon, Clerk to the Board, Local Board Offices, Sale.

STDMOUTH (Devon), Feb. 1.—For supplying and laying 2000 yards of best glazed stoneware socket pipes from 9 to 24 inches in diameter. Mr. Edward Ellis, C.E., Exeter.

STOTTESDEN (Salop), Jan. 28.—For the erection of a school and master's house. Mr. H. H. Treasure, architect, Shrewsbury.

SWANSEA, Feb. 4.—For the erection of a quay wall and other works connected therewith.—Richard Aubrey, Essery, Town Clerk, Guildhall.

TYNMOUTH SCHOOL BOARD, Feb. 3.—For the erection of school buildings at Chilton.—Mr. F. M. N. Haswell, architect, 12, Howard-street, North Shields.

WAR DEPARTMENT CONTRACTS, Jan. 31.—For the execution of artificer's work and repairs, and the supply of materials to War Department buildings. J. W. Lovell, Colonel, Commanding Royal Engineers, Royal Engineer Office, Chatham.

WELLS, Jan. 21.—For the construction of 1720 yards (more or less) of sewers and other works. W. J. S. Foster, Town Clerk, No. 1, Cathedral-green.

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[ADVT.] CORSHAM, WILTS.

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Do.	12 by 7	..	2 18 6	..	13s.
Do.	12 by 6	..	1 7 6	..	11s.

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Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tufon-street, Westminster.

BANKRUPTS.

(TO SURRENDER IN THE COUNTRY.)

Thomas Green, Pinchbeck, bricklayer, February 1, at Peterborough.—Hiram Illingworth, joiner, Bradford, February 4.

SCOTCH SEQUESTRATIONS.

John and Neil McLean, Glasgow, carters and contractors, Jan. 27, at 12.—John Beddie, Edinburgh, brassfounder and plumber, Jan. 28, at 2.—Robert Taylor, Glasgow, brickmaker, Jan. 28, at 12.

PARTNERSHIPS DISSOLVED.

Shore, Durran, and Broadhead, Parkgate, near Rotherham, brass founders.—George Melldow, Son, and Legg, Moorside, Oldham, brickmakers.—Bradley and Sugden, Bradford, or elsewhere, plasterers.—Pedder and Brannow, Sunderland, architects.—John Oakley and Sons, Blackfriars-road, emery and blacklead manufacturers.

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A Great Programme for Christmas. 1. The History of a PLUM PUDDING, with striking experiments by Professor Gardner. 2. A Christmas Tale; or, HOW JANE CONQUEST RANG THE BELL; an illustrated Poem, with remarkable effects. 3. THE "ZOO" AT THE "POLY"; an anecdotal discourse about the Zoological Gardens, by Mr. J. L. King, with photographs by Mr. Percy Vere. 4. The THREE ROSES; or, the Invisible Prince in a new light: a fairy tale, musically narrated by Mr. George Buckland, assisted by Miss Alice Barth, Miss Fulham and Miss Lillie Bartlett. 5. THE WHITE LADY OF AVENEL, the new and beautiful Ghost Story. 6. NEW CHARACTERS IN EXHIBITION, by Mr. Percy Vere. 7. The wonderful SWIMMING FEATS of Marquis Bibbero in the Great Tank. 8. THE MAGIC TUB, full of Toys, to be distributed on specified occasions, to good Children. Many other Entertainments. Open daily, at 12 and 7. Admission, 1s.

THE BUILDING NEWS.

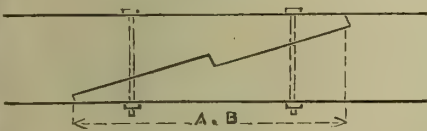
LONDON, FRIDAY, JANUARY 31, 1873.

QUANTITIES.—V.

CARPENTER.

IN measuring carpenter and joiner's work, greater care is required than with the trades already treated of, and the student must have a tolerable amount of practical knowledge of the different methods of framing timbers and joiner's work before he will be able successfully to undertake its admeasurement, particularly when taking off from the working drawings. The one great difference in the measurement of the works of the carpenter and joiner is this:—That in the former you measure the extreme length of the timbers, including the tenons; whilst in the latter this is not the case, the net superficial quantity only being measured, the tenons being considered in the price. In scarfings and laps to timbers, the length of the scarf or lap would have to be added to the net length of the timber, and where the ends of the timbers are bevelled take the *full* length (see Fig. 9).

FIG. 9



Shrinkage.—Make no allowance for shrinkage of timbers, but take the net scantlings. Where it is stated in the specification that the timbers are to bear the full scantlings when fixed, some surveyors make an addition to the material to cover the shrinkage. This is unadvisable, as the timber is presumed to be dry when fixed, in which case no allowance is necessary. Wherever an allowance is made, however, as it is difficult to get surveyors to give up their own adopted methods of measuring, it would be advisable to make a separate item of it, and describe it as an allowance to meet the shrinkage of the timbers.

Dissect the work as much as possible, classifying it according to the nature of its execution, and describe briefly but fully the nature of the labour on the same. Where there is any labour executed on the material in carpenters' work: for example, to the timbers of an open Gothic roof, as planing, chamfering, &c., such labours would have to be taken out separately from the material and described as labour in planing to fir, oak, or as the case may be, or again, so many feet run of chamfer. In joiners' work the labour is generally described with the quantity, thus forming only one item instead of two or three, or even more, as is so frequently the case in the Carpenter.

Where the timbers are *framed*, that is mortised and tenoned, they must be kept separate from the works that are only fixed, such framing necessarily entailing an additional amount of labour. In quantities, all works are understood to be *fixed*, unless stated to the contrary, and would include the labour in nailing, laps, dovetails, &c.

Commence measuring at the bottom of the house, taking first the sleepers, then the wall plates and ground joists; afterwards take the bond timbers (if any), lintels, and wood bricks, to the lowest story, and lastly the quarter partitions. Having finished one floor in this way, proceed to the next, but always complete the one floor before commencing the second; otherwise, omissions are apt to take place which, by adopting this rule, are easily avoided. Proceeding then with what are termed *Naked Floors* (the flooring boards

being taken with the Joiner), take firstly, the sleepers and ground joists, the length by the scantlings. These must be taken separately from the joists of the other floors, and made a separate item of in the abstract and bill, they not entailing so great an amount of labour as the latter, consequently they will not bear so great a value. All other joists are measured in a similar manner, taking care in each case to include the portions inserted in the walls.

In double-framed floors it is customary to take the timbers bearing the greatest scantlings first. Where framed, as in girders, binders, trimmers, &c., they must be kept separate and so described.

Herring-bone and other strutting between the joists is measured at per foot run, stating the scantling and the description, the dimensions for length being taken as follows:—(see Fig. 10), the joists being measured in.

FIG. 10

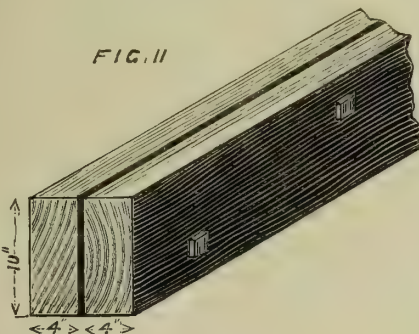


Make the necessary deductions for fireplaces, staircases, &c., as they occur, and add for the additional width of the trimmers in each case.

Measure the feather-edge springer for trimmer arch of fireplace at per foot run, taking the length of the arch.

Girders sawn, reversed, and bolted must be kept separate from the ordinary fir girder, on account of the additional labour thereon; and, again, greater labour still will be required where an iron fitch is inserted to fit the bolts, &c. The accompanying figure (No. 8) I give to assist the reader, and the

FIG. 11



better to exemplify my meaning. In the latter case the iron fitch is not measured in with the timber, the net amount of stuff only being taken.* Trussed girders must also be made a separate item of.

Oak trusses let into girders are measured by the foot run, and the labour, letting in screw-bolts, fixing plates, straps, &c., are numbered; the ironwork being taken off at the same time, and afterwards abstracted and billed with the Smith.

BOND TIMBER is now seldom used, being superseded by hoop-iron, which is a great advance on the old system of building; the unsound uses of the old method in this particular are apparent. Where bond timber is adopted, it is measured the length by the scantling, adding for the laps and dovetails, and is described in the bill as bond timbers. As they are, or should be, carried through the openings in the walls, and have afterwards to be sawn off to the size of the opening, it is customary to make a deduction equal to half

* Thus presuming the length to be 16ft., the timber would be measured thus:—

2	16.0		
	10		
	4	8.10	Fir bolted in fitch girder.

the width of the opening only, in order to allow for the extra labour in the sawing and waste.

Plates and lintels are also generally taken and described as bond timber, about the same amount and quality of labour being expended upon them. They are similarly measured. Many surveyors include the wood bricks for fixing joiners' work under the same heading, though, I think, incorrectly, the extra amount of labour in sawing the timber to the small sizes required and bedding same entailing an additional cost. I prefer, therefore, in this case to advise the rule adopted by the other branch of the profession—viz., to number them and state the sizes.

Roofs.—Where trussed, take the truss first. All timbers comprising the truss—as tie-beams, king-post, principal rafters, and struts—must be kept distinct from the other portions of the roof, and described as "Fir framed in trusses." In each case take the extreme length of each of the timbers, including all the tenons, as before stated. If the tie-beam is scarfed, add the additional length of timber required for this purpose to the net length of the beam as in Fig. 9.

For the king-post (see Fig. 12) the width must be taken where it is greatest, namely, below the shoulders, and a deduction made on one side only between the shoulders, the other side being allowed to pay for the cost of sawing and waste. After the truss take the purlins, which are measured as above. Then take the common rafters, dragging pieces, &c., and, lastly, the ridge, hips, and valley-pieces, all to be reduced to the foot cube—this being the more uniform plan, though some surveyors take the last three items as a superficial dimension, and state the thickness in each case. At the same time as measuring the ridge and

FIG. 12

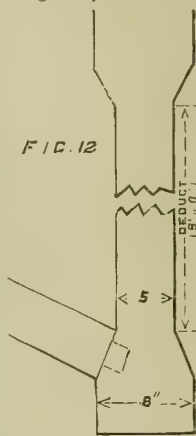
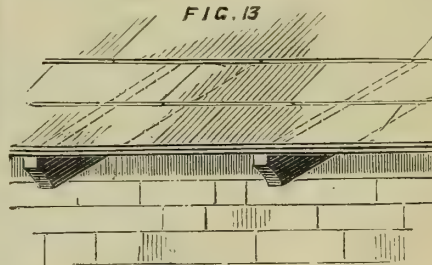


FIG. 13



hips, take the ridge and hip rolls, when there are any, at per foot run, stating the diameter, and also state if spiked or otherwise.

Take a running dimension of the hips and valleys to allow for labour and waste in cutting, and describe it as "Cutting and waste."

The cleats to purlins are usually numbered. Collars, curbs, pole-plates, &c., are measured as "Fir-framed in roofs."

Take the cuttings to ends of rafters where visible at per number according to nature, giving sketch where necessary. (See Fig. 10, where one kind of end is shown.)

Measure the ironwork as it occurs, number the labour for fixing the same, and afterwards bill the ironwork with the Smith.

Boarding or battening for slate is measured the length by the breadth, from the extreme edge of the rafter up to the ridge, and reduced to the square of 100ft. superficial, stating the thickness, as shown in the table. In the case of battens it will also be necessary to state the distance between each batten, and its width.

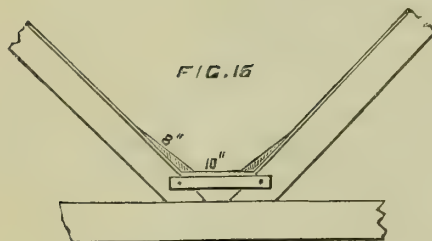
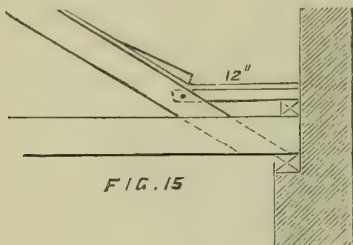
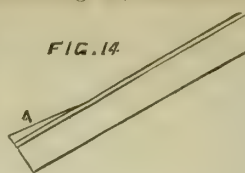
Eaves boarding is measured by the foot run, and the width and thickness described.

Tilting fillets (shown in Fig. 14, and marked A) are also measured by the foot run, and the thickness stated.

It is advisable in the two foregoing items to collect the whole of the dimensions on each roof, on waste, so that one dimension only need be brought forward.

Make all the deductions where they occur for trap-doors, skylights, and chimney shafts, and at the same time make the addition for the trimmers, &c., not forgetting to include the tenons in the length.

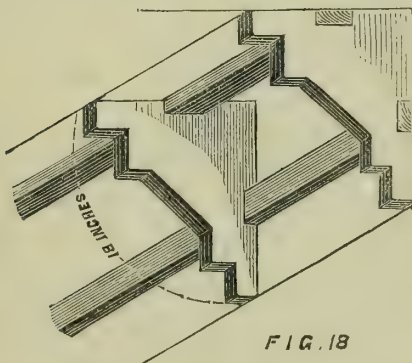
Gutter boards and bearers (shown in Figs. 15



and 16) are measured by the foot superficial, taking the extreme length by the average width; but it is as well to state the greater and smaller widths, and show how you obtain the mean or average width on "Waste." State the thickness of the boarding. It is advisable also to state the sizes and particulars of the bearers when given in the specification; but this is so seldom done that surveyors, as a rule, do not specify them separately.

Where the bearers are specified to be framed, they must be described as such in the bill thus, "1 in. deal gutter boards and framed bearers."

Number the drips and cesspools, describing the latter as "Extra to forming cesspool."



The following is the way these items usually appear in the Dimension-book:—

Greatest width of gutter	2·0
Smallest do. do.	1·0
	2)3·0
Average.....	1·6

30·0	45·0	Inch deal gutter board and bearers.
1·6		
		No. 3 Rebated drips.
		" 1 Extra to forming cesspool.

It is perhaps better, before taking the gutter boarding, &c., to take the trap-doors

and linings where these occur. In so doing state the description of the linings, and in measuring them add to the length in the clear the thickness of the material for the framings. Collect the whole lengths of linings of each opening on waste, so as to have but one dimension for each, and they would have to be described thus:—"1 1/4 in. deal wrought and splayed linings dovetailed at angles," or as the case may be. The rim would be taken at per foot run, and in describing same give the width and thickness, and state also whether dovetailed at angles.

For the trap-door take the width by the height, and state the thickness, and give the full description. Number the handles, bolts, and all fastenings appertaining thereto.

I break off here, as this ends the "Roof." Next week I propose to complete this trade.

B.F.

SUGGESTIONS FOR A TOWN CHURCH COMPETITION.

A TOWN church should have an entirely different character from one intended for the country; and superior height, to enable it to cope with secular buildings and maintain suitable dignity among them, is essential.

The approach should be spacious and effective. The porch of S. Maclou at Rouen, and the narthex of many a church in the Rhine Provinces, may suggest a fitting treatment of this feature so necessary to a town church.

Whereas length was requisite for the ritual of past ages, compactness of plan and freedom from obstructions by piers and columns are to be preferred for the present day.

As regards internal arrangement, the rules of the Incorporated Church Building Society require that a central passage should in all cases be provided, and in the present competition it may be well to observe this rule. At the same time it is questionable, in the writer's opinion, whether this does not entail a sacrifice of the very best portion of the area, which would be more suitable for occupation during service, than for a few moments only while entering or leaving the building. Again, it necessitates the partial concealment of the bases of the columns of a church divided into nave and aisles. If the seats were placed centrally and the passages retained by the side of the columns, two passages would serve instead of three; they would be wider, less regular, more picturesque, and would lend themselves better to processional purposes. Seats, however, in their formal rows are not *de rigueur*. The Incorporated Society will, under pressure, recognise chairs as the provision for seating, and these may be arranged at pleasure, and it will be found that they lend themselves well to arrangement in the main part of the nave naturally. The writer can, however, refer to the effect of the interior of the fine old church of Stratford-upon-Avon, which is fitted with benches without a central passage, with, in his opinion, a satisfactory result. The adult portion of the congregation being provided for in the body of the fabric—the nave, with or without aisles or other adjuncts—the position chosen for the children will need special care. They should not be so prominent that their natural restlessness be a source of disturbance to their elders, and they should not be put in the background, as if a nuisance barely tolerated. They seek to see, and require to hear, as much as others, and it would be well that, as now generally conceded, they should not necessarily be bored by services too long for them, but allowed to retire before the end. For this purpose they should be located near some special entrance—a sort of transeptal projection or second aisle to the easternmost bays would seem to be a suitable position for children's seats.

The separation of the sexes, now frequently adopted, would seem to point to the double-naved plan as undeserving the neglect into which it has fallen in modern times. Not only for churches, but for many other struc-

tures, both ecclesiastical and secular, it was rather a favourite in Mediaeval times; but the treatment of the chancel, so as to be symmetrical and fairly exposed to each division, is a difficulty which might profitably engage the attention of competitors. The central passage in such a case would, of course, be retained in connection with the central range of columns, and that would have the advantage of being a striking feature, without in the least incommoding or obstructing either the vision or bearing of any part of the congregation.

Aisles, if used, should have some commensurate scale and capacity, and not be reduced to the width only required for passages to seats in the nave, or they will be found costly appendages in proportion to their utility. In town churches, the method of lighting them by low side windows, suitable in country districts, is inconsistent. Far grander effect is obtainable by throwing a flood of light into them from above by spacious clerestories, and for both east and west ends the windows, if used in them, should be boldly elevated—in the former case, to admit of a dignified treatment of the altar-table and its reredos and other accessories, and in the latter of the narthex or porch. But the east end may often be with advantage unpierced, and occupied entirely with a structural arrangement of artistic character, upon which light in abundance should be thrown from the side. Work is continuously devoted to elaboration, which is all practically wasted, from having the light behind, when a great traceried window is the prominent eastern feature. The roscas is a suitable feature with which to occupy the western façades, and may be thrown up as high as possible, even above the ceiling ridge within.

In treating the chancel, it will be obviously impossible to make the altar visible from every part; but there should be at least as great openness and expansion of the eastern end as possible, so that it may appear as if it were ready to embrace, and not repel, the whole of the worshippers. If the nave be, as it must, wide and spacious, a narrow contracted chancel will appear mean and inhospitable in comparison, and the apsidal termination, much in fashion nowadays, scarce gives room for proper treatment of the table and reredos on the eastern side, and the windows are all too cramped. Some different and more dignified handling of this feature, if adopted, will worthily occupy the attention of the competitors, and generally the approach to the chancel and its aisles needs more distinctness than it usually receives. The latter also must not be mere closets; the one stuffed up with smothered organ-pipes, and the other misappropriated as a vestry. They must belong to the church, and afford a satisfactory view to congregation which faces them. While discussing the arrangement of the fabric, the organ demands particular attention. Practically, it is one of the preachers of the Establishment, and should no more be set under a bushel, or poked away in a loft, than the occupant of the pulpit. It wants elbow-room, and space for its voice above; it has to sound in harmony and in connection with the voices of the choir, and should therefore be near them. The western end in a gallery is often recommended, but in the writer's opinion this should entail the company of the singers there, as well as the turning of the congregation towards them. His own opinion is that there is no better position for an organ than the centre of the chancel aisle, so that it should appear to be its special closure, with room to pass all round it. In Christchurch, Victoria-street, the organ occupies with advantage such a position at the eastern end of the aisle, which corresponds with that here suggested, the chancel proper, then, being undivided structurally from the nave, and the aisles consequently continuous; and in passing, it may be mentioned that the fancy arrangement of pipes in front of organs is all artificial, and non-natural, and that the designing of the

feature has yet to be worked out, so that the pipes be placed as most suitable for the construction, and yet to make the instrument ornamental, as it should be in so prominent a position. The width of the chancel itself will most probably be less than that of the nave, for there is no need largely to exceed the minimum referred to by the Incorporated Society for the space between the stalls, which is 8 feet for a church of such character as we are discussing, and three rows of stalls on either side are all that can be required; and giving 8 to 10 feet between the stalls, and 9 to 10 feet for the stalls themselves, we have as the extreme width needed for the chancel 26 to 30 feet. Its length, again, will be limited by the requirements, giving (say) 20 feet or thereabouts, for the sacrum, with its proper provision of steps within it. The length of the chancel proper will be regulated by the number of stalls required, and these, if subdivided, should not be less than 2 feet 6 inches from centre to centre, and there should not be less than from 5 to 6 feet on either side between the stalls and nave on the one side and between them and the sacrum on the other, allowing for the screen which should divide the chancel from the nave in the former case. This will be found to give from 45 to 50 feet as the entire length of the chancel, including the sacrum, supposing the reredos to be placed against the eastern wall, which, however, in the case of an apse, is hardly desirable. Vestries for the clergy and choir should be on a liberal scale, and in the opinion of the writer it would be desirable that they should be at the western portion of the church, where all the subordinate buildings might be clustered with effect, whereas at the eastern end they are but undignified excrescences, with probably a comparatively mean access; and the processional path from the western end is decidedly better than one merely doubling round a corner, which must be the case if the usual eastern position be selected for these apartments. The vestries should, of course, have communication one with the other.

The western façade of the town church is usually the principal external feature, and if in a street, should be prominently made such. The turret for the bells, with convenient ringing chamber, should be incorporated with it in the latter case as a composition to be seen from a near point of view, and not as a composition demanding a tower and spire for distant effect. How many exquisite and striking façades of this nature are to be found upon the Continent, and how few comparatively in England, notwithstanding the multitudes of town churches and chapels which in this century have been erected. It is in this part of the composition of the exterior and that of the eastern end of the interior which the writer would be glad to see worked out with especial care, and made the subject of the perspective views which the competitors are invited to send.

There are other matters and details, to which it is possible attention may be directed in subsequent numbers of this journal; but it is distinctly to be understood that those, or these suggestions, are to be considered as mere private opinions to be taken for what they are worth, and in no way to fetter the judgment of the competitors, or to influence the decision to which the umpires will come after careful consideration of the several designs and drawings which will be submitted to them.

J. P. S.

THE SYSTEM OF SUPPLYING QUANTITIES.

THE question of "Quantities," the practical details of which are now being exhaustively treated in this journal by the author of previous equally complete papers upon "Dilapidations," deserves some consideration in a broader point of view than that which is comprised within the scope of

that writer's remarks. Our readers well know that considerable difference as to the practice of architects with respect to this part of the machinery of their work exists in different parts of the country; and, as usually is the fact in disputed matters, there is a good deal to say on both sides of the questions thus raised. The first of these is whether the architect should or should not personally supply and be responsible for the quantities of his own works. If competent to take them out, no one would be so well fitted to do so, because no one else can be so well acquainted with his intentions as to the work required to carry out the design set forth in his drawings and explained in his specifications. Assume good faith on his part as between employer and contractor, and it is evident that the work must benefit by the revision of all the details of his design that the framing of the bill of quantities would entail on the architect. As good faith must after all, sooner or later, be taken for granted, and the work entrusted to some one—and unless confidence be given to the architect, it is but folly on the part of employer or contractor to put themselves in his hands at all—there seems no good reason for trusting the preparation of the design and the superintendence of its execution to him, and yet denying that confidence to the same individual when this lesser operation comes to be considered. The only cause for such vacillating conduct could be that some special and more powerful temptation to the architect as to the quantities exists than with the other portions of his work; or that some method of checking, as by double entry, is obtained by the subdivision of labour which otherwise would be all left in the hands of one person.

Now it is easy to show that there really is no such kind of temptation. The interest of the architect invariably is to obtain for his employer as much as is practicable for his means, and this is a sufficient safeguard that justice is likely to be done to him in this matter, which is perhaps very difficult for him to verify. On the other hand, the responsibility which must attach to whomsoever this task devolves upon of making good errors would naturally prevent the architect from leaning unduly to the side to which it has been shown his interest inclines, because the party who would then be wronged would be the contractor, who is sure to be quite able to protect himself, and demand restitution. To all these reasons, thought by some sufficient in themselves, is added that very cogent one that in many parts of the country there is no one else to do this work, and that therefore of necessity it is done by the architect, or under his direction in his own office; and he therefore undertakes both this work and its responsibilities, and as a proper consequence, he receives payment for same. It is in this payment however, that the *gravamen* of the question lies: from whom is it to be taken? Practically, as all who think upon the subject are aware, it is the employer who, in one shape or another, is and should be the paymaster. The practice almost universally has been that the cost of the quantities—viz., the charge for taking them out, and undertaking the responsibility of their correctness, in the shape of a commission upon the expenditure, and the cost of lithographing and printing them—is made a part of the contract and is paid by the contractor, who, adding the amount to that of his estimate for the work, is reimbursed by the employer. This system in general is found to work well, and on the whole is in itself a just one, inasmuch as, if the work be carried out and the responsibility attached to the quantities incurred, the payment is commensurate. On the other hand, a difficulty constantly arises in the case of works which are abandoned, for obviously there is no contract sum in which this cost can be included, and no contractor to pay it. The employer must then be applied to, as the principal, for payment for this work done in his behalf, which

however would be, and ought to be, less, by reason of the responsibility as to the accuracy of the quantities having lapsed. Nevertheless when this disagreeable necessity arises, trouble generally ensues. Employers, though they pay patiently for bricks, do so very impatiently for brains, and are apt to consider that the commission which they expected to pay for their architect's services would cover all their charges as well. It is true that all this trouble may be avoided by full explanation being given in the first instance. But it is somewhat hard upon an architect that immediately he is introduced to an employer he is to be expected to assume ignorance of all ordinary procedure on the part of the latter to anticipate difficulties and disputes, and possibly to frighten away a patron, before he can prove to him the value and need of such necessary outlay. Should he take this course, it is tolerably certain that it would lead to his having to come to a compromise and take less than his fair charges for all the various operations indicated. Besides, it would be no slight task in itself to indoctrinate several members of a committee, for instance, with a clear understanding as to the intricacies of architectural practice. Only recently the writer had to undergo long and painful correspondence to explain at the same time to one employer why, for a special reason, he had not supplied the quantities for a work, and to another why he had done so, as in the ordinary course of business.

The fact is, it is not only in various parts of the country that difference as to practice in this respect exists, but even in the metropolis works of different scale require to be differently treated. Eminent London builders will not tender for works unless quantities are supplied, and not only so, but they demand, with no small apparent reason, that these quantities be prepared by two surveyors, one appointed by themselves. When this is the case the charge is necessarily high, and to many an employer it seems out of proportion to that commission he pays his architect, for, as he imagines, all the professional work connected with the matter he has intrusted to him. In such cases as these, and it is such naturally which occur most readily to the minds of leading architects in London, there is no possibility that the work could be done by themselves, and obviously, therefore, no plea upon which they could expect payment for the work. No question then arises as to receiving anything from contractors in their cases. Smaller works, however, in London often come under very similar circumstances to those we have described as regulating country practice, with the single exception that the help of surveyors whose special business is to take out quantities is at hand if it be better to seek it.

The resolution come to on these vexed questions by the Institute of Architects affirms as a principle that it is better that architects should not take out their own quantities, but that if they do so, since the wide existence of the practice and the cogency of the causes of it cannot be ignored, then that the architect should be paid for this, as for his other work, directly by the employer.

Now this compromise, though well intended, is illogical, and bears hardly upon country architects, who will without doubt continue their previous practice in spite of this mild remonstrance. We have shown that if an architect be able and have time for the work, no one is so well fitted to do justice to it; and it would be a practical loss to the employer if it be deputed to one less fitted, upon grounds that if the matter were thoroughly explained to him it is not conceivable he would endorse. If he have confidence in his architect, he would not recognise the possibility of his forfeiting this for the declining to do what would be best done by him.

Again, if the payment by the contractor as a part of the contract be the simplest and least troublesome mode, there does not seem to be any objection to the direct payment of a

proper charge for work done by one party to a contract more than by the other to a third person who is supposed to stand in a position of independence between them. That the indirect payment of sums not due by a builder to an architect is indefensible upon any ground has really nothing to do with the above question.

There is one way, and a usual one, in which employers benefit by the non-adoption of the ordinary routine as to the preparation of quantities for builders, but this most unjustly so. If, as is often done in the case of small works, more particularly those in the country, a number of builders are asked to tender from drawings or specifications only, with the warning that no tender is necessarily to be accepted, and the work is ultimately abandoned, the employer escapes paying for the quantities at all. But with this exception, in which some one else is made unfairly to bear the brunt, the employer pays directly or indirectly for the quantities having been taken, and very often far more in the latter than the former case.

He pays directly when his architect has done or deputed this work, and indirectly when it is thrown on to the shoulders of the builders, for they either depute some one to do it, or do it themselves, and have to charge in the estimate for it; or else they do it so slovenly and ignorantly, and lump the amounts sufficiently to cover the cost, while affecting to ignore the process. By this latter irregular method the employer may seem to save surveyor's fees and pay the minimum for brains, but pays instead for many more bricks than he uses. The question, however, often comes home forcibly to the architect, especially the provincial one who does not take out his own quantities, and therefore cannot feel sure about them, as to whether the regular plan of supplying authorised ones or leaving the matter to the builders be the better. But the real truth in this case is, that the value of works is roughly appraised by his employers by comparison with others in their neighbourhood, the cheapest invariably being taken as precedents, irrespective of known failure or roguery on the part of their builders, non-payment of timber bills, and the like; and he is asked to compete as to cost with works done under such circumstances.

The writer has found that tenders invited without quantities being given pay 100 per cent., and that employers invariably insist on accepting the lowest, on the ground that they possess an engine of the nature of a thumb-screw, in the shape of an architect, who, by assumed supernatural vigilance, even without the aid of the clerk of works, is expected to secure that every man, inclusive of rotten builders, shall do their duty, or else be liable himself in case of default.

That even such ingeniously contrived machinery should fail to compass such impossible conditions is not to be wondered at. Yet the system, before it breaks down, will, without doubt, achieve some wonderful results in the way of low tenders, but no one in the end is found to be permanently the better for such a condition of things. The cheap building will before long be found out to be nasty as well, the architect existing awhile on scanty commissions thus reduced in amount, and the builder who breaks and the merchants who trusted him having soon cause to curse it. Yet as the crop of fools is never exhausted, and adventurers will never cease from the land, the existence of this mode of doing business cannot be ignored, but we are not bound to take cognizance of it in striving to introduce or maintain a better one.

One evil of ordinary "quantities" is that those who prepare them are too often not competent. They learn their business in the office rather than upon the works, and this branch of architectural practice, in which the utmost practical knowledge is requisite, suffers for the want of it. There can be no better training for a young architect than to spend

some time in learning the details of work, which he can do well in taking out quantities, more particularly if he conduct the measurements on the spot, and not merely from drawings. Some early period of his practice may, therefore, while his works are few, be devoted to mastering this subject, and for the work so done he ought to be paid; and those of his professional brethren who have got beyond the need of the same should not judge him too hardly for this; nor put it out of his power by restrictive rules.

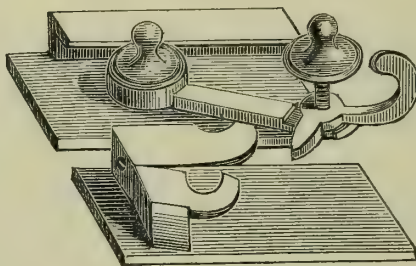
As to the question of excessive elaboration, of which much has been said, builders who know their business can generally make allowance; if in their own practice they have been accustomed to lump items and price them accordingly, when they have full quantities set before them they can ignore the minutiae and lessen the price of the other items accordingly; and if they neglect to do so will not often succeed in getting the works they tender for.

We invite the attention of our readers to the above view of a subject into which we are now at length giving an insight as to the details, being anxious, if uniformity of practice cannot be attained, yet that general principles may be agreed upon which shall neither be lax nor too irksome to follow.

SASH FASTENERS AND SASH STOPS.—II.

INGENIOUS is the next invention that requires our attention. It is called

PRICE'S PATENT SASH FASTENER.



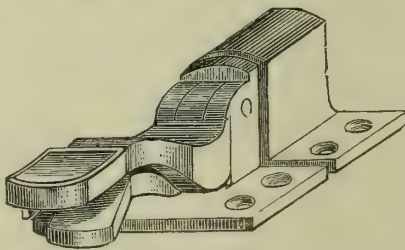
The manufacturer is Mr. Stanbury, of Birmingham.

It will be seen it has two springs—one the ordinary spring, and the other what is called the locking spring. This latter spring is thrown back by the hand pressing the turned-up piece in front of the knob, so that one action opens this fastener or shuts it. It has two defects: one is, that a hooked piece of wire put through the meeting bars and worked from the front of the fastener would pull it open; the other, that I found the spring so weak after (I am bound to admit) a very considerable trial, that it ceased to act. Were this spring stronger, it would lessen the ease in the use of the wire I have alluded to. Is it not worth the while of the manufacturer to try and remedy the objections?

The next we have to consider is a bold, handsome fastener,—No. 6.

It is called

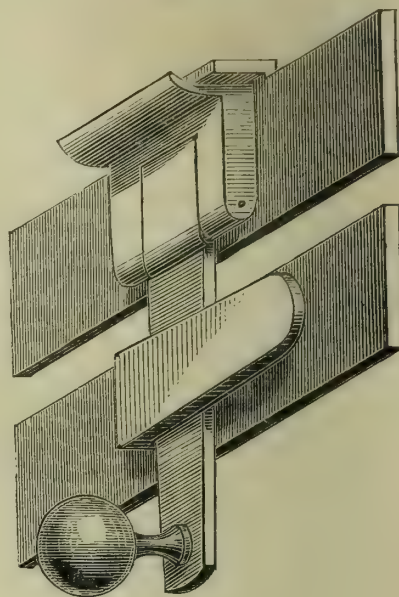
WALKER'S PARAGON SASH FASTENER.



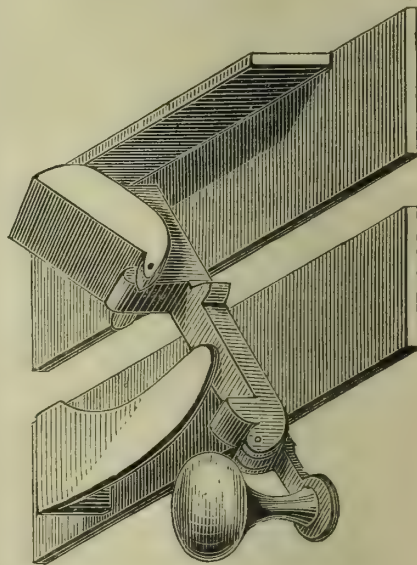
The price is 3s. 6d., which somewhat places it beyond general use. When fastened (the wedge piece is then closed), it may defy any ingenuity; force alone can open it from the outside. The objections are (1) its price, as I have mentioned; (2)

the wedge piece would in practice be seldom used; (3) its being so dissimilar to the fastener in general use, it is a question if the public would adopt it. In its favour should be recorded that the shutting action forces home the sashes—certainly a good point. Next:

CREGAN'S REGISTERED SECURE SASH AND CASEMENT FASTENERS. (Fig. 7.)



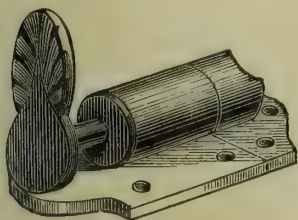
This, like one fastener illustrated a fortnight ago is without any spring, though it is entirely different in other respects. I can recommend it for use as a casement fastener, where cheapness and security are much desired, and care in its use can be obtained. In use, it requires both hands—one to lift the back piece, and the other to push the knob. It is not adapted for ordinary sashes, but the inventor proposes a different kind for such use. (Fig. 8.)



This, like the last, has no spring, but a clever method of lifting the back piece by a lever. In the drawing this piece is shown raised. One hand only is necessary. At first I could not discover the great objection; but after a time I found out that it is perfectly easy to open this fastener with an ordinary knife. The knife must be used at the back of the bar. I have alluded to this fastener more to caution inventors, as I have so often found that that which appeared at first so clever had some radical defect, rendering it perfectly useless.

A recent invention we next take, to illustrate an entirely different principle. It is called—

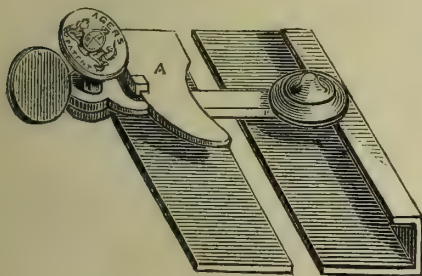
BROWN'S PATENT BURGLAR-PROOF WINDOW FASTENER. (Fig. 9.)



This figure shows the fastener open. It is closed by pressing the knob portion and turning it either to the right or left. To open it merely requires the knob portion to be lifted from the horizontal to the perpendicular, when the spiral spring inside the barrel part of the fastener forces the fastener open. It is very ingenious, and I am informed commands a large sale, which I am sorry I may, by pointing out its defects, diminish. Of course this I cannot help. Its disadvantages are great. (1) With a piece of bent wire placed through the meeting bars, the knob portion could be raised from the horizontal to the perpendicular, and directly this is accomplished the spring itself would complete the work. (2) Unless the sashes are quite closed, the fastener would pass over instead of into its place; and so, though the person turned it correctly, the sashes would not be fastened. At dusk this is likely to happen. It is a most serious defect.

Space will only permit me to give one more illustration this week. It is—

AGAR'S PATENT SASH FASTENER. (No. 10.)



The price 2s. 3d. each. It is a pleasant sash fastener, one action opening or shutting it. It differs from all those previously given, in that its security is obtained by making the catch to work on a pivot. It will be seen, even from the drawing, how the catch (marked A on sketch) is thrown back and the bar released. It may be called an objection, the catch working on a pivot; but if not, then (1) two springs are necessary; (2) the fastener can be opened from the front by the bent wire pulling at the piece in front of the knob. B. F.

(P.S.—The letters received shall have attention next week.)

ARCHITECTURAL ASSOCIATION.

AT the usual fortnightly meeting of this Association on Friday evening last, Mr. E. J. Tarver, Vice-President, in the chair, the minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members:—Messrs. J. F. J. Fish (of Glasgow), W. T. Brown (of Northampton), E. A. Cooke, F. Pinches, E. Hamar, J. P. Doyle (of Exeter), P. Thompson (of South Shields), J. N. Geithing, and T. Smith.

Mr. PAICE proposed a vote of thanks to the Prime Warden of the Goldsmiths' Company, for his kindness in permitting the members of the Association to visit Goldsmiths' Hall, on the 18th instant; to Mr. Hesketh, the Company's architect, for conducting the visitors over the building; and to Mr. James Williams, of Her Majesty's

Office of Works, for his kindness in permitting the members to visit, and accompanying them over, the new Post Office buildings in S. Martin's-le-Grand, on the same date. The motion having been carried by acclamation,

Mr. JOHN SULMAN read a paper entitled,

TEACHINGS OF SOME OLD CHURCHES IN NORTHANTS.

In introducing the subject, the author said that last year it was his good fortune to hold the Pugin Travelling Studentship, and he devoted his time to sketching in the county of Northants. In this paper he proposed to describe the most interesting things he saw, and to endeavour to impart to his fellow-students some of the lessons he had learnt on the occasion. Northamptonshire is one of the three richest architectural counties in the kingdom, the others being Lincolnshire and Somersetshire,—rich, not in abbeys and cathedrals, as Yorkshire, but in parish churches, generally of large size, and to all appearance beyond the requirements of the population. The pre-eminence of the district in this respect is to be accounted for by the fact that it is known to have been a wealthy district, and possessed the advantage of a plentiful supply of good building-stone. The influence of the religious orders who possessed much of the district no doubt had somewhat to do with the size of the buildings. The typical feature of the churches of this district, distinguishing the locality from almost all others, is the ever-prevalent spire. Why this should be so is not easy to understand, for the district generally, although not hilly, cannot be called flat. The object of the spires of Lincolnshire can be well understood. Perhaps in Northants it may have been a matter of fashion, and the spire, having been introduced and developed, it may be, in the flat meadows of the Nene Valley, may have gradually worked its way through the length and breadth of the district. The general impression which the spires of Northants give the observer is that of grace; but a really sturdy, vigorous spire is hardly to be seen. These spires are always pierced with two or three tiers of spire lights, which undoubtedly give them their peculiar lightness of appearance. The churches generally are without transepts, and consist of nave and aisles and chancel, sometimes with a chapel. The towers are almost universally at the west-end, opening into the church by a good tower-arch. The only church Mr. Sulman remembered as having a central tower was the small Norman one at Barton Seagrave—built no doubt before even the rudiment of a stone spire was introduced. It is noteworthy that the towers are always built of the best stone, and seem to have had the greatest amount of money and care lavished on them, while the bodies of the churches are left to take care of themselves, being sometimes built of the roughest rubble, as though the towers had swallowed up all the good ashlar. For high-pitched roofs stone slates are frequently used, and with good effect, and they were probably the general roofing material of the district before the flat lead-covered roofs of the Perpendicular era were introduced. As to the periods in which the churches of the district were erected, the Norman era, Mr. Sulman remarked, can claim very little; of reputed Saxon work, however, there were three of the best known examples in the country, viz., Brixworth, Brigstock and Earl's Barton. The Transitional era has left considerable remains at Rothwell, one or two towers, and many small portions scattered here and there among various churches; but the greatest architectural movement took place in the Early English era, from about 1230 to 1250, when by far the greater number of the churches of the district were either founded or rebuilt. To these, additions and insertions of Decorated work were constantly and continually made till the middle of the Perpendicular period was reached, by which time the people seemed tired of the darkness of their churches, and forthwith the rage for clerestories began, leaving scarcely a single church untouched throughout the county. Clerestories had, however, been introduced here and there, especially in new churches, towards the beginning of the Perpendicular period. The sudden transition from the earlier high-pitched roofs to the flatness of later date was no doubt caused by this change, as, had the high-pitched roofs been retained above the added clerestories, they would have obscured too much of the tower. Having given this general idea of the district, Mr. Sulman proceeded to describe the chief characteristics of some of the churches he had visited. The church

of S. Peter's, Northampton, is one of the few churches in the district containing much Norman work, which in this case is very rich indeed. It is principally shown in the nave and chancel arcades, the very rich tower arch, and a peculiar flush arch in the west face of tower, now filled in with a Perpendicular window. The tower is a very fine specimen, and a good example to study for massive proportions. The clerestory is well treated as an arcade, a window being pierced here and there. The ironstone of the district, a rich brown in colour, is universally employed for banding, together with a whiter stone, and this treatment is common in many churches of the district. At S. Sepulchre's, Northampton, exists some of the most interesting historical work in the county. Originally a round church of the order of Knights Templars, it has, like its companion the Temple Church in London, been so added to at subsequent dates that its primary form is almost lost. The circular form is confined to the aisle, the clerestory being octagonal; but it is quite dwarfed by the west tower and spire, with its enormously projecting buttresses. A projecting chancel and aisles were probably added to the circular portion towards the latter part of the twelfth century, leaving the circle as a nave; but these in their turn have now to give place to a new chancel, and recently have had a second north aisle added to them by Sir G. G. Scott, the grandly simple church of the old Templars being used as a baptistry. This circular planning on an enlarged scale might (Mr. Sulman remarked *en passant*) be turned to good account in the present day for churches, so as to seat large numbers without obstructions to the sight; and if the dome was ever to be assimilated with Mediæval design, it seemed to him that it must be with some such kind of building as the one under notice, which, from its very form (far more than the square, with which domes were frequently employed) seemed to call for it as its only natural covering. Having alluded to the unprotected condition of the beautiful Eleanor cross at Northampton, Mr. Sulman said that almost adjoining Northampton on the north is the once aristocratic but now decayed village of Kingsthorpe, with its rather large church, quite of the Northants type. An interesting feature on the tower—and one well worthy of study in this very "shabby" age—is the deep hollow-splayed reveals of the belfry lights, the plane of the tracery being set far back; the effect is remarkably good. The spire has the usual tier of traceried triangular-headed spire lights. A bit of detail worthy of note is the moulding to the jambs of the square-headed south chapel windows, with four-leaved flowers carved on the outer chamfer; this is a pleasant variation on the usual treatment. The nave arcades are simple massive cylindrical Norman shafts, with semi-circular arches of one square order; to those who still wish to retain the old system of church-planning, this arcade afforded a good specimen of simple and vigorous treatment without obstructing the view of too many of the congregation in the aisles. Under the east end of the chancel there exists a good square vaulted crypt of Decorated date, with a central shaft; this crypt now serves the purposes of a coalhole and lumber cellar. A few miles to the north the church of Spratton stands well on a hill, its chief attraction being the good Transitional west tower. The spire, of late date, grows well out of the tower. The iron bands round the tower may perhaps have been added when the spire was built, or, at any rate, have been necessitated by it, for Mr. Sulman conjectures that the walls, although thick (8ft. 6in.), are merely built with casings of ashlar, and filled in with rubble. The tower arch is small, being only 5ft. 6in. wide and 10ft. 3in. high. In this church the responds of the nave arcade are not attached to the end walls of the aisles, as was usually done; but there is a small piece of wall projecting at each end. The one to the east might be understood as having been used to screen off the side altars; but why should there be one at the west end as well, unless the Mediæval architect who built this church had the idea of balance, which is generally relegated to architects of the Classic persuasion? Under the arches dividing the chancel from the north chapel are two altar tombs, one a simple but beautiful specimen of the fourteenth century, constructed in alabaster, with a recumbent effigy of a knight. It is built up of slabs about 2½in. thick, polished, and is a very valuable, because rare, Mediæval precedent for the treatment of marble work. It has merely a simple moulded base and embattled cornice, the space between having only three trefoiled circles

enclosing shields, leaving a considerable amount of flat surface. About two miles from Spratton is Brixworth Church, noted for its Saxon remains—archæologically rather than architecturally interesting. The church of Great Brington, seated amidst most beautiful park-like scenery about seven miles north-west of Northampton, possesses a good square tower, but is famous principally on account of its tombs of Perpendicular, Elizabethan, and Jacobean dates, and all richly decorated in colour. The font is a rude but curious example of the Early English era, with a circular incised bowl and quatrefoil stem. Harlestone Church is very interesting, on account of the greater part of it being all of one date. The west end is Early English, and the clerestory is a Perpendicular addition; but the chancel dates from 1320, and the nave and aisles and south porch from 1325. The church is on a very sloping site, and the remarkably good manner in which the base courses are stepped is worthy of careful study. There is a peculiar kind of window found in some of these churches, appearing outside as two narrow windows one above the other, but included in one splay in the interior. The longer one is frequently called a leper window, whether rightly so or not Mr. Sulman could not say. Gayton Church contains a wall tomb, with a tiny model of an altar tomb and figure fixed in the recess; a late alabaster altar tomb, with incised figures; six stalls, with good carved subellæ; and some wood panelling, probably brought there from some other and perhaps secular building. At Earl's Barton Church the chief feature is of course the noted Saxon tower, one of the finest of its period in the kingdom. It has the usual long-and-short work, with the interspaces plastered. Norman work crops up in every part of the church, and there is some Transitional work in the south nave arcade, and some Early English work in the chancel. The windows are, as a rule, Decorated, and the clerestory is Perpendicular, so that a complete epitome of various phases of Mediæval architecture is presented in one and the same building. Castle Ashby Church contains a well-known Transitional doorway to the north porch. At Yardley Hastings, an ancient and good-sized village, the church is in a deplorable state of decay, and the only objects of interest are the original oak door to the south porch, and the very simple but rather imposing Transitional west tower. The church of Easton Mauditt possesses a graceful tower and spire, and remarkably well-carved and massive Elizabethan communion-table. At Bozeat is a moderate sized church, with a quiet rural-looking tower and spire. The tower is plastered and tattooed all over with little dots. On the west face a large Late Decorated window and door were inserted, but evidently had to be immediately partially blocked up to prevent the tower falling. The most noteworthy feature of the interior is the rich Late Decorated rood-screen, which some churchwarden has had painted and varnished, to improve (!) its appearance. There is a remarkable little church at Strixton, well worth close study as a pure example of a small rural Early English church; Mr. Sulman believed that on this account the church had been measured up and published by the Camden Society. Wollaston Church possesses a magnificent tower and spire, with one transept; all the rest of the church dates from the last century. Irchester Church has a tapering spire, the most slender in the county, but of good proportions, and the tower walls are built and buttressed in courses of brown and white stone. Wellingborough Church is a fine large example of late date, light and spacious internally, as if intended for a large congregation. The east window is a beautiful specimen of Decorated tracery; the west tower and spire are Early English. Mr. Sulman said that at the time of his visit the plastering was being scraped, and (horror of horrors!) the walls, which are of the roughest rubble, were being pointed to be left exposed. Such is the effect of carrying what are called "true principles" too far. At Rushden is one of the few transeptal churches in the district; but its chief glory is its beautifully-proportioned tower and spire. It is of rich Late work, and has small pinnacles and flying buttresses. This tower shows, in a striking way, that the builders of the Perpendicular period studied outline and proportion far more than the earlier architects. The west porch (probably an addition) shows a very simple and common-sense way of resisting the thrust of an arch. The roofs are very rich in carving. Two miles from Rushden, but just within the Bedfordshire border, stands the remarkable little church

of Wymington, which is throughout (even down to the font) of the same date, viz., Late Decorated. Some of the windows have flat heads, and others like two Egyptian lintels meeting in a point, but thoroughly ecclesiastical. The floor slopes from east to west, and undoubtedly did so at first. The church at Higham Ferrers, once a collegiate church, is one of the finest buildings in the district. The church is of a peculiar plan, having, as it were, two naves, each with an aisle. The old subject of a church for a congregation here crops up, and Mr. Sulman said the idea suggested itself whether a pulpit placed exactly opposite a central row of columns, as in this case, would not answer the object of retaining the nave arcade without being an obstruction? But then, how about the chancel? The Vicar said he felt no inconvenience from having a pillar right in front of him. The tower and spire are fine and imposing, and of remarkably good masonry. The west porch, probably a little later than the tower, is noted for its beautiful foliage and bas-reliefs of New Testament subjects. The spire and part of the tower were destroyed by lightning in the seventeenth century, and rebuilt in 1634. The church at Irthlingborough is also collegiate, and perhaps the most remarkable in the county. Its exceedingly picturesque detached tower is well-known. A good hint might be taken from this in treating our church towers occasionally as detached campaniles, as Mr. Street has done with good effect at St. James-the-Less, Westminster. Finedon Church, another fine pile, might be termed the "church of the mouldings," so good and numerous are they. The nave arcade, however, teaches the architect what to avoid, for the arches are struck from centres a little below the springing, giving them a broken-backed look. There is a strainer arch here which is almost a *fac-simile* of one at Rushden. The want of cusping to the bar tracery of the Curvilinear windows gives them a poverty-stricken appearance, which should certainly not be imitated. Some miles to the north-west Kettering spire rises high above all surrounding objects, and with good reason, for it is beautifully proportioned, and is well worth study. The general date is Perpendicular, and the north porch is built to face the path from the town, and not making a right angle with the church, showing a cool disregard of orthodox rules on the part of the Mediæval architect that few of his modern brethren would be daring enough to imitate. At Rothwell, four miles off, is another collegiate church. For a country church it covers an enormous space, the chancel alone being quite as large as an ordinary church. The tower is massive and square, with a good stair turret, and once had a spire. The nave arcades (Transitional) vie in height with those of a minster, and have very good carved caps. The tower, if the obstructing walls were removed, would be a most magnificent feature. Having briefly referred to the Market House at Rothwell, Rushton Hall, and the eccentric and well-known triangular lodge (said by local tradition to have been the trysting-place of the conspirators concerned in the Gunpowder Plot), the author proceeded to speak of the secluded village of Geddington, which is situate in a lovely amphitheatre, surrounded by woods and magnificent avenues of trees. The chief attraction, and the pride of the village, is the charming Eleanor Cross, the least known but perhaps the best and most beautiful—and certainly the most novel—of the three still existing. In plan it is a triangle, the two lower stages having a moulded contour, and being covered with a beautiful diaper. Above this are the three figures, covered by pedimented canopies; but the apex has vanished. The church here has an interesting Norman nave arcade of very squat proportions, and it possesses a wood screen and an original stone reredos with the altar worked in the wall, and consisting of a number of panels with cusped heads of Late Decorated date. At Barton Seagrave is a most peculiar but instructive little church, with some very vigorous Norman detail. It has a nave and south aisle, divided by a single fine shaft and two arches; a central tower, south chapel, and chancel. The nave has a clerestory, so that on the north side there are two ranges of windows. The tower arch is very muscular, having a span of only 7 feet, and a depth of 4 feet; it is, however, moulded only on the nave side—an amusing instance of economy of ornament we do not usually give the old men credit for. The Decorated portions of the church were added when it belonged to the Priory of Kenilworth, and the numerous small heads found are said to be the portraits of the monks. At Burton Latimer the

walls of the church have been scraped, and some interesting specimens of Early English wall decorations have been brought to light. Great Addington Church has a good square Decorated tower, with two ranges of battlements, one later and built over the other. At Little Addington there is a picturesque church, whose chief peculiarity is that it has the tower built within the west-end of the church, and opening into both the nave and aisles with arches that certainly cannot be commended for their beauty. The nave arcades, however, are very good. Stanwick Church, on the other side of the Nene, must have been built by an original genius. Mr. Sulman said he did not believe there was another tower and spire like it in the kingdom. It is octagonal from the ground upwards, and is a beautiful specimen of Early English work: date 1230, the spire being Decorated. Its grace and delicacy of outline are such that it has obtained the name of "The Lady," while the fine tower and spire of the neighbouring church of Raunds is known as "The Gentleman." In conclusion, Mr. Sulman referred to Raunds Church, a magnificent structure, with Early English tower and spire, which doubtless served as the model for many afterwards built. The interior is very spacious, but dilapidated. Inside the tower is a most beautiful window, or rather an inner plane of tracery. The east window is a large and fine Geometrical one, but without any cusps, and Mr. Sharpe, when the church was visited by the members of the Association last summer, expressed his opinion that it had always been so.

Mr. Sulman's paper (of which the foregoing is but an abstract) was illustrated by numerous sketches, and we understand the complete series will be on view at the forthcoming Members' Soirée. Very little discussion ensued, and nothing of any importance was said. The usual vote of thanks having been given to Mr. Sulman for his paper, the proceedings terminated.

Next Friday Mr. Tarver will read a paper before the Association, on the "Restoration of Willesden Church," which we intend to report and illustrate in the following number of the BUILDING NEWS.

ON PROFESSIONAL PRACTICE.

LECTURE VI.

MR. ROGER SMITH delivered the sixth and concluding lecture of this course on Monday evening last, taking for his subject Law and Property. He remarked that every profession or branch of business had its own special law, or had some special relation to the ordinary laws of the country. It was therefore incumbent on the merchant, for instance, to make himself acquainted with the law as to bills of exchange, shipping, bills of lading, &c.; and on the medical man to be versed in what was known as medical jurisprudence. Law was much too closely connected with an architect's practice to be safely omitted altogether in the training of an architect for professional practice; at the same time, it was far too large a subject to be exhausted in one lecture. He therefore proposed to say something as to the occasions which would most frequently crop up in an ordinary practice in which some knowledge of the law was requisite, and not to do much more than indicate the directions in which an architect might most favourably further pursue the study of the law if his practice was likely to be of such a nature as to require it. Property was very closely connected with law, the same class of practitioners who were most consulted in legal cases having most to do with the management and valuation of property. Most of this class of business was usually called surveying. Some men could occupy their time more profitably than by undertaking surveying, especially if they were highly talented as designers. When a man greatly excelled in the artistic part of his profession he would not be wise in devoting more time than he could help to surveying business, arbitrations, or any work of the kind. But such cases were very exceptional, and his hearers would find that when they entered into practice as architects they would not make so much money as to incline them to dispense with surveying business—business which came legitimately into their hands and which was fairly remunerative. It was therefore necessary for an architect, particularly for one who (as most did) combined surveying with purely architectural practice, to know something of the law relating to property, and to be able to understand such legal questions

as the architectural surveyor had to cope with. Hardly any subject could be a more appropriate one for a course of lectures to those training for the profession than the law of property, and he ventured to hope that some one competent to deal with the subject would be asked to give such a course of lectures to the members of the Association. In considering the special subject of his lecture, there were one or two general principles which might be usefully borne in mind by the architect. One of them was that every Englishman was expected to know the law of his country. If a man committed any illegal act, it was no excuse to plead ignorance of the law. While, however, he advised architects to study the law as it affected themselves, their clients, and the contractors, he wished particularly to caution his hearers not to presume too much upon their interpretation of the law, unless they were quite sure that they were right, for the maxim that "A little knowledge is a dangerous thing" was especially worth remembering by all those who ventured to dabble with the law. There were, however, certain things as to which, after a certain amount of experience, the architect would be able to say what was and what was not illegal. An architect of experience, for instance, would have no difficulty in saying what were the rights and wrongs of a building contract. But in other matters, the architect who had given some attention to the study of the law would know at once when it was necessary to go to a solicitor. The second general principle to be borne in mind was that the greater part of the law of England did not consist of Acts of Parliament. It was difficult, if not impossible, so to frame any Act as to prevent at any subsequent period any doubt as to the meaning of the Legislature. Very often the most important provisions of an Act were doubtfully interpreted until some party interested raised the question in a court of law, and the decision given by the judge was accepted as the meaning of the law, unless a superior court or the House of Lords gave a different decision, the latest and most authoritative decision on the point being always accepted as the law. This being the case, it was obvious that precedent, in legal matters, assumed an importance which it hardly had in any other relation of life whatever. It might be taken as a leading principle that anything which was customary, anything for which there was long-established usage for guidance, was safer in a legal point of view than any innovation which could be made upon it. Mr. Smith said that whenever an architect had a document to draw up, whether it was a contract or anything else, there were only two courses open: either to get a precedent in the shape of a form which had been long established, or else to draw up the thing as little like a legal document as possible, putting it into the plainest English, and omitting all legal verbiage. Such a document as the latter would in all probability stand the most crucial tests, but altogether it was probably much the safest plan to use a thoroughly good form. It was the best and the only wise course to have legal advice when there was the slightest doubt. It should be remembered that a contract could not be entered into with a Committee, as a Committee, but that it must be entered into with certain of the persons who formed the committee. On the other hand, incorporated bodies, possessing charters, could enter into contracts collectively, either under their seals or through their officers. Another general principle to be borne in mind was that English law divided itself into two great branches—Common Law and Equity; the latter being, as far as architectural dealings were concerned, by far the most formidable of the two. If a person proceeded at Common Law he recovered—if he recovered anything at all—a pecuniary compensation for any injury or damage he might prove to have sustained. But if he chose to proceed at Equity, he could get substantial relief; could get the matter set right or stopped if it was proceeding to his detriment. Another point to be borne in mind when it was proposed to resort to the law, was that law in any shape meant delay. To see a fashionable dentist or physician in the height of the London season, or to gain admittance to a Parisian theatre on *fête* nights, was expedition and celerity compared with the operation of the Law Courts, even in the simplest and most trifling cases. The fact was that the business upon the courts was always far greater than could be got through without continual postponements; although it seemed to him that the lawyers took a much longer time than the members of any

other profession to transact the simplest matters of business. True, the responsibility upon a solicitor was great, and it ought not to be done in undue haste, but the usual delays seemed out of all reason. Law, however, might mean a great deal more than delay. Litigation of any description was one of the most serious evils that architects could encounter, either for themselves or their clients, and was to be avoided as far as possible. It was sometimes really necessary to go to law, and in such cases it often happened that going to law was the least of two evils, although it cost a large sum of money, and much peace of mind and moral power. Often even the successful man in a lawsuit was a loser by his success, while the unsuccessful man was frequently ruined. It was highly desirable for architects, as well as other people, to have the most respectable legal advisers possible—men who would not make it their business to entangle their clients' affairs in the meshes of the law merely because a long lawsuit was a lucrative affair. Mr. Smith said he was once told by an old gentleman, "My principle is, 'Always consult a rich lawyer.' I like a good rich lawyer, because he is not fond of bothering with law, and he keeps you out of lawsuits if he can." The first legal matter that architects would have much to do with would be the contracts for buildings. A great many buildings were erected, and satisfactorily so, without any further contract than a mere exchange of letters between the parties. It was, however, as a general rule, advisable to have a carefully-drawn-up legal contract, expressing exactly what was meant, and omitting what was not meant. Wherever possible, therefore, the client's solicitor should draw up the contract. Ordinarily speaking, in such cases the solicitor would apply to the architect for the conditions of contract, and the architect should in such cases supply them. He had a series of forms of contract, and he ventured to suggest that it might be really worth while to get a collection of such forms for reference in the Library of the Association. (Hear, hear.) In many cases the client would absolutely decline to employ a solicitor; in such cases the architect must see to the preparation of the contract. Mr. Smith said he was some years ago engaged on some works for a gentleman who was then an eminent Queen's Counsel, and who was now a judge, and he said, "I shan't trouble about a solicitor. You write at the bottom of the specification, with the conditions attached: 'I undertake to perform the above works under the above conditions for the sum of £—.' This was dated, and signed by the contractor, and signed as "accepted" by the client. This form, brief as it was, was quite sufficient, Mr. Smith was informed by the authority in question, for all practical purposes. If more information was wanted as to the law of contracts, he could but refer his hearers to "The Law of Contracts for Works and Services," by Gibbons, being No. 50 of Weale's useful series. This was a very fair book, and formed one of the list of books which was arranged by the Committee for the Voluntary Architectural Examination. If there were any unusual conditions in the contract, the architect ought to be provided by a solicitor with a form of order for "extras." The following extract from Gibbons's book, just referred to, would exemplify the importance of being correct in these matters:—

Generally speaking, a corporation can only contract by deed under the corporate seal. The Guardians of Billericay Union made a contract by deed with Mr. Lamprell, a builder, for building their union work-house. The works were to be done under the superintendence of Messrs. Scott & Moffat, architects, and it was provided that if the architects required alterations or additions in the progress of the works, they should give Lamprell written instructions for the same, signed by them, and that he should not be deemed to have authority to do such additional works without such written instructions. The contract price was £5,500. Many extra works were done, which were valued by Scott & Moffat at £3,133, and there were several letters, some from Scott and some from Moffat, approving of the extra works. The Guardians had paid £6,300, and had accepted and acquiesced in the additional works. An action was brought by Lamprell against the Guardians for the balance of the contract price and the extra works. The Court of Exchequer, with great reluctance, decided against him, saying that his claim was apparently the most just and reasonable. The ground of the decision was that the Guardians, being a corporation, could only be bound by the deed, and the orders for the extra works were not according to the deed. They held that a written order signed by one of the architects was not sufficient to render the Guardians liable, the deed requiring it to be signed by both; and that a writing signed by the architects during the progress of the

works, or after their completion, was not sufficient. They also held that Lamprell could not appropriate the payments to the extra works, although made generally on account, because there was no liability on the part of the Guardians to pay for any of the extras.*

Anything unusual from special, again, ought never to be introduced into a contract unless by legal advice. General forms of tender could of course be followed from those generally accepted and about which there was no doubt. The next legal matter that would probably engage an architect's attention after the contract was signed would be, if he was going to build on leasehold property, to ascertain whether there would be any infringement of the lease; for if the conditions under which the lessee held the property were violated, the works could not be proceeded with. If what the architect proposed to do was reasonable, he would not ordinarily find much difficulty in getting the surveyor of the owner to accede to it. It was his experience, however, that it was never wise to seek permission to carry out new works from unprofessional parties, particularly next-door neighbours, who would be certain to refuse. The next legal matter to which he had to direct attention was the Acts regulating buildings in the Metropolis, and other large towns. It was not generally known that there was a considerable number of provisions in the Local Management and the Local Management (Amendment) Acts which affected buildings in London to a certain extent; and there were also certain bye-laws which the different local boards of works were empowered to make. Within the last few months, too, the London water companies had made bye-laws which had now the force of law, although he believed that they would, generally speaking, be evaded. But the Metropolitan Building Act was of course the most important, and it was desirable that every one who had to deal with buildings in London should be familiar with its provisions. Its two objects were to secure fair stability in the buildings put up, and to take the most obvious and reasonable precautions against fire. With the stipulations relating to stability the architect should make himself thoroughly familiar, as this would give great facility in working out the different problems that from time to time arose, and besides, would often lead to economy. For instance, one of the provisions of the Act was that walls which were not more than 25ft. apart from centre to centre, and which were tied together by the joists of floors at certain distances, might be thinner than would be necessitated under other circumstances. This provision was often overlooked. He thought that no one ought to desire to build with thinner walls than the *minimum* prescribed by the Building Act, for its structural provisions, on the whole, had been drawn up with great judgment. The Act permitted the use of 9in. walls to the top stories of dwelling-houses; but he advised his hearers to eschew that permission, as a 9in. wall was a very poor protection against the wet and cold of this climate. Under certain circumstances some of the conditions of the Act could be dispensed with by the permission of the Metropolitan Board of Works, but other conditions were indispensable. The question of light and air was a very important legal matter for the architect to consider, and when the ancient light of any property of his client was being injuriously affected by the carrying up of any new building, prompt action should be taken, and if necessary, an injunction obtained to stop the works. Any delay in this respect was extremely dangerous, for the courts might refuse to afford relief if much time was allowed to elapse before the party who felt himself aggrieved sought a remedy. Having alluded at some length to the question of the rights of light, and to the disagreements upon the subject by Mr. Homersham Cox and Professor Kerr (the Professor being, in Mr. Smith's opinion, in the right), Mr. Roger Smith next dwelt at some length on the subject of arbitrations, his remarks on that subject being substantially the same as those of Mr. Banister Fletcher (see the BUILDING NEWS for January 10, p. 38). Having treated with some minuteness on the subject of valuations, and described the ordinary methods of procedure, Mr. Smith offered some useful advice as to the laying out of estates, &c., and the management of property in general, and concluded by remarking that if there was any moral to be derived from the course of lectures which he had now completed, it was that architects ought to congratulate themselves that their profession was one that opened up such a varied field for prudence,

* Lamprell v. Guardians of Billericay Union, 3 Ex. 283.

honesty, and courage. Although the list of subjects with which he had to be acquainted seemed a formidable one, it was by no means so formidable as it appeared to be. Good success was fairly within the reach of any one who would take the trouble to attain it. (Hear, hear.)

Mr. PHENE SPIERS, in proposing a vote of thanks to Mr. Smith for the pains he had taken in giving this course of lectures, said that his own experience, so far as it went, confirmed all that Mr. Smith had said. He might mention that in last Friday's *Times* Mr. Smith's view as to the importance of prompt action in case of interference with ancient lights was borne out in the case of *Pretious v. Spiers and Pond*.

The motion having been seconded, was put to the meeting and carried unanimously, the Chairman especially endorsing what had been said by Mr. Smith as to the keeping of house property in good order. He thought the lectures would prove very useful, and in consequence of the reports which had appeared, would be of wide benefit.

The lecturer, in reply, said that he always felt it a pleasure to do anything to promote the welfare of the Association, and as the Press had been mentioned, he could not but express his thanks to the reporters for the, on the whole, very correct reports of this course of lectures which had appeared in the professional journals, thus giving a wider publicity to what he had intended as beneficial advice to the members of the Association.

MEDIÆVAL SANITARY ARRANGEMENTS.

IN a paper read on Friday evening last by Mr. John Sulman, before the Architectural Association, entitled, "Teachings of some Old Churches in Northants" (and of which paper an abstract will be found in another column), the author incidentally alluded to the remnant of a Mediæval house close adjoining Yardley Hastings Church, as being well worth visiting. The building consists of three floors—a basement (with rather peculiar slits for ventilation, such slits being, in section, of nearly the same shape as the chimney of a magic-lantern), a ground story (probably used as stores), and the first or main floor, used as the hall or a living room. This is approached by a wooden staircase formed of solid blocks of oak half square in section, supported by, and overhanging at each side, two sloping beams. In this hall there are a square-headed fire-place and several lockers in the wall. At one end is a small door, which leads into an ordure closet formed in the thickness of the wall, and well ventilated with two windows. The shoot, with its stone front, still exists, but it is blocked up about 12ft. down. No doubt, however, it was connected with a drain, and on examination outside Mr. Sulman found two or three slits about 1in. wide at the internal angle of a buttress for ventilating it. Mr. Sulman remarked that such careful sanitary arrangements in an age considered to be by no means particular about such matters would undoubtedly teach many sanitary reformers of the present day, and if we are wise will read us a very clear lesson that simple means are sometimes more effectual and preferable than the elaborate contrivances generally indulged in. Excluding the last twenty or thirty years, he was inclined to think that sanitary matters were better studied during the Middle Ages than at any subsequent time. Another example of the same kind existed at Pen-y-cær-Mawr Castle in Monmouthshire, which was exceedingly well arranged; and there were doubtless other instances.

THE PALESTINE EXPLORATION FUND.—The Committee of the Palestine Exploration Fund, in their quarterly statement just issued, inform subscribers that they have two main lines of work, the survey of Palestine and the examination of Jerusalem. The former has been conducted during the last year with as much vigour as was possible. More than a thousand square miles have been plotted, and when the committee can send out two more men to help, it will go on with double the expedition. It has been decided to open a special fund for Jerusalem purposes, to which subscriptions are invited.

At a meeting of the members of the Royal Academy on Tuesday night, there were elected Associates—as Painters, Messrs. H. W. B. Davis and J. Hodgson; and as Engraver, Mr. T. Oldham Barlow.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SELECTED DESIGN FOR THE CATHEDRAL OF
S. MARY, EDINBURGH.

We give this week an illustration of the North Elevation of Sir Gilbert Scott's design, selected by the Trustees for the erection of the new Cathedral of S. Mary, Edinburgh. We hope to be able next week to give a full description of the design, together with further illustrations.

FARM-HOUSE AND HOMESTEAD, THE COOMBE,
WADHURST.

These buildings were erected [in 1871-72, for C. de Murrieta, Esq., to take the place of some old buildings which had fallen into decay. The old house still forms a picturesque feature in the landscape, and is crowned by a fine chimney stack, from which the tall one on the new farm-house has been accurately copied. The new buildings stand on the S. W. slope of a hill, and are so arranged that the farmer may command a view of the yards and sheds from his bedroom and from a small side window in the chimney corner of his living room. The house has a basement containing the dairy and dairy scullery, the approach from the farm-yard being by an inclined plane, to avoid the awkwardness of carrying milk-pails down steps. The ground floor contains front and back staircases, living room, sitting room, kitchen, wash and bakehouse and other offices. The first floor contains five bedrooms and a w.c., and the second floor a bedroom for the men.

The homestead has a lofty building to the north, containing granary, barn, and threshing floor, terminating at one end with the cart shed and implement shed, and at the other end with the gig house and nag stable; all these buildings being accessible from the road. Entering by a gate facing the farm-house, a clear feeding-passage four feet wide connects all the other departments of the homestead. First there is a poultry-house and yard to the left, and beyond these a bull-house; on the right a calf-pen; next on the left a cow-house fitted with mangers and water-trough. After this the feeding-passage turns, and gives access to the boiling-house, which is thus centrally placed; beyond this is a root-store, and further on a spare stall or infirmary; while on the opposite side of the passage are the piggeries and the open hovel for young stock. The passage continues to a chamber for hay and chaff (with loft overhead), and terminates with a door into the earthen stable. The latter has been built at a different angle from the rest, partly to give more space to the inclosed yard, and partly to give that yard as much sun as possible. There is a continuous water supply to all the buildings and yards from a pond higher up the hill.

The whole has been carried out by W. Shearburn, of Dorking, from the plans and under the superintendence of Edward J. Tarver, architect.

DETAILS OF FRENCH WORK.

We re-produce from a French work, "Recueil de Sculptures Gothiques," by M. Adams, Inspecteur des Travaux de la Sainte Chapelle, some interesting details from the Cathedral of Notre Dame and S. Chapelle, Paris. The details from Notre Dame consist of a portion of the frieze of the tritorium of the nave, and those from S. Chapelle of the cornice of the oratory.

FIRE-PROOF CONSTRUCTION.

The recent disastrous fires at Boston, America, and in Thames-street, London, have had the effect of drawing attention to what is commonly called fire-proof buildings. It becomes therefore desirable that the occasion should not be neglected for considering, and, if practicable, for remedying, the admitted defects of those modes of construction which at present only approxi-

mate, and that remotely, to so important a desideratum.

Iron, than which no material better serves the purposes of the architect, comes in for a full share of condemnation, as treacherous in the highest degree when applied as it now is in the construction of buildings, increasing rather than diminishing the risk of injury or destruction by fire.

The large space required for vertical supports of brick in any building, especially in warehouses and factories, would be such an encroachment on the floor area and intercept light to such an extent as almost to preclude the use of that material. It therefore becomes necessary, before excluding iron from the limited list of materials at command for that purpose, to ascertain whether means cannot be devised for neutralising its negative property of inability to withstand the action of excessive heat, and retaining under that condition its positive properties, those of the smallest known sectional area in relation to the duty to be performed, with the greatest resistance to compression and tension.

Captain Shaw, in his "Fire Surveys," gives many useful hints as to the principles to be observed in the construction of buildings aiming at being proof against fire, most of which an experience extending over twenty-five years of the causes and effects of many hundred fires, that have come under my official notice, enables me to endorse.

One of those hints, that in which he advises the use of solid instead of hollow columns of iron and their protection by plaster, recalled to my attention the whole subject of fire-proof construction, the result of which I have embodied in the accompanying drawing, which is self-explanatory.

Cylindrical shafts, cast in the coarsest sand, having slots to admit of the protrusion through them of the concrete core, forming, with the fillets or ridges, a key for the encasement of the columns by Portland cement 1½in. in thickness; by these means the quantity of the metal is reduced to a minimum, and that minimum efficiently protected, externally and at the core, by plastic and concrete material, proof against the action of fire, as regards the trustworthiness of the points of support.

Carrying the subject beyond the safety of the points of support, the drawing further shows a mode by which neither iron beams nor timber become necessary in the formation of floors, which are here proposed to be formed of groined arches of bricks and plain tiles, with a sufficient thickness of concrete over them to guard against injury to the arches by impact, or moving loads on the surface of the floor, which is proposed to be of Portland cement, with a floated surface.

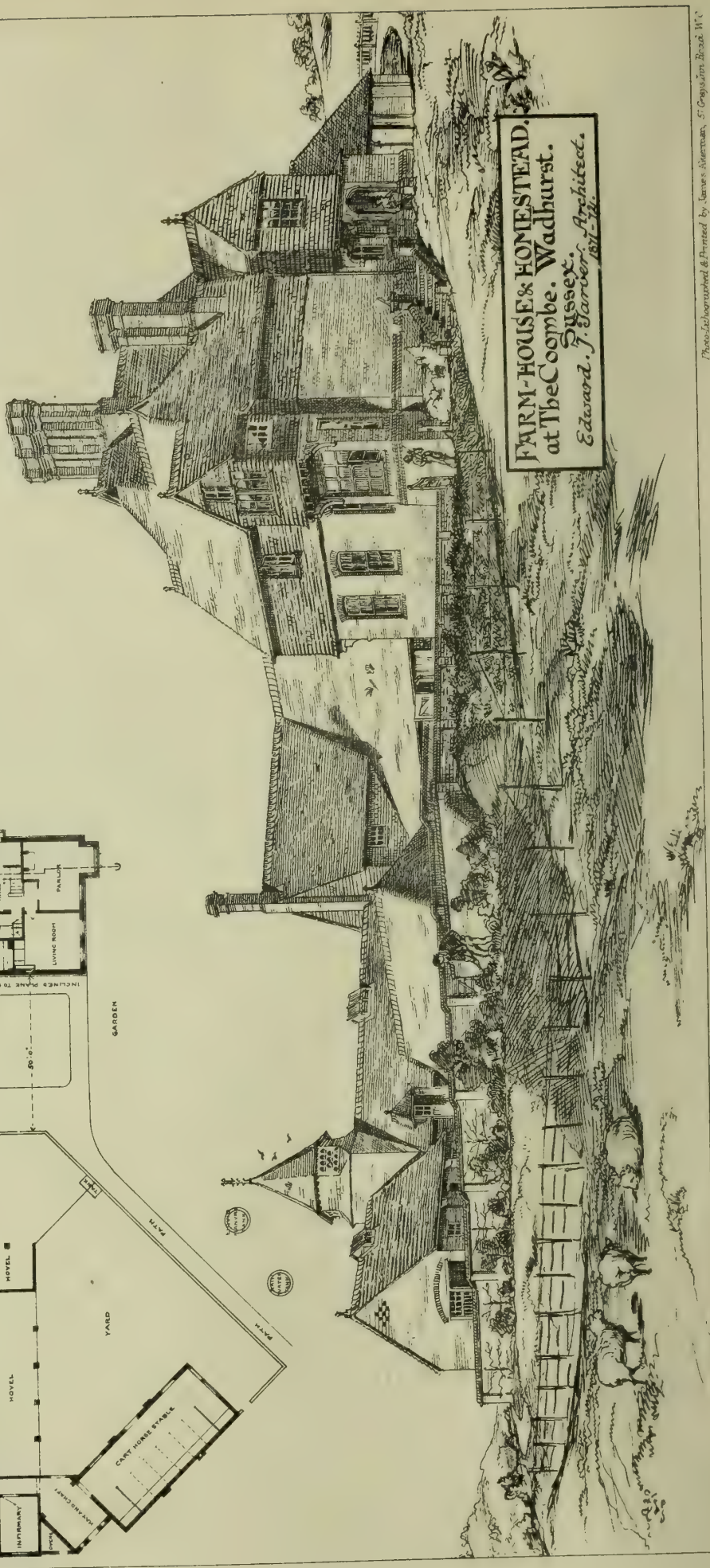
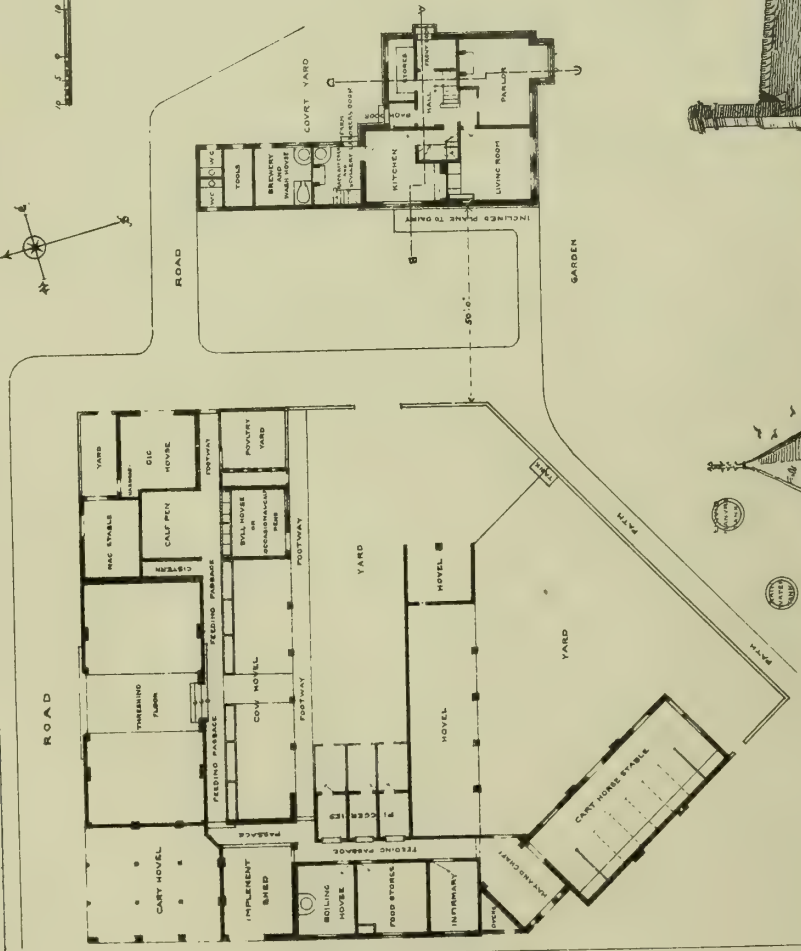
Of this mode of construction, my experience as an architect, through upwards of forty-five years, enables me to speak with confidence.

The drawing (see Lithographic illustration) must be considered as setting forth certain principles only of fire-proof construction. The variations of treatment will be as numerous as the differences in the requirements, whether for buildings to be appropriated to the stowage of light goods only, or to the heaviest merchandise, and the consequent railway-like rolling of bales and other packages over their floors.

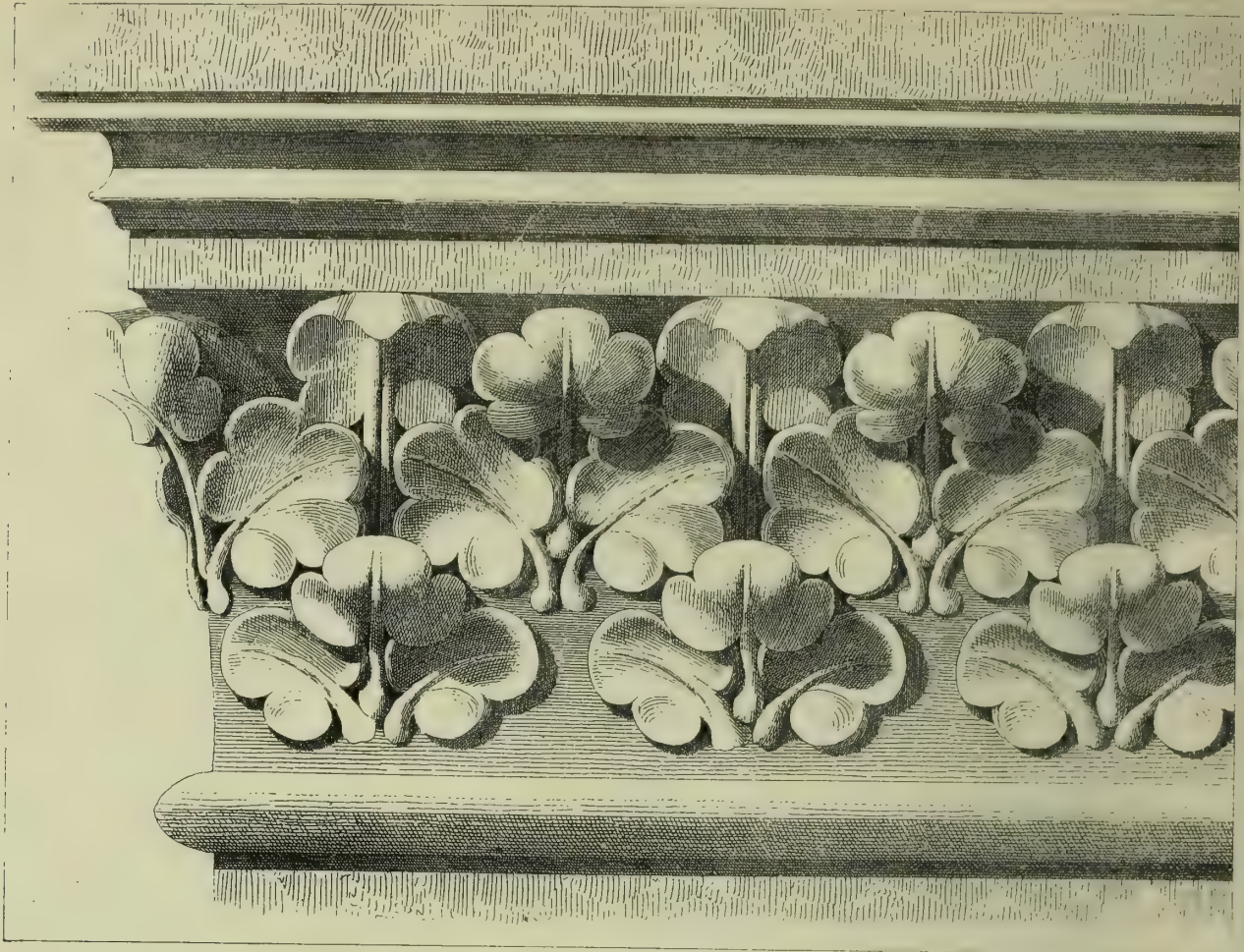
THOMAS BELLAMY.

8, Charlotte-street, Bedford-square.

LEEDS SCHOOL BOARD.—At a recent meeting of this Board a proposition was carried that the resolution relative to the method of payment of commission to architects, adopted at the meeting of the Board held on the 14th November, be rescinded, and that the terms of payment of commission be the same as adopted by Her Majesty's Office of Works and Public Buildings.



FARM-HOUSE & HOMESTEAD.
at The Coombe, Wadhurst.
Sussex.
Edward. J. Barber, Architect.
1871-72.



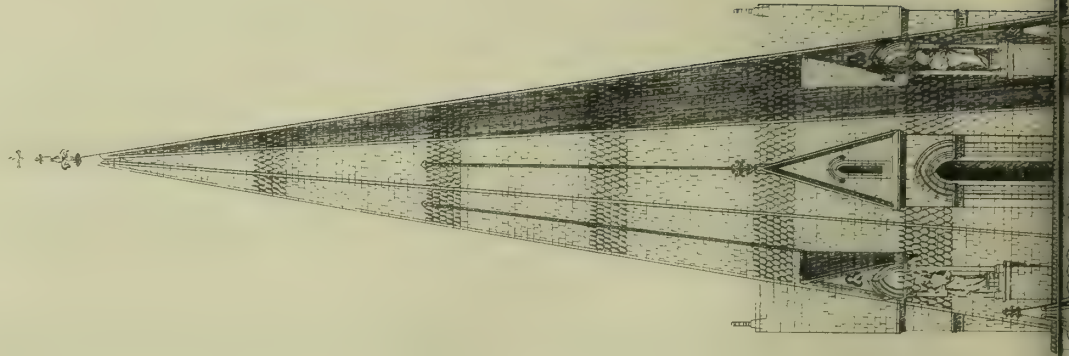
NOTRE DAME, DE PARIS
Frise du triforium de la nef

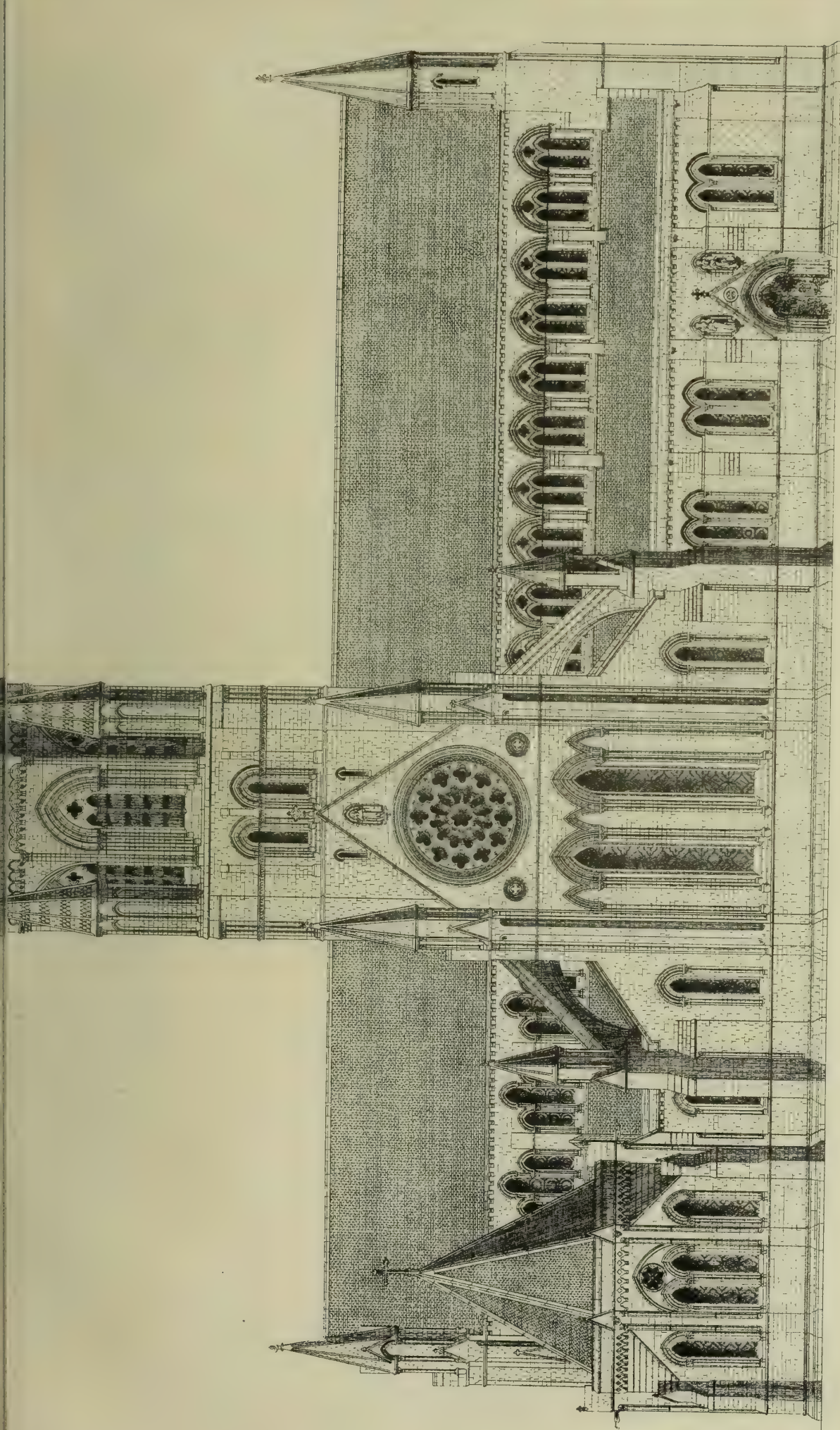
13th Century



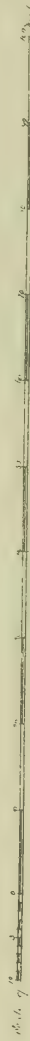
Whitman & Bass, Photo Litho to the Queen, 236, Holborn, London.

CHAPELLE DE LA REINE
Frise de la nef



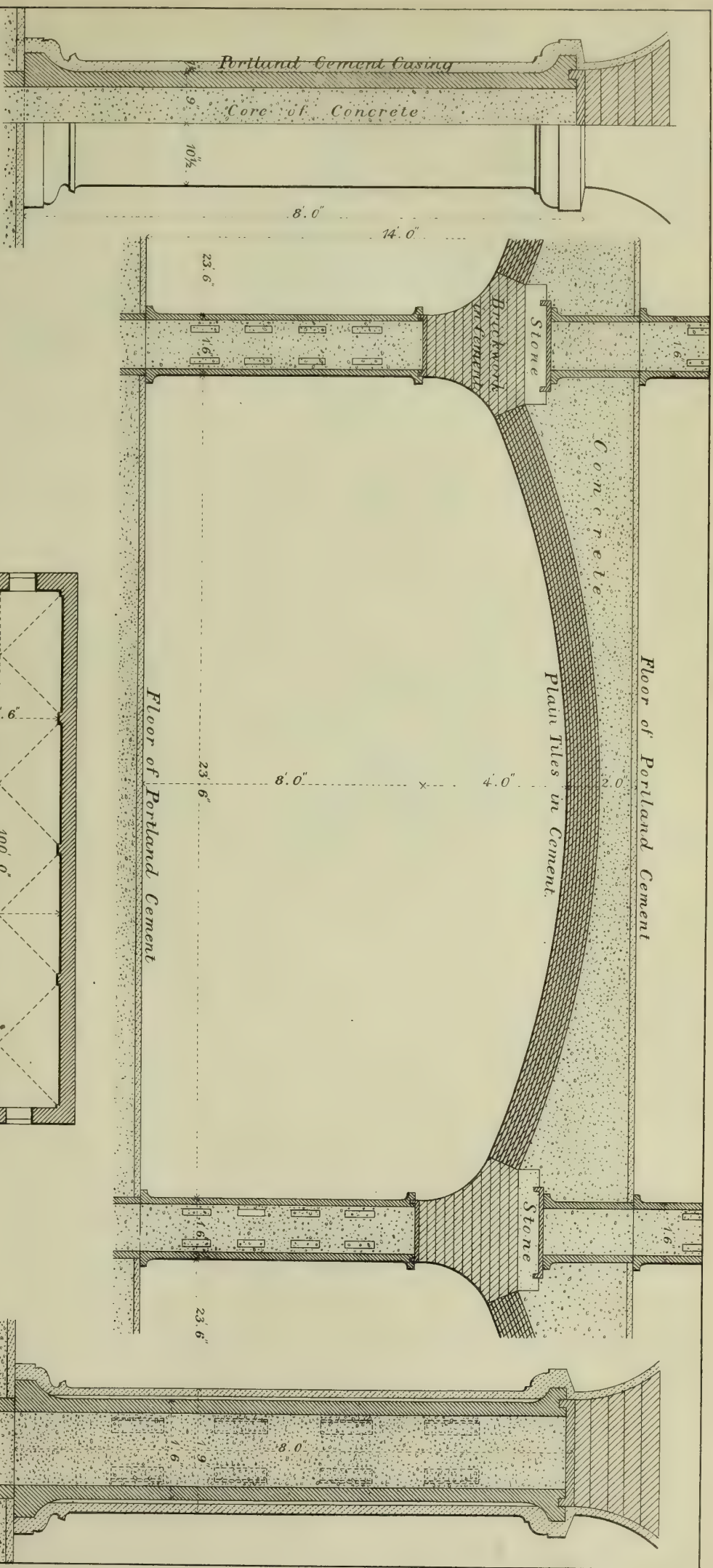


NORTH ELEVATION.



SELECTED DESIGN FOR THE CATHEDRAL CHURCH OF S. MARY, EDINBURGH.

SIR GILBERT G. SCOTT, R.A. ARCHT.

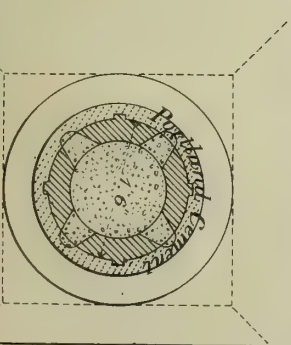


FIRE PROOF CONSTRUCTION

Plan Section and Details.

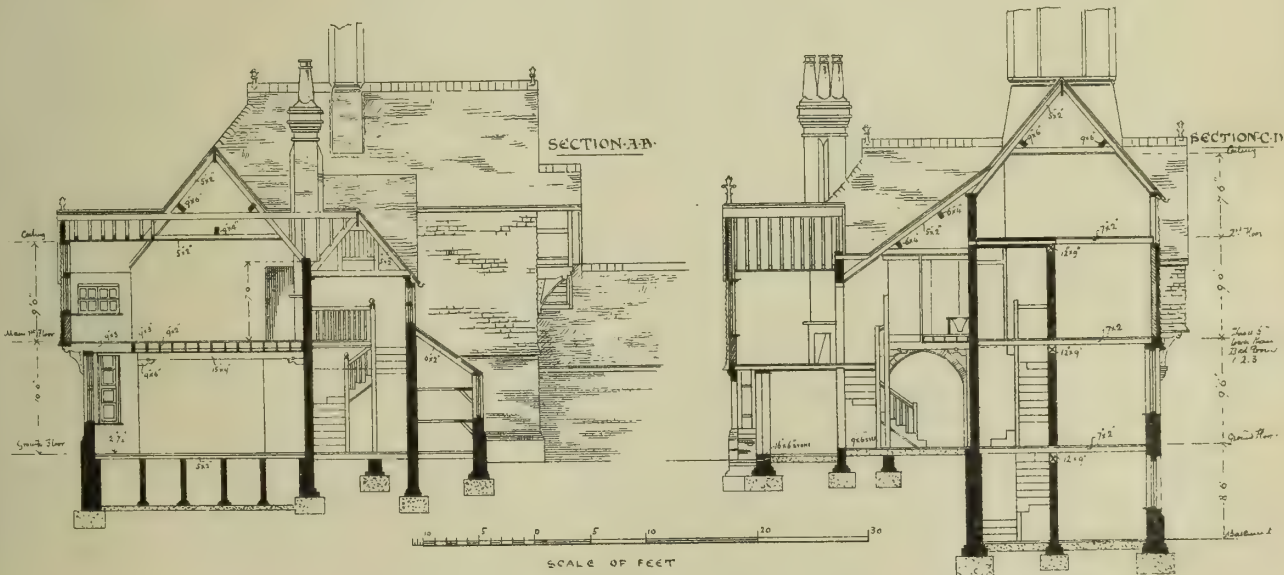
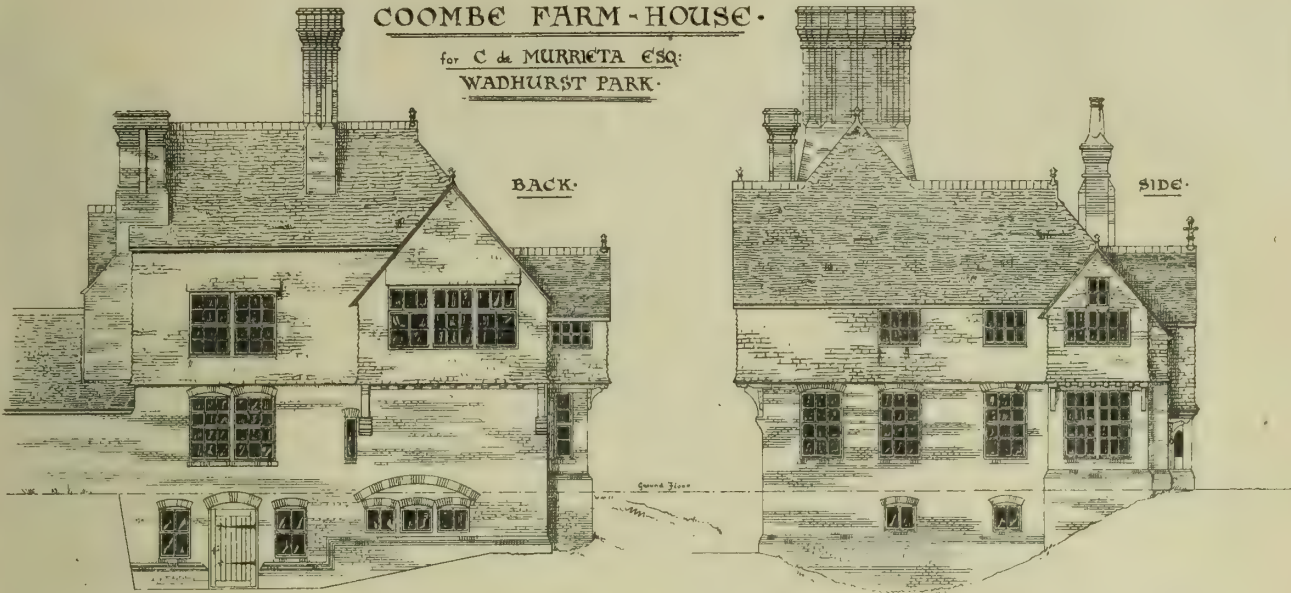
THOMAS BELLAMY,
20th Nov. 1872.

WAREHOUSE OR FACTORY.

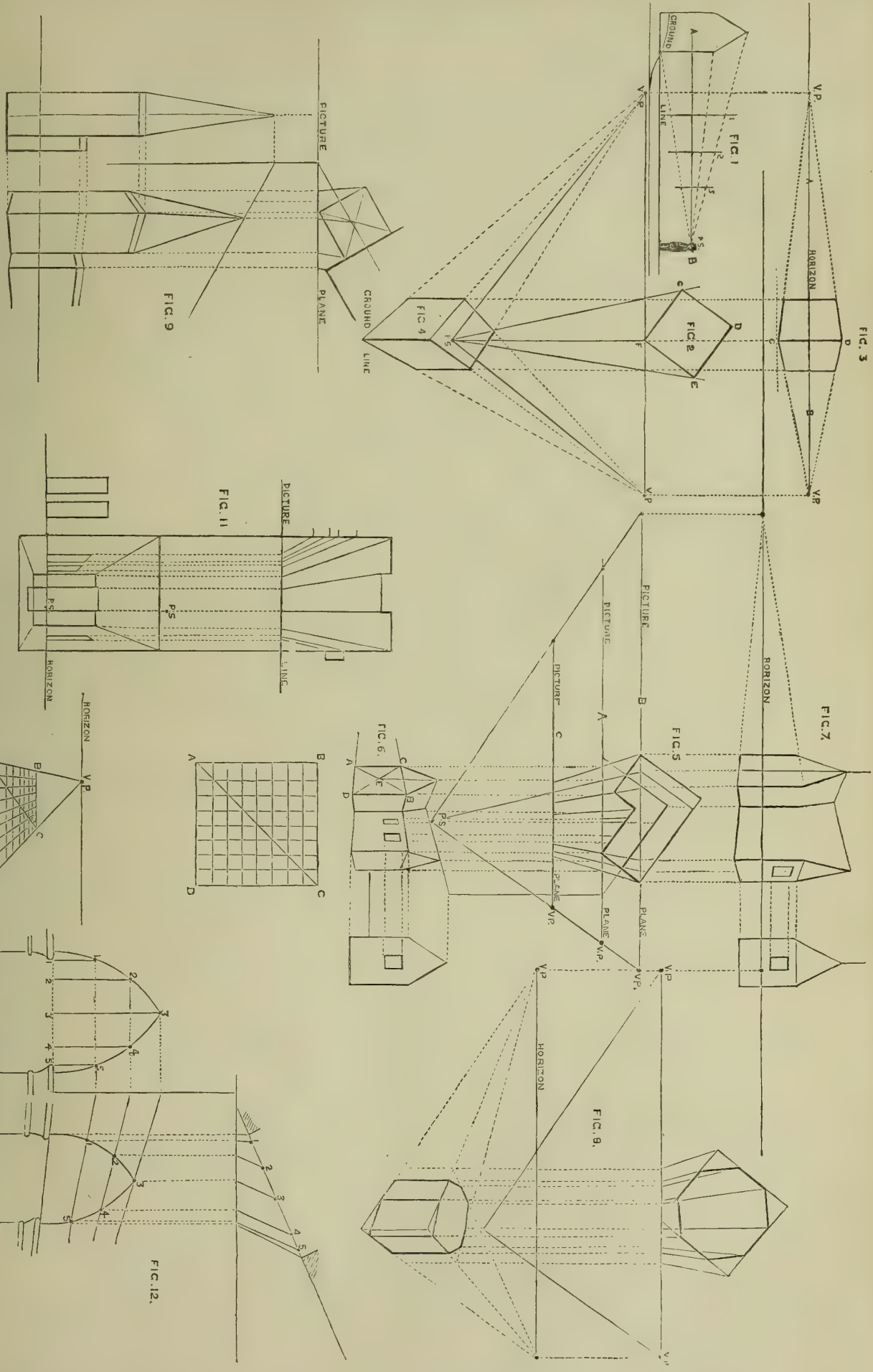


COOMBE FARM-HOUSE.

for C de MURRETA ESQ.
WADHURST PARK.



Adams & Taver: Archt.
10, Great Court, Chancery Lane



ARCHITECTURAL PERSPECTIVE.*

THE subject to which I propose this evening to direct your attention is one, I consider, of the greatest importance to us in the practice of our profession, and an intimate knowledge of which it is necessary for every architect to have. It is with diffidence that I venture to address you, as I know that the greater number here to-night are as conversant with or know more of the subject than myself. My remarks are intended for those who have not as yet studied Perspective, that I may give them some assistance and advice. It is, I regret to say, never, or almost never, taught to pupils in architects' offices; and the student, if he wishes to acquire a knowledge of it, must teach himself. The principal or his chief assistant gets up all the perspectives, and the pupil has thus no opportunity of acquiring an art so very simple and useful.

The science of perspective owes its origin to the art of painting, and is used to represent the effect presented to the eye by objects situated at different distances from the spectator. The ancients had some knowledge of perspective; Vitruvius, in his seventeenth book, remarks that it was taught to some extent in Greece by Democritus and Anaxagoras, who wrote treatises on the subject, of which no traces now remain. Euclid and some Roman authors have also left some rules. Perspective was to some extent practised in the Roman Empire, but of (so to speak) a conventional description, such as may be seen in the Pompeian wall-decorations. Their ideas were in many respects very enlightened, as is fully exemplified in several of their landscape panels; yet they had not the knowledge which we possess of representing things as they really appear. They seem to have had a rough idea that the lines should take a sloping direction, but do not appear to have understood that they should meet in a point. The Chinese and Japanese also practise perspective, but their efforts in that direction are of a very conventional nature. Although the art of painting may be traced to the earliest ages, the science of perspective, as at present practised, is of comparatively recent origin, being first introduced with the revival of art in the thirteenth and fourteenth centuries. Both ancient and modern painters, in many cases, do not in their compositions rigidly comply with the rules of perspective, and, as a general rule, they fail in the proper representation of buildings or architectural details. Canaletti, of Venice, however, was an excellent perspective draughtsman, as also his pupils Guardi and Marieschi, whose views are faithful representations of the buildings they delineate. "A View in Venice," by the former artist, in the late Exhibition, is remarkable for the beauty and clearness of the colouring, and the accuracy and care with which the perspective has been drawn. Panini also, whose views of Rome ornament the various galleries of Europe (amongst others, our own National Gallery is fortunate in the possession of one of them), was an excellent perspective artist; so also Peter Neefs, and Steenwyck, a Dutch painter, whose pictures owe their chief attraction to his careful drawing of perspective. That of "The Palace of Dido," in the National Gallery, is an excellent example of his style.

In the preface to a Treatise on Perspective, by a Jesuit of Paris, the following passage occurs, which I consider so quaint and apposite that I trust you will excuse its introduction:—

"The principle or foundation from which perspective arises is the eye; an organ which Nature has endued with a greater share of vivacity and other perfections, than the rest of the senses; and which even holds the same advantages over them, that the soul does over the body. The like advantage does the art of perspective hold over the other mathematical arts, being confessedly the most elegant and agreeable, and affording more matter of entertainment than all the rest. 'Tis the very soul of all painting; and that alone which can make the painter a master. 'Tis this must conduct him in the dispositions, heights, and proportions of his figures, buildings, moveables, and the other ornaments. 'Tis this must show him what colours are to be deep, or faint, or vivid, or dull, where each is to be applied; what is to be finished up, and what only touched; where light is to be bestowed, and where not; in a word, 'tis this begins and ends the painting. Without the assistance of perspective, the best master must make as many faults as strokes; and especially in buildings, and some other enrichments, which are things I find some of our most reputable painters so horribly defective in that this has been one great motive to my undertaking the following work, wherein their errors will be shewn, without naming the authors, and novices instructed how to avoid the like. The most consum-

mate master is tied to the strict observation of every one of these rules, on pain of pleasing none but the ignorant, and an indifferent painter (or architect) may be told this to his comfort, that if he make himself a thorough master of these rules he shall be able to do wonders."

Every word of the foregoing I will heartily endorse, as I consider it to apply just as well now as when written, three hundred years ago.

Numerous writers of more or less note and ability have treated the subject, whose names, were I to enumerate them, would show you that the greatest painters and architects have devoted to it great care and attention. Some works I have been enabled to lay on the table for your inspection, a cursory glance at which will convince you of the different methods by which various authors arrive at the same results, some more or less simple, whilst others are almost impossible to understand.

Some authors treat perspective as Euclid did geometry, and divide it into a number of dry and abstruse mathematical problems, which I consider a very confusing and imperfect method, and one that I would almost defy any student to master without losing immense deal of time in study, in comparison with the method that I adopt, which is so simple that it may be applied in every case with the greatest ease, with few lines, and may be learned in a very short time. It would be impossible in a short paper like this to give examples of every case that would be likely to arise. I will explain to you the rules, and give some examples that, with some study and consideration, may be applied in almost all cases.

Before entering fully on the subject, it is necessary that I should explain some terms and lines which form the groundwork or foundation of the science, if such it may be called. We will fancy a sheet of glass held up between any object and the eye; if we trace its outline on the glass as we see it, we will have a perspective view. In Fig. 1 on accompanying engraving it will be seen that rays or lines proceed from the object to the eye; and let 2 be the position of the glass, it will be seen that if we wish to diminish or increase the size of the picture, we have but to advance or withdraw the glass or plane interposed between us and the object. It is also obvious that all the rays intercept the glass in the same proportion, no matter what its position. The glass is called, in perspective, the plan of the picture, back picture-plane, being the surface on which the view or picture is delineated. The horizontal line, or horizon, is a line the height of the spectator's eye; whether it be placed higher or lower in the picture depends on the position from which the object is viewed, whether from an eminence or a hollow. The horizontal line is always at right angles with the perpendicular. In Fig. 1, A B is the horizontal line. The point of sight is the position of the spectator, or the point from which the object is supposed to be viewed. Some judgment is necessary in the selection of the point of sight, that the building may look to the best advantage. The distance at which it is usually placed is three times the height of the building. No fixed rule can be laid down, as circumstances will dictate its position—as in street views or other confined situations. In looking at all objects, it will be seen that the horizontal lines of the building (except in what is called parallel perspective (have a tendency to converge more or less according to the angle at which the building is viewed; if those lines be produced they will be found to meet, always on the horizon. Such points are called vanishing points. Let C D E F be the plan of a cube, fig. 2, and P S the point of sight. To find the picture plane, draw the lines—or, as they are called, visual rays—C P S, F P S, and E P S; bisect the angle formed by the extreme visual rays at P S, and at the point F draw A at right angles to the line of bisection. A B is the picture plane. To find the vanishing points through the point of sight, draw two lines parallel to the two sides of the cube until they intersect the picture plane. The points of intersection will be the vanishing points. So far for the preliminary work. In order now to draw the cube, draw the horizontal line, A B (Fig. 3), draw up vertical lines from C, F, and E in plan: let C be the ground line, and on the line C D measure off C D the height of the cube to the same scale as the plan has been drawn; now draw line from D and C to S the vanishing points, and the drawing is finished.

The point C is situated on what is called the ground line, and the aspect of the building will,

in a great measure, depend on the height at which the horizontal line is fixed over the ground line; 5 ft. 6 in., the average height of the human eye, is that usually adopted; but the artist is at full liberty to chose the height at which the building will appear to the best advantage. When the horizontal line is taken at a greater height than the building, it is called a bird's-eye view, as the cube is shown in Fig. 4. We will now take a more elaborate object—a house with gables. The lines are found in the very same manner as the cube, and the drawing proceeded with as in Figs. 5 and 6. In order to show how in perspective there are various means of arriving at the same end, I will explain two methods of finding the centres of the gable; by one, draw the centre line on the plan, draw a visual ray, and bring it down as the other lines. The second method is to draw the two diagonals of the gable, and the point of their intersection is the centre of the gable. To draw the gable, take off the elevation, the height of the eave and apex, and draw the lines to the vanishing point; connect the three points, and the feat is accomplished. In making perspective drawings by the above methods, you will find the view will be of a smaller size than the elevation; in order to obviate this, and make the perspective drawing to a larger scale, the picture line is drawn through the building, or, if still larger at the back of it. The heights are measured off at the point where this line cuts the plan, as in Figs. 5 and 7. If it is desired to make the perspective to a smaller scale, the picture line is advanced to the front as the line C, fig. 5. The heights are measured off a line found by producing one side of the plan to cut the picture line. No matter how many picture lines we may draw, they would be all divided in the same relative proportion, as also the views that might be made from them.

To draw an octagon, Fig. 8, make a plan of the octagon and produce four of the sides to form a square; proceed as with the square; find points of the octagon in the sides of the square and connect them; thus the octagon is formed. This method will be found very useful in drawing bay windows, &c. Cylinders may be drawn in the same manner. To draw a spire, proceed as in the other cases; draw on the plan, Fig. 9, a line through the centre of the tower, parallel to one of the sides to cut the picture line, draw a vertical line from it and measure off the height of spire; draw a line to the vanishing point, and where that line cuts the visual line of the centre of spire, will give its height. In order to draw ornamental pavements, draw the diagonal as in Fig. 10; divide the picture line, and draw lines to the vanishing point; draw the diagonal in perspective, and draw lines through the points where it cuts the other lines of the pavement.

Interior perspectives are governed by the very same rules as exterior, as will be seen by a glance at Fig. 11, where the visual rays are brought down to the picture line A B. The point of sight in interior views is also the vanishing point. Some care must be used in selecting it. It must not be taken in the centre of the room, for then both sides will appear exactly alike, and will have an exceedingly unpleasant effect. It is better to have one side of the building seen as much as possible, at the same time indicating the architectural features of the other. The artist must, however, use his own judgment to suit the case. The arch, of no matter what form, is most difficult to be drawn well in perspective. The method is shown in Fig. 12; divide the arch into ordinates on plan and elevation, and find the perspective points where they cut one another. If a line be drawn through those different points, it will give the perspective aspect of the arch; it requires great practice to do this, as it must be drawn with a steady hand. I may here allude to a kind of perspective largely indulged in by engineers, which has nothing to recommend it but its hideousness and absurdity, as it is neither one thing nor the other. Need I say that I mean isometrical perspective, or as it is more properly called, isometrical projection, which I hope to see few of you waste your time upon; its only advantage is that a scale may be applied to it, which is impossible in true perspective.

It is a great error to be careless in the first instance with a perspective, and then bestow a great amount of work on the details. Get in the main lines correctly, and after some practice, you will be enabled to fill in the details without rules by merely getting a few main points. Of course the portion nearest the eye should be drawn

* By MR. J. L. ROBINSON. Read at meeting of Architectural Association of Ireland, January 9th, 1873.

neatly, and with greater care than the back-ground, which may be treated in a comparatively sketchy manner.

Architects, as a general rule, are too prone to confine themselves to geometrical drawings, which, though exceedingly useful and indispensable, are such that none but a professional man can grasp, and that few of the uninitiated can understand. We all know who have tried the experiment how difficult, almost impossible, it is to impress a client with the slightest notion of what we mean by an elevation or plan. It is from a want of perspective knowledge, not only with the profession, but with the public generally, that is mainly derived the odious custom of having the front of the detached or semi-detached suburban villas of red brick of the most ambitious design, whilst the flank and rear walls are simply dashed, or still worse, compe'd down and "struck out to imitate stone." This generally arises from an elevation of the front being submitted to the client, whilst the sides and back are allowed to shift for themselves. Both architect and employer forget that, when built, it can never possibly appear as on paper. If we cannot have the funds to build such houses of red brick all round, let us have all the walls of good Dublin stock bricks, well designed and of good outline, without wiggling or shams of any kind; and I have no doubt but that the public would prefer them to the ridiculous mushrooms that are springing up round the city, whose appearance "cannot but make the judicious grieve."

An architect should, when making a geometrical drawing, of no matter how trifling an object, have the perspective effect of it in his mind's eye, and he will never make a mistake, or be disappointed when he sees his design put into execution. Some I have known who, when they are making a design, make a rough perspective sketch on the margin of the paper, to give themselves an idea of the effect, which I consider an excellent practice, and worthy of imitation.

There is no greater aid to the study of perspective than that of sketching from nature, or by a close study of completed buildings. If the artist has a good eye and steady hand, he will see how objects show in perspective, and will after a while be enabled to make perspective views untrammelled by any rules save those of good taste. What can be more agreeable to the architect or artist than to ramble about, sketch-book in hand, and sketch any object that strikes his fancy, and thus lay by a store of pleasant souvenirs or useful hints which he may have received on his travels? It is by such means that the mind is to be enlarged and experience gained.

I would now caution you against a fault which I would almost consider criminal—namely, the deliberate falsification of perspective drawings which some indulge in, in order to give their designs a better aspect than the working drawings. This I consider—and I consider you will agree with me—is a pernicious and dishonest habit, and likely to lead the men who are guilty of it to shame and exposure. It is mostly resorted to in getting up competition drawings; others—and notably the illustrators in the professional journals—when they introduce figures in the foreground of their drawings, make them veritable pigmies, ranging from 2 ft. 6 in. to 4 ft. in height. This is done in order to make the building appear of far greater size than it actually is: the cheat is, however, soon detected by comparing the size of the doors and windows and other details with the figures.

And lastly, a word with regard to that not least important branch of the subject, the style of the drawings. Some architects draw them in pencil pure and simple, and I consider few drawings have a neater and better effect than a neatly-drawn pencil sketch; others outline in pencil, Indian ink, or brown ink, and tint—much can be done in this way by a clever colourist; and others etch in Indian ink, writing ink, and brown ink. Etched drawings are very effective, are great favourites, and are open to a wonderful variety of treatment. What can be more striking than the different styles of line drawing practised by such artists as Messrs. Street, Shaw, Godwin, Seddon, and Brooks, whose styles we are all so familiar with through the medium of that invaluable invention, photolithography? You are all conversant with Mr. Drew's admirable pen-and-ink sketches, some of which adorn our walls, and which will favourably compare with those English artists I have already named.

In conclusion, I will re-echo the words of our worthy president—"Sketch, sketch, and learn to sketch well," and if my few remarks this night will serve to direct your attention to the study of that all-important branch of our profession—Perspective—my efforts will not be unrewarded.

ON THE VENTILATION OF BUILDINGS.*

(Concluded from p. 86.)

MANY people would probably say, "Oh, what a draught there would be to one's legs and feet." Well, of course if a good-sized hole were cut through the wall, say directly opposite the fire-place, and one shut the door and stood between the opening and the fire, it was very likely that he would feel rather cool about the inferior extremities; but Mr. Butler said he did not propose anything of this kind. The fire must have its own supply, which should be given by means of a pipe leading through the hearthstone, as was sometimes done, with the opening facing the fire, which latter, as it constantly acted the part of a pump, would take care to get its own allowance from the nearest source. We had, therefore, only the forcing power of the difference in weight between columns of air of equal height but different densities, due to difference of temperature between the exterior air and that in the room. This difference Mr. Butler assumed to be 30°. This forcing power would cause the air to enter the room with a velocity equal to that which would be acquired by a body falling a distance equal to the difference in height between a column of air 10 ft. 6 in. high at 62° in the case he had assumed, and the same air at 32°. The difference would be equal to 643 of a foot, and the speed of the entering current would, by the rule of falling bodies, be 6.43 ft. per second. Assuming that all the air entered through one opening, then about eight square inches would be sufficient. It would be obvious, however, that it was not advisable to admit air at so high a velocity as this; nor would one inlet be as efficient as several. The author proposed, then, for existing rooms, that the inlets should be made in the side walls near floor, and in as many different sides of the room as its situation will allow; that these be made larger towards the room, and that they should be inclosed by metal gratings made ornamental on the outer and inner faces. There should be a fine wire-gauze screen just behind the ornamental grating. This served a very useful purpose, for it screened and broke up the entering current of air, preventing all draughts; and if the openings had sufficient area, allowed the incoming air to mingle so gently with that in the room that its presence was not felt save in a pleasant way. A little consideration would show that the heated chimney afforded the best possible exit under the circumstances. By causing the foul air to escape into the chimney, we increased the ventilating power very considerably. We had no longer to deal with the small difference before mentioned, but might calculate upon the whole height of the chimney above the opening through which the foul air entered it, and have the difference between this column of air, highly heated as it was, and that of another of the density of the outer air, as the force at our disposal. Care must be exercised in the use of a valve to close this opening against draughts. The best which had come under the author's notice was formed by a series of leaves or flaps of mica inclosed in a metal case. The flaps were very light, and being hung from the top, were absolutely secure against return currents. The front might be made as ornamental as could be desired. The heated and spent air from the gas-lights should be conveyed away immediately when possible. The ornamental flower which was commonly placed in the centre of the room might be pierced through, the opening thus formed being boxed in between the joists with thin sheet metal connected with a tube for conveying the waste gases into the chimney or outer air. The register of the fire-grate would form a regulator, by closing or opening which the draught through the escape-valve might be increased or diminished. Exercise of proper skill and judgment in the form and position of the inlets, and in the construction of the exit, would insure comfortable ventilation in rooms built with no special provision for it. The tube which supplied the fire should have a valve to close it,

so that when necessary the whole pumping power of the fire might be applied to sucking in fresh air through the room. The last source of the contamination of air in dwelling-houses was foul drains and waterclosets. Any unpleasantness from the former would commonly arise from faulty design or malconstruction. A drain was ill-designed which passed under any portion of the house, unless no other way was possible; also where no provision was made for ventilating the drain, and when it was not of ample size. A drain unevenly laid, built of inferior materials, badly jointed, or not properly connected with the main sewer, was badly constructed. The remedies for bad smells from drains were (1) the proper laying of the drain. It should be formed of socketed pipes, in no case less than 4 in. in diameter; 6 in. would often be better, or even 9 in. pipes for large houses. Sufficient fall should be given; not less than 3 in. in 10 ft. The pipes should be laid in good concrete, and jointed with Portland cement. (2) The drain must be trapped. The common syphon trap was the best form for general use, and in the author's opinion a single trap was preferable to a double one; for with two traps, when the water had passed the first it compressed the foul air, which escaped into the house. (3) All injurious escape might be prevented by ventilating the drain. A pipe should be connected with the syphon on the summit of the bend, between the water which closed the trap and the leg of the syphon which joined the drain. This pipe, Dr. Carpenter says, should be nearly the same bore as the syphon, and should be carried up outside the house above the eaves, as far from any window as could be. Outside a chimney was a good place, but the opening should not be above or near the top of the chimney. Care should be taken to make the joints in the pipe gas-tight. Unpleasantness from the water-closet would almost always arise from its position. This was very commonly the worst which could be found, viz., under or close to the stairs, the well of which formed a shaft for conveying foul air into all the bedchambers. The water-closet should, where possible, be outside the house—not detached, but separated by such a space as would allow of double doors, with sufficient space between them for ventilation. The building itself should also be thoroughly ventilated. Mr. Butler next proceeded to state briefly how a house might be built so as to be efficiently ventilated on the principle of thermo-ventilation. It would be sufficient to take one room as a type of the rest, and the author assumed that it was desirable to keep up the old-fashioned open fire-place, wasteful as it is. The fresh air might be brought directly through the outer walls, or might be first slightly heated by passing through a hot-water coil, or other apparatus. If the former course were followed, air-bricks must be inserted in the outer face of the walls, communicating with a channel running round a portion or the whole of the room. This inner channel should be enclosed by a cast-iron box, with an ornamental open-work front and without a back. The front, which might be of brass, should be fastened so as to be readily removable. The exit of foul air should be through open-work in the ceiling. This open-work might either be done in plaster, similar to the centre ornament, or fine brass wire gauze might be inserted in the cornice. The foul air would pass through this into the space between the joists, where the sound-board and pugging would prevent its ascending into the upper rooms. From these spaces it would pass into a cast-iron channel running round the room, which would communicate with the chimney or air-flue. The openings into the chimney must be fitted with valves, as before. The author believed it would be easy to construct a chimney having all the advantages of a chimney and air-flue combined. A tube might be inserted in the brick trimmer, giving immediate communication with the fire above, which, when lighted, would aid the ventilation of the lower room. All large houses should have a special ventilating shaft, communicating, by means of pipes and valves, with every room in the house. If thermo-ventilation alone was intended, a fire must be kept burning at the base of the chimney, the only supply of air to which must come through the tubes. Some day, perhaps, we might have ventilating shafts for every street or block of houses. We provided for carrying away of foul water; why not of foul air? The one was just as harmful as the other. Perhaps, too, although this belonged rather to warming than ventilating, we might some day see but one fire to each house, and even one chimney—nay, perhaps one chimney to a

* Abstract of paper read before the Civil and Mechanical Engineers' Society, on the 10th inst., by Mr. F. W. BUTLER.

great number of houses—perhaps even one to a town. This might seem a speculative flight, but had coals always been very dear, instead of cheap, the present wasteful system would not have lasted long. A fruitful source of annoyance, which was often closely connected with defective ventilation, was that of smoky chimneys. Want of air caused more chimneys to smoke than anything else, and before any one set to work to alter a chimney in any respect, it was better to see whether it was not more air that was wanted. For churches, schools, and factories thermo-ventilation might be used, but probably the fan or blowing-wheel would in many cases be more efficient and economical. This method was in use in London with very satisfactory results. Its useful effect would vary with the size of the wheel and the speed at which it was driven; and in designing a fan it should be borne in mind that a large fan and slow speed was generally better than a small one at a high speed, chiefly on account of the vibration caused by gearing running at great velocities. The motive power might be either steam or water, or a weight which could be wound up as occasion might require. It was impossible to enumerate the many noxious manufactures, chemical and otherwise, but if they were prevented by law from polluting the atmosphere, the science of chemistry was quite equal to finding a remedy, and even to converting the noxious fumes into useful products. There was an objection to thermo-ventilation which did not apply to the fan, viz., that as it depended for action upon the difference in temperature between the inner and outer air, so in summer it might come to a stop or be even reversed. This objection was not of much weight, as people were far oftener out in the air in summer; and at night, when gas or candles were lighted, ventilation would commence again. A special shaft, however, would preserve the action all the year round, though most active in winter. The fan was probably the leading instrument in mechanical ventilation. Box stated that a fan 5ft. in diameter, running at a speed of 50 revolutions per minute, would discharge 2,250 cubic feet of air in that time, while a fan of 10ft. diameter, at 25 revolutions per minute, would discharge 9,000 cubic feet. In regard to sewers, it might be considered established that the exhalations from fresh sewage were not injurious; but it was equally sure that those from putrid sewage were highly poisonous. Of all of them, sulphuretted hydrogen might be fairly considered the most deadly. This gas was slightly heavier than air, hence it was more difficult to remove than the lighter gases. According to Thénard a proportion of one fifteen-hundredth of sulphuretted hydrogen in the air would kill a bird, one thousandth a dog, and one two-hundred-and-fiftieth a horse. Some of the gases generated in sewers were explosive: hence it would be dangerous to introduce them into factory chimneys. The experiment was tried in Southwark, with the blowing-up of the furnace as the result. With sewers, as in other cases, ventilation must be subject to modification. In villages and small towns, where pipe sewers were alone employed, small ventilating shafts carried up the nearest building, tree, or other suitable object, would answer the purpose, viz., that of relieving the sewers of any pressure of gas. Their useful effect would be increased by the use of the Archimedian screw cap, as used in Liverpool, and a wire basket containing charcoal might be beneficially placed where the gas must pass through it. Large brick sewers must not only be relieved of pressure, but must be clear enough for men to work in them. In London they were supposed to be kept clear of foul gas by the numerous open gratings seen in every street. This would seem, at first sight, a rude method and a dangerous one. Experience, however, taught us that the evils naturally to be expected from such a system were not so serious in practice as the nature of sewer gas would lead us to think. No doubt the diffusive property of gases had much to do with this favourable result. By the proper use of charcoal it would seem that the possible evil was reduced to a minimum. The author did not think that any insuperable difficulty would be encountered in applying mechanical ventilation to sewers. Certainly there was the cost, but this should not stand in the way for a moment when the public health was concerned. If those in authority said it must be done, the way would soon be found. A sewer 6ft. in diameter and five miles long would contain 746,000 cubic feet of air; but after deducting one-third for space occupied by sewage water, 497,550 cubic feet

would be the quantity left to be dealt with. As mentioned before, a fan 10 ft. in diameter would remove 9,000 cubic feet of air per minute, so that the entire quantity in the sewer might be changed once every 56 minutes. Certainly nothing like this would be required. Practical difficulties would no doubt be encountered, especially in regulating the admission of air into the sewers, the position of the fan, the construction of side entrances, gullies, &c.; but these difficulties must be overcome if we wished to apply mechanical ventilation to the sewers of London. There was nothing new in this proposed method of ventilating sewers, as it was suggested by Mr. Gibbs in 1871, when it was met by objections that unless every gully or air-hole were stopped up when the fan was at work the air would enter the sewers at the nearest inlet with great velocity, which would diminish the further the distance was from the fan. Mr. Butler, however, thought it was not beyond the engineering talent of the country to devise inlets which should admit the air to sewers in such proportions and at such places as might be required. The difficulty would be much diminished if a system of sewers had but one or two outlets; and if the sewers were used simply for sewage, and not for surface and subsoil water, the difficulty would be very small indeed. The same objections would, moreover, apply to any system of artificial ventilation for sewers, whether it be by the furnace or by simple ventilating shafts. The following Table, computed by Mr. Hayward, C.E., showing the temperature of the City sewers, would not be out of place:—

Time of Year.	External Temp. in Shade.			Temp. in Sewer.			Above	Below
	Highest	Lowest	Mean.	Highest	Lowest	Mean.		
Summer...	71°	55	65°04	68	56	61°92	...	3·12
Winter ...	34	30	32°37	52	40	43°98	11·61	...
Spring ...	61	46	52°46	59	48	52°53	0·06	...
Autumn...	68	48	59°90	70	53	62°97	3·07	...
Average of year ...	...	...	50·24	...	...	55·35	5·11	...

This Table showed that we could not at all seasons of the year rely on the superior temperature of the sewers for ventilation. The ventilation of railway tunnels presented fewer difficulties than that of the sewers. No description of the way in which underground railways were ventilated need be entered into. Everyone was acquainted with the stifling atmosphere underground, and the choking burning-matches odour which pervaded the stations and streets near them. The insertion of iron grids in the roofs of the tunnels, and the discharge of the noxious vapour or steam into the streets, could hardly be considered a satisfactory solution of the question. Mechanical ventilation must be resorted to. Taking the Metropolitan or Metropolitan District Railway as a type, it would be seen to consist of a series of tunnels and open, or semi-open, stations. The foul air was generated during the passage of trains through the tunnels, and a certain quantity of this foul air was thrust out of the tunnel into the station by the train as it entered the further end of the tunnel. This foul air, being heated, slowly ascended, filling the streets and neighbouring houses. The stations were nothing more than dwarf ventilating shafts, in which the passengers were partially stifled previous to entering the tunnel. Firstly there was a certain quantity of foul air to be got rid of without harm or annoyance to the public. Secondly, the stations must be kept so clear as to allow of passengers using them with comfort; and thirdly, circulation of air should be maintained in the tunnels, which should be kept as sweet as possible, not only for the sake of the passengers, but for the workmen also; and for the greater security of the public against accidents. It seemed to the author that these objects would be best accomplished by reversing the present system: turning the stations into down-cast shafts, and drawing the foul air away at the middle of the tunnels. A little consideration would show how a series of tunnels might be connected together by what might be called "air-sewers," and the foul gases led to one or more pumping stations, there to be forced up high chimneys. The pumps might be either air-pumps, such as were used in some Belgian col-

lieries, or machinery similar to Nixon's ventilator, or one of the many kinds of fan. Some of these machines were very powerful. At the Navigation Pit, near Aberdare, Mr. Smyth gave the theoretical quantity of air expelled per minute by one of Nixon's machines as 166,000 cubic feet. In Belgium many fans of enormous power were at work ventilating coal mines. The chief difficulty was the expense, but this ought not reasonably to stand in the way. As to the ventilation of ordinary railway stations, it was difficult if not impossible to apply any system to a building which sometimes consisted of but one wall and a part of a roof; and when the station was of greater pretensions it was almost always open at both ends. Free escape of steam must be provided, and a good example of roof for this purpose was that at the Shoreditch low-level station of the Great Eastern Railway Extension Works.

A discussion followed the reading of the paper, in which the President (Mr. C. W. Whitaker), and Messrs. A. C. Pain, L. H. Moorsom, G. W. Willcocks, H. Howard, C. H. Rew, and E. H. Brewster took part; and the thanks of the meeting having been tendered to Mr. Butler for his paper, the proceedings were brought to a close.

THE "BUILDING NEWS" COMPETITION FOR A TOWN CHURCH.

AFTER considering the various suggestions that have been made with reference to this subject, we have prepared the conditions, which will be found below. A few words may be desirable to account for the presence of some clauses, and the absence in this competition of others. In the first place, it has appeared impossible to leave it an open question, as some correspondents wished us to do, for what religious body the church is to be designed. The arrangements most appropriate to different forms of worship differ considerably, even when the uniform stipulation is made that the whole congrega-



tion shall be able to see and hear the service. It is much more difficult to fulfil this stipulation for some forms of service than for others, and hence those competitors who might happen to deal with the more easily-managed set of requirements would have an unfair advantage over the rest. Secondly, that there might be no needless difficulties added to an already difficult problem, it has seemed best in this competition to lay down no fixed limit for the expense. We can only say under this head that architecture will count for more than ornament, and that planning, construction, and general design should be satisfactorily dealt with in the first instance. It is in these fundamental points, even more than in detail, that modern buildings generally, and churches amongst the rest, stand in need of improvement; but the difficulties they involve being once fairly conquered, good detail will have its due share of weight. Thirdly, from the same desire to import no extraneous difficulties into the problem to be solved, we have marked out a more spacious and convenient site than can often be counted on for a town church. The houses in the narrower of the two streets adjoining it may be assumed to be 40ft. high from the pavement to the top of parapet or cornice: those in the wider street 60ft. between the same points. Fourthly, it should be remembered that it is a very possible, and, indeed, easy thing, to put a large congregation in sight of the minister, and yet, to a great extent, beyond the range of his voice. The probable acoustic properties of the

various arrangements proposed will, therefore, be taken into consideration in making the award. Finally, the chief aim and purpose which we wish to be kept in view is, not to obtain convenience, as it is too often obtained, by the sacrifice of every artistic quality, but to unite it with a noble and monumental type of architecture, and with all the impressive and elevated characteristics which befit building designed for the highest purposes.

CONDITIONS OF THE COMPETITION.

The designs are to be for a town church, adapted for the worship of the Church of England. Sittings are to be provided for twelve hundred persons. Every sitting, if possible, should be so placed as to afford a view both of the pulpit and the altar. For convenience of comparison, all plans must be shown seated with benches, at least 2ft. 10in. from back to back. The number of sittings in each different length of bench must be marked on it in figures, thus, "5 sittings," "4 sittings," &c. No sitting must be less than twenty inches wide. The whole congregation should be easily within hearing of every part of the service. The drawings required are the following:—Ground Plan, Longitudinal Section, at least One Transverse Section, and at least Two External Elevations. In case of a gallery being provided, either for an organ or for seats, a plan of it must be given. All the above general drawings are to be to a scale of twelve feet to an inch. An exterior and interior perspective, outlined or etched in ink, are also required: the drawing in each of these should not measure more than 16in. in the longer direction, by such width (less than 16in.) as competitors may severally prefer. Competitors may, at their option, send a sheet of details drawn to a scale of one-third of an inch to a foot. All drawings should be finished in lines for convenience of photolithographing: and should not be tinted in any way. A specification of materials, as short and clear as possible, should accompany each design. The plans are to be adapted to the site, of which an outline is given, and which measures 200ft. from East to West, by 110ft. from North to South. The church must not project beyond the building lines of streets. All drawings are to be delivered at the office of the **BUILDING NEWS**, addressed to the Editor, not later than 5 p.m. on the 1st May, 1873.

Building Intelligence.

CHURCHES AND CHAPELS.

BRISTOL.—The church of the Holy Cross, Bristol, is undergoing restoration. The arch leading from the tower to the nave has been opened, and the space gained appropriated to a baptistry. The roofs have been renewed throughout, a new pulpit erected, and a new East window by Clayton and Bell is to be inserted. The sanctuary and chancel will be laid with encaustic tiles manufactured by Mr. W. Godwin of Lugwardine. In the "Weavers' Chapel" a memorial window to John Wesley is to be erected by Mr. Bell. The church is one of the few sacred buildings in the country associated with the order of the Knights Templars.

BRISTOL.—The new church of S. Matthew, Moorfields, was consecrated on Monday. The edifice will consist of nave, two chapels, and side aisle. The south chapel and aisle are not yet completed; the style is thirteenth century Gothic. It is built of pennant stone, with freestone dressings, and will accommodate, when finished, about 700 persons—at present there is accommodation for 500. The roofs are oak timbered, the chancel roof being boarded over by rafters, and the walls are plastered stucco. The seats are open and furnished with pitch-pine benches. Mr. W. Banner has been the general contractor. The architect is Mr. Neale, of Bristol.

LONDON.—Brunswick Chapel, Portman-square, has, under the direction of Mr. W. F. Hunt, lately been completed. The walls are finished in a warm stone-grey tint, with a dado seat high in Indian red, finished with lines and running stencil-ornament in blue and red, which are also continued round the windows. The wall space over the altar is formed into a reredos in colours and gold. The surface is divided into five panels, the outer panels being occupied by the Lord's Prayer and the Creed. Each panel is separated

by a border in stone vellum, outlined in deep red, the spandrels, formed by the circular heads, being in olive green, and filled with a suitable scroll ornament upon a diapered ground. The centre, or square panel, having at each side a pilaster, upon which are inlaid panels in two hues of Indian red, the panels filled with a diaper of self hue. The panel is occupied by a circlet with diaper ground, upon which the emblem of the Trinity is inlaid with gold. Below this panel, which is shorter than the others, is a deep gold band separated by border and lines from the square panel, upon which is a text in white letters outlined in deep brown. Over the panels is a deep gold band, upon which a text in white letters is inscribed, outline as before. The designs were made and the work carried out by Messrs. W. Phillips and Son, Baker-street, Portman-square.

BUILDINGS.

MELBOURNE.—The first of the model lodging-houses to be erected in Melbourne, Victoria, for the benefit of the working-classes by a company promoted by Mr. Thos. M'Pherson, a former mayor of Melbourne, is now in course of construction. Mr. M'Pherson laid the foundation stone some weeks since. The design consists of a three-storied brick building, 100ft. by 50ft., capable of accommodating 200 persons. Ample provision is made for ventilation and cleanliness. It is proposed that the charge shall be 6d. a night, and accommodation only will be provided, the lodgers having to undertake finding their meals for themselves. The intention is to make the institution not only self-supporting but payable, and should this experiment prove successful, other institutions of a similar character will be established. The amount of the contract for this building is £5,395.—The new Eastern Arcade, which rapidly approaches completion, will be a pleasing addition to the street architecture of the capital of Victoria. The total length of the arcade is 315ft., with a frontage at both ends of 66ft. It consists of two stories, in all 64 shops, with hotel accommodation at the ends. The dimensions of the shops on the ground floor are 22ft. by 12ft. The shops in the gallery tier are 18ft. by 12ft. Around the gallery is a cornice, supported by Corinthian columns. Access to the gallery is gained by wide staircases at each end of the arcade. The entire cost is estimated at £17,000.

THAMES DITTON.—The Malden entrance to the Malden and Worcester Park, Thames Ditton, has undergone alteration. A new lodge and three villa residences have been erected, with conservatories attached. These new buildings, now nearly completed, are in the Swiss style. The ground floors are of red brick with stone dressings, and the first floors, gables, &c., are of timber and stucco, with roofs of ornamental tiling. The gables are finished with deep verge boards and massive timber finials. The architects are Messrs. John Giles and Gough, of Craven-street, Strand, and the builders Messrs. Hibbins and Trasler, of Kingston. The whole of the works were carried out under the superintendence of Mr. Mark H. Judge.

SCHOOLS.

HUDDERSFIELD.—At the usual fortnightly meeting of the members of the Board, held on Monday, the Finance Committee's minutes approved of plans of Mount-pleasant and Mold-green Board Schools, and the architects were instructed to submit them to the Education Department. The Board adopted the following tenders for the various works required in the erection of the Lindley Oates Board School:—Messrs. Dyson Bros., Lindley, masonry, £4,489; Mr. Jas. Christie, Huddersfield, joinery, £1,519; Mr. James Brooke, Huddersfield, ironmongery, £537; Messrs. Pycock and Sons, Leeds, slating, £500; Messrs. J. H. Taylor and Co., Huddersfield, plumbing, £539; Messrs. Longbottom and Sons, Huddersfield, plastering, £161; Mr. W. T. Earnshaw, Lindley, painting, £95; Messrs. Lawson and Hainsworth, Halifax, ventilation, £133 4s; Mr. J. W. Bell, Leeds, clock and bell, £92. 10s; total, £7,885. 14s.

The old mansion at the foot of Denmark-hill, Camberwell, which was erected by Sir Christopher Wren upwards of 200 years ago, and is the last remaining example of his work in the neighbourhood, was recently disposed of by auction as old materials, and will now be demolished to make way for the erection of about 200 houses.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for "Situations Wanted" are inserted at a charge of one shilling for the first twenty-four words, and sixpence for every succeeding eight words.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—E. W.—J. P. S.—Rev. Dr. A.—J. A.—J. and Co.—J. E.—F. R. N. H.—Rev. G. M.—P. and K.—A. W. R. W.—Competitor.—Rev. C. M.—F. B.—G. T. S.—McT. and Co.—T. M.—H. and N.—T. S.—J. V. D.—J. N.—J. D. W.—A. W.—W. S. B.—J. S.—A. H. B.—H. F.—J. H. R.—T. B.—R. S. and Co.—J. A. W.

QUA VERE VERUM.—See letter in to-day's impression by Mr. Banister Fletcher and Mr. Roger Smith.

G. W. G.—We believe Mr. Murray published "The Gentleman's House," by Prof. Kerr.

JUNIUS.—We cannot comply with your request.

F. E. W.—Put your question more definitely.

W. B. HALL.—No illustrated title-page will be published for the last volume.

R. S.—You may find Mr. Riddell's address through Virtue and Co., City-road, the publishers of his book.

PEDDIE and KINNEAR.—Drawings to hand. We are afraid that even the "slight wash" will be prejudicial to either of them being reproduced by photo-lithography. We will, however, try.

SCHOOL-PLANNING COMPETITION.—William B. Wallis, of 172, Euston-road, N.W., writes to say that he is the author of the design with the motto "Vivo in Spe," which we announced last week as having no name.

Correspondence.

EDINBURGH CATHEDRAL COMPETITION.

SIR,—I have only now received the **BUILDING NEWS** of Friday, and am glad to have got at the origin of the rumour which appears to have been afloat for the last six months, which deeply affected my character and of which I can offer a very simple explanation. After my appointment as a competitor, and after thinking over and fixing on the general features of my plan at Inverness, I made a tour to the Continent. Before doing so I asked a friend in London to find me a "draughtsman up in Gothic work" who would come to Inverness to work at my plans. He kindly did so; and on my return, I was introduced to Mr. Roper, of whom I previously knew nothing, and on his satisfying me of his ability, I engaged him at a fixed rate per day. The time for preparing the plans was short, and considering that Mr. Roper was then in my employment, I took him fully into my confidence, and in the studio of my friend explained my whole scheme of the design by sketches made off-hand, showing my note-books, and jottings, and references to old examples. Next day he came to my hotel, and I went still more fully into the matter—in short, during these two days I gave him a complete idea of my design sufficient to work from. In a few days I received a pencil-sketch of parts of the west front embodying my ideas, and naturally resembling that which I had shown to the Bishop of Moray and Ross, and this must have been the sketch seen by your correspondent.—I am, sir, &c.,

ALEXANDER ROSS.

Inverness, 29th January, 1873.

[We are bound to say that the main statements in the above letter are in contradiction to

evidence which has reached us from unimpeachable sources since this matter was first mooted in our columns. In order, however, to clear the matter up, it is now incumbent on G. F. Roper, both for his own sake and for that of Mr. Ross, to step forward and give a precise and authenticated statement of facts. The letters which have hitherto appeared in our paper have failed to efface the impression that Mr. Ross's competitive design for the Edinburgh Cathedral was mainly suggested and wrought out by Mr. Roper. We need scarcely say that we are not influenced in any way in favour of either Mr. Ross or Mr. Roper, and desire only that the truth should be made known.—ED.]

SIR,—It would have been far better if your correspondent "Cui Honor Honorem" had made himself master of facts before rushing into print upon the troubled subject of the "Edinburgh Cathedral Competition."

His having seen some drawings in a London office before they were sent to Scotland proves nothing respecting their originality, and as I have reason to suppose that I possess more information than any one else about this part of the matter in question, I must ask you to allow me a brief space in your journal to give the profession and the public the benefit of it.

About twelve months ago Mr. Ross wrote, asking me if I could recommend him a good draughtsman, and one well up in Gothic work. He also called upon me shortly afterwards, on his way to the Continent, and I gave him Mr. Roper's name, showing at the same time some of his work, and mentioning what I knew to be his general terms.

Mr. Ross, intending to be on the Continent for at least a month, deputed me in the meantime to arrange with Mr. Roper for an interview on his return. I did so, and they first met in my chambers.

After all preliminary matters had been successfully gone into, the subject of treatment of the new cathedral was introduced. Mr. Ross was asked if he had made any designs for it, to which he replied that "he had a few rough sketches, and had perfectly made up his mind as to what he should do;" at the same time taking up a piece of drawing-paper which I handed him, he proceeded to sketch out his ideas to Mr. Roper.

Upon nearly all points there seemed to be a perfect oneness of opinion, and I have never heard to this date that there has been any material departure from these first ideas of Mr. Ross's; but have always understood that whatever drawings were made, were in conformity with all previous instructions.—I am, Sir, &c.,

JOHN BURBIDGE.

10, John Street, Adelphi, Jan. 27, 1873.

"BUILDING NEWS" SCHOOL-PLANNING COMPETITION.

SIR,—Our attention has been drawn to the letter signed "R. R. R." in your issue for 24th inst. We beg to say that the writer does not state anything which makes us desire to alter the recommendations of our report, or which was not before us when that report was made.

That design which so adapts itself to the site that it does not require light from the adjoining property is decidedly better than another of nearly equal merit which does. It requires more skill, and therefore if successful deserves more praise; and it far better conforms to the actual circumstances of architectural practice. The permission to get light as described ought to have been used, if at all, with the greatest possible moderation; by reading the extract from our report contained in his letter, it can be seen to what extent "R. R. R." used the adjacent land.—We are, Sir, &c.,

BANISTER FLETCHER,

T. ROGER SMITH.

HIGHWAY DISTRICT SURVEYORS' ASSOCIATION.

SIR,—May I request the aid of your valuable journal on behalf of the above, a deputation from which is to be introduced to the Local Government Board, by Major Allen, M.P., on Tuesday next (Jan. 28th), at two o'clock. The grievances under which we suffer are very great, and call forth general complaint, and do most certainly

tend to keep good and competent men from seeking these appointments. You, Mr. Editor, will readily perceive that surveyors of highway districts should be men of good ability, having, as we have, the sole charge of districts containing from 4 to no less than 160 parishes, with a superficial area of from 60,000 to 300,000 acres (see the Hexham and Morpeth districts in Glen's "Highway Laws"), and a length of road varying from 100 to 800 miles, and this is not all; since the abolition of the turnpikes, these roads have been added to the districts, considerably augmenting the mileage. By this it will be seen that a district surveyor should be a good engineer, as in such districts he would have to plan and superintend the construction and repair of numerous bridges, culverts, and sewers, also the laying down, surveying, and making of all new roads, and diversion of old ditto, and often he has to map his district for the use of his Board; he must also be a good accountant, as he has to keep numerous books, &c. And now, for these services how is he paid? Well, the salaries vary from £80 to £300; but as in nearly every case he is compelled to keep a horse (and in some cases two horses), and to pay all his travelling expenses (not a small item in his expenditure), you will see that he has little left to make a provision for old age, sickness, or accident, and as there is as yet no superannuation attached to this office, he, after years of incessant toil, finds himself destitute. And now it is that we ask your aid, as publicity will doubtless benefit us. I inclose a copy of the suggestions to be submitted to the Local Government Board, and can only trust that they will deem the matter worthy of their consideration.—I am, Sir, &c.,

JAMES BATEMAN, Civil Engineer, and
Surveyor to the Kingston Highway Board.
Kingston-on-Thames, S.W., Jan. 27th, 1873.

SUGGESTIONS TO BE MADE TO THE LOCAL GOVERNMENT BOARD BY THE DEPUTATION:—

"The appointment and dismissal of district-surveyors to be placed under the control of the Local Government Board. The present appointments to be confirmed by such central authority, to give them freedom and independence in the performance of their onerous duties, and more particularly from the changeable character of the highway boards in changing their members every year, &c. The Local Government Board having a voice in such appointments would be a guarantee that the most competent men were elected; highway boards objecting to such would tend to prove the necessity thereof.

"That a moiety of surveyors' salaries should be paid out of the Consolidated Fund, similar to that which is intended to be done in respect to inspectors, &c., of nuisances appointed under the 'Public Health Act.'

"That surveyors should be entitled to a superannuation or compensation on being disabled by accident, sickness, or old age.

"The cost of maintaining all highways (and not late turnpike-roads only) should be a common charge upon all property rated to the relief of the poor in each district or county. It would simplify the management, and prevent the necessity of keeping two sets of accounts, &c.

"The 23rd section of William IV., cap. 50, should be amended or made retrospective.

"There are many uninstalled roads set out under the Inclosure Acts, and the ratepayers of a particular parish may press on highway boards to repair the same, if such could be made a common charge, although such may not be required for public use.

"The 66th section of 5 & 6 William IV., cap. 50, should be repealed, and power given to surveyors to trim the sides of all hedges and banks as often as required.

"The 67th section of 5 & 6 William IV., cap. 50, should be amended, and made imperative on surveyors to clean out all ditches, drains, &c., necessary for the purpose of draining highways; the soil removed therefrom to be vested in the highway board, with power to sell, &c.

"That landslips may be removed by surveyors, and the expenses of such removal charged to the adjoining landowners.

"That no manure or other nuisance should be allowed on any waste or unclosed land within 50ft. of the centre of the highway—"

"The 51st section of 27 & 28 Vic., cap. 101, which allows manure not to be placed within 15ft. of the centre of the road, being insufficient to prevent nuisances, more particularly in regard to the late turnpike-roads."

The deputation will consist of Mr. E. Hicks, of Bridgewater; Mr. J. Y. Sturge, of Thornbury; Mr. E. Reynolds, of Clutton; Mr. A. Maule, of Bath; Mr. Jas. Bateman, of Kingston-on-Thames; Mr. Edwin White, of Chew Magna, Bristol, secretary to the Surveyors' Association—introduced by Major Allen, M.P. for county of Somerset.

ARCHITECTS AND THEIR ASSISTANTS.

SIR,—The correspondence concerning the authorship of Mr. Ross's design for the Edinburgh Cathedral opens a most important question as to the employment of assistants in an architect's office.

I presume that any gentleman working in the office of another architect, and not stipulating that his name shall appear jointly on the drawings with that of his employer, is merely in the position of an architectural assistant; and, as such, is bound in honour to show to no one the sketches prepared under the directions of the architect employing him.

Now, Sir, the question is, shall an architect in large practice be compelled to employ only such as are capable of but little more than tracing or repeating a bay, or the like? or may he avail himself (as men of all other professions do) of the services of those who have obtained a considerable proficiency in their work, but have as yet to wait for a practice of their own?

Should it be decided that any of the latter class have the right of claiming as their own design any they may have assisted to work out from the sketches or instructions of their employer, it will inflict a great injury on both parties. The architect will be compelled to spend much time on the working out of his own first sketches, which would be far better employed in a latter stage of the work: and many a young member of the profession would lose at once both the means of making an income and of gaining an amount of experience which would be of the greatest service to him when he shall be so fortunate as to be entrusted with the execution of large works himself.—I am, Sir, &c.,

ARCHITECT.

FITTING UP BATHS.

SIR,—I read with interest the remarks at p. 95 by "H. K." upon this subject, and would certainly much wish to see the important subject of plumbing far more ventilated than it has as yet been. I think your readers are indebted to you for allowing the subject to be treated upon and discussed in your columns in the way it has been. As to the plan shown in the sketch by "H. K.," there need be no difference between it and that involved in Fig. 130, except that the bath shown in the one is of iron, while that in the other is of wood. Both are filled by cranes at top, and have plug and grating at bottom. To assert, however, as "H. K." does, that the iron baths are "more cleanly" than the wooden ones, is a question; for water left in iron baths will soon get rusty, which it will not do in wooden ones. When cold water is used, the wooden bath also feels more kindly to the feet than the metal ones. I may also add that although in one of the largest of our iron districts, yet I find in one public institution here all the baths and other ablutionary appliances, except the kitchen sinks, are made of wood. Iron, therefore, appears to have been discarded, and become a "thing of the past" in this case.

As to emptying baths by means of plugs, many who can afford it would not have that style, but would insist upon a rod-pipe and valve being put in; and I think they are right. The only thing the Water Company might fairly say would be, "Discharge your cranes into the bath direct, so that we may see if they leak."

The plan which "H. K." shows of discharging bath waste-pipe into top of open siphon or gully-trap outside, is good. Many, however, would object to carry a special waste-pipe for bath a distance of 40ft. or so, when perhaps 3 or 4ft. will lead it into a passing soil-pipe; and to obviate the "breaking of the joints," they would say, "Give us a soil-pipe which can stand both hot and cold water." Now such a soil-pipe can be easily got by using extra thick iron pipes. In regard to the hot water apparatus as depicted by "H. K.," I would ask, What is the use of putting cold-pipe to boiler so far up into copper tank? Also, why put tap on where shown merely to empty cylinder, and no tap or pipe to cleanse out boiler? Had the tap been shown under boiler it would have emptied and cleansed cylinder and boiler at once. Then should water in boiler boil,

I have, it appears, laboured under what now turns out to be a delusion--that any architect entering into competition was bound in honour to keep his drawings and motto as secret as possible until after the award of a committee. Whether the Right Rev. Robert Eden was on the Edinburgh Committee or not does not affect the question, and there is no doubt that his personal influence--apart from any official influence as Bishop of Moray--would have a great weight with individual members of that Committee, especially after the remarkably clean breast he has made of it in his own

letter, containing, as it does, most startling and dangerous admissions.

It seems to me that this competition question should be determinedly faced and settled, and this is the main object of this communication: How is this to be done?

There is at present a competition open at Nottingham, under the auspices of a Limited Liability Company. No definite ground plan has been furnished, nor can satisfactory information, either by personal or written application, be obtained thereon. No assurance has been given that professional arbitration will decide the merits of the competitive drawings. About the whole affair there is such a halo of pre-arranged plans that there is no ground of security whatever for the honourable competitor.

Again, some time ago, a chapel committee in this town invited architects to compete for an extensive alteration and enlargement, and in compliance several gentlemen took immense trouble to prepare drawings with great exactitude, in accordance with special instructions of the committee. This was all done, of course, at the trouble and expense of the architects. The drawings were duly sent in, and the committee, without even any expressed opinion as to their respective merits, quietly returned the plans to their unhappy owners, with the cool remark that the committee would be unable to raise the funds to carry out the proposed alterations. Why should architects be thus treated, and have no redress or remedy?

The most painful facts have transpired here (and no doubt at other places) discouraging to all honourable men. It has been known that on the eve of depositing important competition drawings, and previous to the awards of committees, certain architects have given champagne suppers, to which members of such committees have been invited. The rebuilding of the Mechanics' Hall here, after the fire, was a most unsatisfactory piece of business.

During a recent competition for schools in Nottingham, the name of the adopted competitor was mentioned some time before the decision. Numerous drawings of competing architects were placed on chairs in a small room, and loosely turned over in a haphazard kind of way. Some architects had afterwards the consolation of knowing that their drawings were looked at twice. The adopted plans were sent to London, and three times returned for amendment before they were fit to be sanctioned by the authorities. The adopted competitor's estimate was from £1,000 to £1,500 higher than any other, and there was no professional arbitrator unconnected with the town. The adopted competitor was intimately acquainted with the leading men in connection with the schools; but the usual force of motives was gone through for decency's sake. No drawings were afterwards exhibited, although the other competitors requested a view; nor do they or the public to this day know what the adopted plans are like!

That much of this unsatisfactory state of things is due to the shabby and unprofessional conduct of certain architects is, alas, too true! There is a frequent habit amongst some of underbidding their more honourable brethren; and I can vouch for one instance in which an architect, out of mere spite, actually tendered his services gratis, after an open competition in which he had not succeeded! This was done to filch the honour (if any) from his successful opponent. In other cases, less than half the usual commission has been tendered for work actually given into the hands of brother professionals. All this sort of thing ought to be, and must be, got rid of if the profession is to keep up an integrity to be relied upon. For my own part, I think nothing can be done until we really unite in a bond of protective measures and uniform action.—I am, Sir, &c., A VOICE FROM NOTTINGHAM.

January 29, 1853.

THE "BUILDING NEWS" IN EDINBURGH.

SIR,—Referring to the letter of Mr. McLaren, in your issue of 24th, regarding the charge we make for the BUILDING NEWS, we beg to state that any of our subscribers who prefer receiving their newspapers by post are charged at the publisher's price, and this mode of supplying it was offered to him when he called at our office. But if delivery by messenger is preferred we charge extra for that service; and we consider ourselves entitled to do so, especially in the case of Mr. McLaren, whose residence is above a mile from our office.

Further, we supply the BUILDING NEWS at the nett price to any one who will call for it.—We are, Sir, &c., ROBERTSON & SCOTT.

13, South Hanover-street, Edinburgh, 27 Jan., 1873.

MR. ROSS'S DESIGN FOR S. MARY'S CATHEDRAL.

SIR,—I find in the "To Correspondents" of your issue of the 24th of January:—"Mr. Gildard, Glasgow, in a letter says:—'Mr. Ross is a man who seems to have found himself famous about as suddenly as Byron did.' I hope that what I mean will not be misunderstood. It is simply this:—That Mr. Ross, an architect in a remote provincial town, seems to have found himself suddenly famous, because of the place he now holds with men of such widely-enjoyed reputation as Sir George Scott, Mr. Street, and Mr. Burges, and it has no regard to the question whether Mr. Ross holds this by the exercise of unaided talents, or by the use of occasional assistance. Hoping to see his letter in your next impression, I am, Sir, &c.,

THOMAS GILDARD.

27th January, 1873.

SIR,—In the altogether unjustifiable attack on Mr. Ross that has appeared lately in the pages of the BUILDING NEWS, I consider that not only Mr. Ross's honour, but also the honour of the country he so well represents, has been *fatally tampered with*. And as one who has had ample experience of our Scotch architects' offices, allow me utterly to refute the grave charges you have—without any wish to damage anybody—so fatuously preferred against a gentleman whose name and skill are a credit alike to himself and the country which brought him fourth, and who has produced more great men in a fortnight than England could in a century.

I do not for a moment deny that extensive assistance is obtained from London by one or two of our Gothic architects when pressure of other business compels them to lay by the pencil for the crowbar (so to speak). But in spite of this slight indiscretion, I would proudly point to our architecture, as seen in the street in Edinburgh, as evidence that Scotland is by no means behind your country in "arms, in arts, and song," and the simple mention of the new Bank of Scotland, on the Mound, the new church at the bottom of Pilrig-street, and the National Monument to our brave soldiers on the Calton-hill, will, I think, be sufficient.—I am, Sir, &c.,

NEMO ME IMPUNE LACESSIT.

[We insert the above extraordinary letter, written by a gentleman who says, in a private note, that he has "known Mr. Ross from an infant." We, however, fail to see wherein it will in any way assist Mr. Ross. Neither do we see wherein the honour of Scotland has been "*fatally tampered with*." The question at issue is more one of individuality than nationality. Our correspondent talks tall, but somehow he proves nothing.—ED.]

SANITARY OPERATIONS IN GLASGOW.

SIR,—I have taken the liberty of sending to you the appended article clipped from the *Evening Citizen*, on the work of the Sanitary Department, Glasgow, as I think it may be interesting to your readers to know how filth, disease, &c., are being battled with in a great city. You are aware, I dare say, that Glasgow has the grandest water-supply in the world; that it has an extensive Improvement Scheme in active operation, letting in light and air to the worst parts of the city; and that it has an unenviable death-rate.—I am, Sir, &c., THOS. GILDARD.

People hear and read a great deal about the sanitary condition of the City, and the business of the department which makes the health of the citizens its peculiar care; but so little is popularly known of the practical work performed that it may be of some interest to explain it briefly from the details given in a report by the Inspector, which has just been printed. The service is divided into eight branches, beginning with Nuisance Inspection, which includes the sanitary improvement of defectively constructed dwellings and their surroundings, and by which ventilation, light, drainage, paving, water-supply, suitable conveniences, and the means of maintaining cleanliness are obtained. Labour in this department has been attended with satisfactory results, not only in the comfort and health of the occupants, but in the absence of infectious diseases in localities formerly notoriously prolific of cases for fever hospitals. Owners and tenants are complimented for the willing acquiescence shown in carrying out suggested improvements, the cases for prosecution being few, while the astonishing number of 9,944 nuisances were removed. The next branch of the business is Lodging-house Inspection, which controls the number of lodgers in ticketed houses, common lodging-houses, and houses let in lodgings; enforces cleanliness, and detects overcrowding therein. Out of 14,463 houses visited, 13,273 were found clean, and 1,190 dirty, while 19,152 visits were made for the detection of overcrowding. It is stated that the houses now present an appearance much improved from what they did at the outset of the inspection in 1870, the rules as to cleanliness, ventilation, and whitewashing being in most cases fully observed, and admitted by the class of persons subjected to them to be greatly conducive to their good health and comfort. Branch the third, Epidemic Inspection, includes house to house visitation, for the discovery of persons suffering from infectious diseases, the arrangement for their hospital and home treatment, and the appliance of measures necessary to check and prevent the spread of such diseases. In connection with this object the extraordinary number of 144,712 visitations were made and 1,014 cases found. Then there is Female Visitation, to promote the education of the poorer classes and habits of cleanliness. Excellent results are shown under this head, some 13,000 first visits having been paid, and great improvement found on a return. The female visitors are well received by the people, and continue in many ways, it is stated, to aid the general service. Detecting unwholesome food is the fifth department, and the officers engaged made 3,137 inspections, 119 seizures, and obtained 14 convictions. The inspection of workshops is now in the hands of Government officials; but the sanitary condition of these places of employment continues to engage the close attention of the health officers. Bakehouses are made a separate branch, which includes the enforcement of proper ventilation, cleanliness, and the detection of employers overworking young persons. A large number of inspections were registered, but the employers do not appear to have given the officials any work. The remaining branch is the Indoor service, engaged in making up returns and other office

work. Performing the labour of the entire department, there is a staff of five district inspectors, nine nuisance inspectors, six lodging-house inspectors, eight epidemic inspectors, one inspector for detection of unwholesome food, one indoor inspector, three clerks, two office boys, and four female visitors, under the orders of Mr. Kenneth M. Macleod, who draws up the report, and shows that there is work enough for them all in looking after the sanitary condition of the city.

Intercommunication.

QUESTIONS.

[2768].—**Factory Chimneys.**—Will any of your practical readers kindly inform me what materials would be best to line a factory chimney with through which the fumes of brimstone stoves have to pass, and what height the lining should be carried? An early reply would be much esteemed.—T.C.

[2769].—**Dry Rot.**—Will any reader of the BUILDING NEWS kindly inform me if there are any means for effectually preventing dry rot? It exists in a house near York which is comparatively modern; and in making alterations lately, fungi were found growing to a considerable height behind the casing jambs, and they were also plentiful in the brickwork. There is ample ventilation everywhere.—AN ARCHITECT'S CLERK.

[2770].—**Wood-work and Hot-water Pipes.**—I must apologise for troubling you, but can you tell me if a satisfactory answer was ever given to a question about the possibility of setting fire to wood-work by any form of hot-water pipes in the number of your journal for November 17, 1871, beyond the ones published, which throw very little light on the subject. I can hardly believe it possible, even with the small-bore high-pressure system, to ignite wood-work, but am told that the late Mr. Braidwood, of the London Fire Brigade, traced several fires to this cause. If you could give me, or put me in the way of finding, any positive information on the subject, I should be much obliged.—A. L. TATE, architect, Manchester.

[2771].—**Shading Elevations.**—Will some one please explain how an elevation of a building is shaded by the use of the angle of 45 deg?—J.C.L.

[2772].—**Drying Ground under Flooring.**—Would any one kindly inform me of the best means of drying the ground under flooring of house? Air bricks have been put in some months, but owing to the late rains, have not dried ground. The flooring stands about 2ft. 6in. above ground. Has sulphur been tried for the purpose?—S. T. T.

[2773].—**Apportioning Cost of Drain.**—I have to apportion between A., B., and C. the cost of laying a branch drain. Which is the proper mode—the area of premises, the frontage, rateable value, or one-third each? A. maintains that C. ought to make it down to B.; B. and C. half each to A.; and A., B., and C. one-third each of the remainder to sewer. Therefore C. would have to pay for the whole of his own, together with half B. and one-third of A., which I consider unfair.—X.

[2774].—**Centrolinead.**—Will some one kindly tell me how to fix a centrolinead, the distance of vanishing points, &c., on plan being known? How are the pins regulated round which the centrolinead works, and what distance ought they to be from the line of heights?—X. Y.

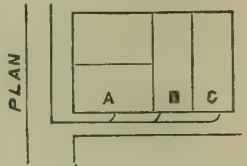
[2775].—**The Wooden House from Norway.**—I noticed a paragraph in your paper headed "A Wooden House from Norway," stating that it had been constructed there, and afterwards conveyed to some place in Devonshire, and there set up complete. Can you kindly favour me with the address of either the owner, architect, or builder? If you are unable to do so, perhaps you would inquire through your Intercommunication column.—N. H. H.

[2776].—**Creasing.**—I hail with pleasure the additional illustrations in the BUILDING NEWS, as I believe that the spirit of architecture is in the drawing more than the letterpress, although your practical papers are very useful. I should be glad to have a definition of the term "Creasing," used in your articles on "Quantities."—B. NELSON, Architect and C.E., Llandudno.

REPLIES.

[2760].—**Cracked Ceilings.**—A Plasterer wishes to know the cause of cracked ceilings, and a remedy for them. I think I can supply him with the information he requires. Supposing the materials used to have been good and a sufficient quantity of hair mixed with the pricking-up coat, then the general cause of cracking is from the floating coat being laid on before the pricking-up is quite set, or, as is frequently the case with hurried work, the three coats being followed one immediately upon the other, so that they are little better than one thick coat. I always insist on each coat being perfectly dry before the next is put on, and the consequence is that I never have any cracked ceilings. Contractors, as a rule, very much object to this, as once they have the scaffold up they like, in order to save trouble, "to follow straight on." The only satisfactory remedy for cracked ceilings is to line them with stout lining paper hung with butt joint, and then distemper.—E. B. J. K.

[2761].—**Royal Northern Agricultural Society's Show.**—In reply to "Inquirer," I send the accompanying, being a portion of the report of the last meeting of the Royal Agricultural Society, held on December 24th, 1872, which will give him some information concerning the competition:—"Improved Cottages for Agricultural



Labourers.—Colonel Innes: It is proper that I should make a statement to this meeting as to the position of matters in reference to this question, and also to ask that the committee be re-appointed to bring the matter to a successful termination. You will remember that twelve months ago a committee to get plans for cottages was appointed, and they were directed to place themselves in communication with the General Committee, to frame rules under which the competition should be conducted. We very soon saw that the subject had attracted the attention of more Associations, and that competition had been carried on for some time in England, and that very great interest had been taken in the matter. Borrowing something of the terms they had adopted, we arranged the terms upon which competition was invited for the premiums offered by the Society. The competitors were invited to lodge their plans in the last week in October, and we trusted that ere this time we should have been ready to present to you the final report, and to exhibit the plans which had been selected as the best, and that the whole matter should have been completely in shape. I am not now here to apologise in any way for that not being the case. It has not been owing to any miscarriage in the arrangements of the committee, or failure in their exertions, that we are not prepared to present the report; it has been from the rather unexpected success of the competition. The number of plans has been very large, and it has taken some time to have all the plans classified. There have been nearly 50 plans sent in, comprising 500 separate drawings. The selection of plans is now in such a state as that they can be laid before the committee for final consideration, and I trust that in a few days the committee will appoint a day in which they can decide upon these plans. I beg to move that the committee be re-appointed, with the addition of Mr. Macdonald, factor, Cluny, and Mr. Begg, factor, Durris."—W. Fox.

[2765].—**Architects' Charges.**—To the query of Architect (No. 2765) in last number, I should like to see an answer from some professional man of standing. I am somewhat interested in the same matter, and a year or two ago I had occasion to measure up and value a good deal of work that I had designed and carried out, no contracts being entered into. My charge for this (2 per cent.) was objected to by my client, as I was informed that under no circumstances could an architect be entitled to more than 5 per cent. for all services, and he confirmed his statement by the opinion of an eminent member of the Institute of British Architects; so I had to withdraw my charge. Doubtless, had I added my percentage to the builder's account, including the same therein, my client would have known nothing about it, and been perfectly satisfied. There are no professional surveyors in this part of the world, and all this work has to be done by the architects themselves. Had I employed a surveyor, I suppose the same objection would have been made by my client as to paying him.—PROVINCIAL.

[2767].—**Draught in Church.**—Put blinds to your windows 2in. from glass, curtains to your doors.—R. A. W.

WATER SUPPLY AND SANITARY MATTERS.

THE BOARD OF WORKS AND THE NATIVE GUANO COMPANY.—The reports of the Engineer and Consulting Chemist of the Metropolitan Board of Works on the experiments of the Native Guano Company at Crossness have been printed. Mr. Bazalgette states that the total expenditure in producing 142 tons of native guano was £895, or about £6. 6s. 4d. per ton, exclusive of rent, interest on capital, depreciation of plant, and other incidental items. With the exception of a few shillings, the company's books show no returns in the shape of sales of manure. The Consulting Chemist, Mr. Keates, F.C.S., states—(1), that the effluent water was, on the whole, in a fit state to be admitted into any ordinary river without producing a dangerous degree of pollution, but the sewage, owing to the heavy rains of the winter, was in an extremely dilute state, and the effect of this was to render the results somewhat inconclusive; (2) that there was no nuisance during the process; and (3) that the value of the manure, as judged of by its chemical composition, does not exceed 20s. per ton. It appears from Mr. Bazalgette's report that Mr. Rawson, the general manager of the Native Guano Company, had addressed a letter to Mr. Keates and himself, urging that certain expenses incurred during the process ought not to be debited to it, but he deems it his duty to report simply what was done, and not what might have been done or was left undone by the company during the three months of the experiment, and he must not be considered to assent to the accuracy of Mr. Rawson's views.

SEWAGE OF NESTON AND PARKGATE.—At a meeting of the Local Board at Neston, last week, instructions were given to Messrs. Reade & Goodison, civil engineers, of Liverpool, to prepare the necessary plans and sections for the complete sewerage of the district. The water supply being now completed, a system of sewerage has become indispensable. The question of utilisation is still an open one, but as the nature of the district is adapted to irrigation works, they may probably be eventually adopted. When the sewerage is completed, there appears to be no reason why this locality should not be as healthy as it is picturesque.

TIDE-WELLS AT MARGATE.—A correspondent of the *Antiquarian* says that Margate, which used to stand almost at the head of English watering-places for salubrity, now is almost the lowest in the list, according to the Registrar-General's return for 1871; and her neighbour, Ramsgate, once far below her, is now vastly superior: the mortality of the former being just double that of the latter, viz., 22 per thousand as against 11. What are the causes of this change? May it not be attributed to the fact of Ramsgate having secured a thorough system of drainage, and good supply of water, while Margate has still no regular drainage, at least in the old town, and

at many houses the water, being from wells, and those wells in close proximity to cesspools, is necessarily impure? Some at least of those wells are, as J. Lewis mentioned in his "History of Tenet" (1736), tide-wells, the water rising and falling in them with the tide. Lewis attributes this circumstance to the soft and porous nature of the chalk, especially on the west or London side of Margate, from the Nayland rock to Cliff-end; and it shows itself at a considerable distance from shore, as in wells at Garlinge, and in consequence of this, and the enormous increase of late years in the number of visitors, and greater amount of sewage, wells once held in repute for good water have had to be closed altogether, as, e.g., one in Trinity-square, near the church. But tide-wells still are in use, although lodging-house keepers and others try to keep the fact concealed, and are a frequent source of low fever, diphtheria, and cholera, during the season.

STAINED GLASS.

CAMBRIDGE.—The large bay-window in the Hall of Peterhouse, Cambridge, has recently been enriched with stained glass, the work of Messrs. Morris, Marshall, & Co. In this work Mr. F. Madox Brown has had a considerable share as the designer of several of the figures. The window comprises three tiers, of seven lights each. The whole represents a tree, on the branches of which hang shields of arms; these occupy the lowest tier of lights. The second tier comprises seven figures, one in each light, being representations of six worthies, and the founder of the college, in his monk's dress. All these figures are by Mr. Brown. They represent Homer, Aristotle, Cicero, the Founder, Friar Bacon, Lord Bacon, and Newton. Four other windows for the same hall have been entrusted to the firm in question. They comprise three lights each: 1, enriched with figures of Edward the First, S. Peter, and Queen Eleanor. The first and third of these are by Mr. Brown. This window is in its place. 2, figures of Dr. Warkworth, Cardinal Beaufort, and Chancellor Holbrooke. 3, Cavendish the chemist, Grafton, and Gray the poet. 4, Crashaw, Bishop Cosins, and Whitgift.

LAND AND BUILDING SOCIETIES.

OXFORD BUILDING AND INVESTMENT COMPANY.—The seventh annual general meeting of the Shareholders of this Company was held on Wednesday week. Four hundred and eighty-nine shares have been issued during the year 1872, making a total of 12,000 shares, representing a subscribed capital of £60,000, of which £46,628 are paid up. The business done in loans during the past twelve months amounts to £30,278, making a total, since the commencement of the Company, of £150,980. The Directors resolved, after careful consideration, to recommend a dividend of not more than 10 per cent. per annum, and that the sum of £7,105. 16s. 10d. should be carried forward. The annual income of the Company, in the form of repayments on advances, amounted to £13,517. 18s. 4d. at the end of the year.

HAWICK WORKING MEN'S BUILDING AND INVESTMENT SOCIETY.—A meeting of the directors of this Society was held on Monday last. There was a balance available for dividend of £447. 1s. 8d. It was proposed to apply this in paying a dividend of 7½ per cent. on the amount of share capital, which will take £204. 15s., and to carry forward a reserve fund of £100.—£304. 15s.—thus leaving a balance to be carried forward of £142. 6s. 8d.

WAGES MOVEMENT.

LONDON.—It will be remembered that last summer the operatives in the various branches of the London building trade made a demand for an increase of one penny per hour in their rate of wages, and that the employers conceded a halfpenny. The Central Association of Master Builders have just received notice that this year the men intend to "stand out" for the other halfpenny, making their wages 9d. per hour, "in accordance with the terms of their original memorial." The notice fixes the 19th of July next as the date for increase "to come into operation," and adds that, "considering the increased cost of the necessities of life, they find the purchasing power of money within the last few years has been reduced at least 20 per cent."

LEAMINGTON.—A large meeting of builders and employers in the various branches of the trade was held at Leamington on Thursday week to organise a masters' association, and to consider the demands made by the operatives from the bricklayers and carpenters down to the labourers, through their United Trades' Council, for shorter hours and increased wages, after the 25th of March next. The workmen stipulate that 54 hours instead of 56½ shall constitute a week's work, and require an advance of wages, ranging from 7-8ths of a penny to a farthing per hour. There are also very stringent regulations as to the overtime, the number of apprentices to be taken by any master, and the time and expenses to be allowed to men employed out of town. It was decided to form a Masters' Association, and a committee was appointed to prepare the necessary rules.

A new school erected at Arthington at a cost of about 1,600 has been opened. The style is Elizabethan.

Our Office Table.

BRISTOL SCHOOLS COMPETITION.—The designs of Mr. Stuart Colman, architect, Bristol, have been selected by the Bristol School Board.

BEER FREESTONE.—At the last meeting of the Edinburgh Geological Society, the Secretary read a communication from Mr. W. Linford, Exeter, in reply to queries which had been addressed to him with respect to the beautiful white stone from Beer quarries, of which a specimen was exhibited at last meeting of the society. After giving some details as to the cost of the stone and the means of transport available, Mr. Linford stated that, while some practical men recommended the stone for external work, others thought it did not sufficiently resist atmospheric influences. However, many churches had been built with it, and it was still occasionally used for external purposes, for which it was said to answer well when not exposed to the vertical action of the weather. There was no difference of opinion as to its value for interior work; and it was now being used in the restoration of Exeter Cathedral.

DRAINAGE A REMEDY FOR SUPERSTITION.—In consequence of the long-continued rain, what is known as the Surrey Bourne water has again made its appearance in Caterham Valley, and a strong current is running in the direction of Croydon. A culvert, however, has recently been constructed by the Croydon Local Board of Health, and this time it is expected that the large volume of water which is supposed to be caused by the overflow of springs in the Surrey hills, will be received into the Wandle, and carried away harmlessly. Long ago this overflow was known as the "Woe Water," and its rising was supposed to indicate a change in the Government of the country. It duly appeared, according to an old chronicle, in the years of the Restoration and the Great Revolution, and on previous occasions of similar importance.

THE LATE MISS SUSAN DURANT.—Miss Susan Durant, the sculptress, has just died. A pupil of the Baron de Triquetri, and constantly commissioned to execute works in her own peculiar line by Her Majesty and other members of the Royal Family, Miss Susan Durant was widely known both in London society and also at Paris, where her death occurred. She will be best remembered by her portraits in marble of Mrs. Beecher Stowe and of the late Mr. George Grote, by her cenotaph to the late King of the Belgians, at Windsor, and by her bust of the Queen now in the Hall of the Inner Temple. With Miss Durant the art of sculpture was followed, not for the sake of pecuniary gain, but through a love of the art itself.

It is stated that during last year, the average quantity of water sent into the city of Glasgow and district was 32,400,000 gallons per day, or 1,550,000 above the average supply of 1871; and that the consumption per head of the population was 51 gallons, or 2½ gallons more than the average of the three previous years. Of this increase, however, half a gallon is accounted for by the greater supply for trade purposes.

CHIPS.

Abberley Parish Church, situated about a mile and a half from Witley, Worcestershire, has been almost totally burnt down. It is supposed that the fire was caused by the overheating of a stove. The erection of the church, which was completed in the year 1852, cost upwards of £8,000.

The new Church Institute, North Parade, Bradford, which is approaching completion, is to be opened at Easter. The building, which is being erected from the designs of Messrs. Andrews and Pepper, architects, Bradford, will cost somewhere about £12,000.

The eminent French engineer, J. B. A. Lebas, is dead. It was he who placed the obelisk of Luxor in the Place de la Concorde. He was born in 1797, and was a pupil of the Ecole Polytechnique. In 1849 he published an important memoir, with plate entitled "L'Obélisque de Louqsor, Histoire de sa Translation à Paris."

It is said that when, in April next, Mr. Henry Cole retires from the post he has so long held at South Kensington, General Scott will succeed him as secretary. Mr. Cole will undertake the management of the London International Exhibition.

The master brick-makers of Birmingham and neighbourhood have issued a notice, stating that in consequence of the rise in the price of coal, on and after February 1 an advance must take place in bricks at the rate of 3s. per thousand.

Trade News.

TENDERS.

BEDFORD.—For the erection of two business premises in the High-street, Bedford, for Mr. W. Roff, confectioner. Mr. F. T. Mercer, architect, Bedford. Quantities supplied by him.

Foster	£3,460 0 0
Cunwin	3,229 0 0
Spencer	3,200 0 0
Taylor	3,139 0 0
Moore	3,122 0 0
Corby	3,118 0 0
Chibnall	3,055 0 0
Haynes	3,052 0 0
Potter	3,050 0 0
Lilley	3,045 0 0
Hull	3,000 0 0
Carter	2,999 0 0

CITY.—For two warehouses, Wood-street-square, Monkwell-street, City, E.C. Mr. Herbert Ford, architect.

Myers and Son	£3,680 0 0
Scrivener and White	3,669 0 0
Nightingale	3,740 0 0
Brass	3,439 0 0
Perry Brothers	3,393 0 0
Simpson and Co.	3,383 0 0
Williams	3,330 0 0
Henshaw and Co.	3,231 0 0
Killby	3,222 0 0
Crabb (accepted)	3,100 0 0

KENDAL.—For the erection of entrance portion of villa residence, Brathwaite-green, for Mr. D. H. Penton. Mr. Stephen Shaw, architect.

Troughton (walling and masonry)	£220 0 0
Thompson (carpentry and joinery)	143 0 0
Goulding (slating, labour only)	16 0 0
Davis (plastering)	49 0 0
Robinson (plumbing, painting, & glazing)	48 12 0
KENDAL. —Cottage house, Kirkland, for Mr. Nicholas Atkinson. Mr. Stephen Shaw, architect.	
Medcalfe (walling and slating)	£86 0 0
Peel (carpenter and joiner)	50 0 0
Jackson (plumber, painter, and glazier)	31 0 0
Davis (plasterer)	17 0 0

LONDON.—For villa residence, with studio, at Haverstock-hill, for Mr. G. G. Kilburne. Mr. T. Batterbury, architect.

Linzell and Son (accepted) £1,500 0 0
ST. HELENS.—Sir, Allow me to correct an error in one of the amounts of tenders for Town-hall, St. Helens, Lancashire, which appeared in your issue of the 17th instant.

CORRECT AMOUNTS.

Tender A	£27,745 0 0
Tender B	10,900 0 0

Total amount.....£38,645 0 0

STOCKWELL.—For house for Mr. J. F. Honey. Mr. A. T. Timewell, architect.

Snelling	£1,025 0 0
Miller	1,016 0 0
Pharaoh	915 0 0
Cobbedick (too late)	900 0 0
Harrop (accepted)	855 0 0

SURREY.—For alterations and additions to servants' offices, Tandridge Court, Surrey, for the Right Hon. the Earl of Cottenham. Mr. R. Martin, architect. Quantities supplied by Mr. Fredr. Sparrow.

Bridgman, Nuthall, and West	£955 0 0
Ward	790 0 0
Jarrett (accepted)	780 0 0

WATHAMSTOW.—Foundations for S. Saviour's Church, Walthamstow.

Add in Selenetic Mortar.

Myers	£1,176 0 0	£40 0 0
Perry and Co.	1,000 0 0	10 0 0
Carruthers	846 0 0	50 0 0
Egan	806 0 0	37 0 0
Dove Bros.	795 0 0	40 0 0
Henshaw and Co.	790 0 0	50 0 0

ASHTON & GREEN,

Slate, Iron and Marble Merchants and Quarry Agents.—ROOFING SLATES.—Bangor, Blue, Red, and Green. Blue, Portmadoc, and Whitland Abbey Green. The new "Permanent" Green, weight the same as Bangor and uniformity of cleavage equal. Marble and Enamelled Slate Chimney-pieces. Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s SPECIAL RED RIDGE TILES. Large Show of all Goods at 14 and 15, Bury-street, St. Mary Axe, London, E.C. Drawings and Prices upon application accompanying trade card.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—ROYAL INSTITUTE OF BRITISH ARCHITECTS.—(1) "On the Shoring of Grosvenor Church Tower." By Mr. J. P. Seddon. (2) "On Warming and Ventilation." By Mr. J. Barber, C.E. 8 p.m.

SOCIETY OF ENGINEERS.—President's Address. 7.30 p.m.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—(1) Discussion on "Cylindrical Foundations." (2) "The Relative Advantages of the 5ft. 6in. Gauge and of the Metre Gauge for the State Railways of India, particularly for those of the Punjab," by Mr. W. T. Thornton, Secretary of the Public Works Department, India Office. 8 p.m.

WEDNESDAY.—SOCIETY OF ARTS.—"On Ships for the Channel Passage." By Lieut.-Col. A. Strange. 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—"On the Restoration of Willenden Church." By Mr. E. J. Tarver. 7.30 p.m.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—"On Roads." By Mr. J. Bateman. 7.30 p.m.

COMPETITIONS OPEN.

THE CARLISLE DIOCESAN CHURCH EXTENSION SOCIETY.—January 31, 1873.—For plans for a mountain chapel, suitable for 100 persons. Two prizes of twenty and fifteen guineas for the best designs. This competition is open to architects residing in Cumberland, Westmoreland, and Lancashire only.—Rev. Canon Shipman, Vicarage, Aspathra, Cumberland; and Rev. Canon Stock, Rectory, Windermere.

THE FROME DISTRICT AGRICULTURAL SOCIETY.—Feb. 20.—For adapting a field near Frome for the purposes of a Cheese, Corn, and Cattle Market, and for the erection of suitable buildings. Premiums of £20 and £5 for first and second best designs.—Messrs. Cruttwell and Daniell, Solicitors, Frome.

HALIFAX. Feb. 18.—For designs for a school at Booth Town. Mr. R. Ostler, School Board Office, Waterhouse-street, Halifax.

NORTHAMPTON. Jan. 27.—For designs for two new schools, with classrooms, out-offices, &c. Mr. J. B. Hensham, Solicitor, Northampton.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 6s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

BEAUFORT. Feb. 3.—For the erection of a school at Beaufort-hill, to accommodate 189 children. Mr. Liéw. P. Jones, Victoria-road, Ebbw Vale, Monmouthshire.

BROWNHILLS (near Walsall), Feb. 10.—For the erection of a market-hall, shops, and other buildings adjoining the Railway Station. The Rev. J. J. Singleton, Ogley Hay Vicarage, near Walsall.

CHICHESTER. Feb. 8.—For alterations and additions to the West Sussex Club premises, in East-street. Mr. George Elkington, architect, West-street, Chichester.

CUCKFIELD (Sussex), Feb. 7.—For proposed alterations and additions to the Workhouse and premises at the Cuckfield Union.—Mr. E. Waugh, Clerk to the Board, Cuckfield.

DUBLIN. Feb. 5.—For lowering and widening Essex-bridge. N. Proud, Secretary, Port and Docks, Office, Dublin.

ELLAND (Yorkshire), Feb. 3.—For the erection of a fire-proof worsted mill and shed, with engine and boiler house, offices, and mill chimney. Mr. T. W. Hellewell, architect, Brighouse.

FRANKFORT-ON-THAINE. Feb. 12.—For the construction of about 846 lineal metres 4ft. 6in. by 3ft.; 975 lineal metres 3ft. 6in. by 2ft. 4in.; 5,396 lineal metres 3ft. by 2ft. brick sewers; and 102 lineal metres 12in. pipe sewer, and other works. Board of Works, Frankfort-on-tha-Maine.

GEDDING (Suffolk), Feb. 3.—For the erection of a rectory house. Mr. W. Kirby, architect, 29, St. Luke's-road, Birmingham.

GLOUCESTER. Feb. 5.—For the supply of 200 pieces of oak timber, suitable for checking-posts on the canal. Henry Waddy, secretary, Canal Office, Gloucester.

GRAYS (Essex). Feb. 12.—For the erection of the new building in connection with Palmer's Endowed Schools. Mr. Thomas Book Maples, Queen's Chambers, Chapel-street, Bedford-row, W.C.

HANLEY (Staffordshire), Feb. 3.—For the supply of blue paving bricks. Mr. J. Lobley, Borough Surveyor, Corporation Offices, Hanley.

KEIGHLEY. Feb. 13.—For making a new survey and finished plans of the district, to a scale of 30ft. to an inch. Henry Alty, C.E., Engineer to the Local Board, Keighley.

LEAVESDEN WOODSIDE. Feb. 6.—For the supply and fixing of steam-driving machinery at the washhouse and laundry, at the St. Pancras Schools. Daniel Fildew, Clerk to the Guardians, Vestry Hall, St. Pancras, N.W.

LITTLETON (near Evesham), Feb. 3.—For the erection of a new school and teacher's residence.—Mr. George Hunt, architect, Evesham.

LONDON BRIDGE.—For the erection of a factory for 200 workmen. Mr. W. G. Coldwell, 21, Railway Approach, London Bridge.

MARCH. Feb. 13.—For the erection of boys', girls', and infants' schools and class-rooms, for the accommodation of 500 children, and residences for the master and mistress. Mumford and Townsend, architects, No. 3, York-row, Wisbech.

MIDDLESBOROUGH. March 3.—For the new Cart Ferry works on the North and South Side of the River Tees. J. T. Bell, Town Clerk, Middlesborough.

MIDLAND RAILWAY. Feb. 4.—For alteration to the refreshment rooms and other works at the Derby Station.—J. Williams, secretary, Derby.

MIDLAND RAILWAY. Feb. 4.—For bricklaying, excavating, &c., adjoining Whitecross-street.—Engineer's Office, Goods Station, St. Pancras.

MIDLAND RAILWAY. Feb. 4.—For general works, &c., at Sheffield.—J. Williams, Midland Railway, Derby.

NEWCASTLE-ON-TYNE. Feb. 21.—For the erection of the Bell-terrace schools. Alfred Goddard, Clerk to the School Board.

NORTH EASTERN RAILWAY. Feb. 4.—For the erection of three cottages at Howden, and three at Crook. J. E. Macnary, Railway Offices, Darlington.

NORTH EASTERN RAILWAY. Feb. 4.—For the supply of one million bricks for the new station at Middlesborough. J. E. Macnary, Railway Offices, Darlington.

OPENSHEAW. Feb. 10.—For draining, flagging, &c. Mr. J. Elliott Holder, Clerk to the Board.

OSBOURNEY. Feb. 10.—For the restoration of the parish church. Mr. Kirk, Architect, Sleaford.

ROCHDALE. Feb. 13.—For the erection of a new workhouse at Dearnley, near Rochdale.—John Holgate, Clerk to the Guardians, Acker-street, Rochdale.

SNELSTON (near Ashbourne), Feb. 8.—For the erection of a parsonage-house. Rev. Clement F. Broughton, Snelston, Ashbourne.

S. LAWRENCE NEWLAND (near Maiden), Feb. 10.—For additions and alterations to the rectory house. Rev. J. W. Mills, New Hall, Bradell, near Maiden.

S. MARY, ISLINGTON. Feb. 7.—For the construction of 1,070ft. of brick sewer (3ft. 9in. by 2ft. 6in.), and other works, John Layton, Vestry Clerk, Upper-street, Islington.

SWANSEA. Feb. 4.—For the erection of a quay wall and other works connected therewith.—Richard Aubrey, Essery, Town Clerk, Guildhall.

TYNMOUTH SCHOOL BOARD. Feb. 3.—For the erection of school buildings at Chilton.—Mr. F. R. N. Haswell, architect, 12, Howard-street, North Shields.

BATH AND OTHER BUILDING STONES, OF BEST QUALITY.

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		Per 1,200 Slates.		
Best Green Slates 14 by 7	2 17 6	16s. 6d.		
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Do. do. 13 by 7	2 3 0	14s.		
Do. do. 12 by 7	1 18 6	13s.		
Do. do. 12 by 6	1 7 6	11s.		

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Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tufton-street, Westminster.

BANKRUPTS.

SITTINGS FOR PUBLIC EXAMINATION.

J. W. Hackworth, Darlington, engineer and engine builder, Feb. 11.—J. W. Burns, Manchester, lately coachbuilder, Feb. 20.

DIVIDEND MEETINGS.

R. Johnson, Lowestoft and Norwich, coal, slate, and timber merchants, Feb. 20.

SCOTCH SEQUESTRATIONS.

Robert Stewart Lyall, Glasgow, plumber, February 3, at 12.

PARTNERSHIPS DISSOLVED.

Robert Sharpe and Sons, Victoria-street, Westminster, contractors for public works.—Hillas and Priestley, Bradford, Yorkshire, joiners.—Penson and Ritchie, Chester, architects.—William Fallows and Co., Liverpool, iron merchants.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

(From the Public Ledger.)

		LEAD.	
		per ton	
Pig—Foreign	£21 15 0	£22 0 6	
" English W.B.	22 10 0	23 0 0	
" Lead Co.	22 15 0	0 0 0	
" Other brands	22 0 0	22 10 0	
Sheet Milled	23 0 0	23 5 0	
Shot, Patent	24 10 0	25 0 0	
Red or minium	23 15 0	24 0 0	
Litharge, W.B.	0 0 0	0 0 0	
White Dry	28 10 0	30 10 0	
" ground in oil	0 0 0	0 0 0	
		TIMBER.	
		load	
Teak	£14 10 0	£15 10 0	
Quebec, red pine	3 10 0	5 0 0	
" yellow pine	3 5 0	6 0 0	
" pitch pine	4 0 0	4 10 0	
Quebec oak, white	6 10 0	7 0 0	
" birch	5 0 0	6 0 0	
" elm	4 15 0	5 0 0	
" ash	4 10 0	5 0 0	
Dantzic oak	4 10 0	6 10 0	
" fir	3 10 0	5 0 0	
" undersized	2 10 0	5 5 0	
Riga	4 0 0	4 5 0	
Swedish	2 15 0	3 0 0	
Wainscot, Riga	4 15 0	6 15 0	
Masts, Quebec red pine	4 0 0	6 10 0	
" yellow pine	4 0 0	6 10 0	
Oregon	7 0 0	9 0 0	
Lathwood, Dantzic fm.	8 10 0	10 0 0	
" St. Petersburg	10 10 0	11 10 0	
Deals per C., 12ft. by 3 by 9in			
Quebec Pine, 1st qual.	20 0 0	24 0 0	
" 2nd do.	14 10 0	16 10 0	
" 3rd do.	10 0 0	11 0 0	
Canada Spruce, 1st	11 10 0	12 0 0	
" 2nd & 3rd	8 15 0	9 15 0	
New Brunswick	9 0 0	9 15 0	
Archangel, yellow	14 10 0	15 10 0	
St. Petersburg yellow	12 10 0	13 10 0	
Finland	8 10 0	9 10 0	
Memel and Dantzic	0 0 0	0 0 0	
Gothenburg, yellow	10 10 0	13 0 0	
" white	10 0 0	10 10 0	
Geffe yellow	12 0 0	13 10 0	
Christiania	10 0 0	13 10 0	
Battens, all sorts	7 10 0	8 10 0	
Other Norway	8 10 0	9 10 0	
Flooring boards pr square of lin., first yellow	0 11 0	0 12 6	
First white	0 9 6	0 11 6	
Second qualities	0 7 0	0 10 6	

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 7, 1873.

GLASS-PAINTING.

IN noticing the new system of glass-painting,* we were led, as a matter of course, to describe with an unsparing hand some of the shortcomings and failings of glass-staining and painting as practised by our modern English painters. Although our strictures were severe, they were true; and so far we are glad to see that their truth has been acknowledged by a discreet silence on the part of those professionally interested.

The importance of the question and processes so treated cannot be overrated, and we see no valid reason why the advanced skill and chemical knowledge so widely and so extensively studied at the present day cannot be brought to bear upon this subject, and result in the making of enamels which shall be permanent in colour, and equally as lasting in wear as those used by the early glass-painters.

Much controversy has been held from time to time as to which is the most true and the best style of painting, for ecclesiastical windows especially, some arguing that a church-window should not be used as a medium for picture-painting, but should be composed simply of a combination of harmonious colours geometrically arranged, so that a rich and gem-like effect should be produced without the aid of light and shade properly so-called. Others, again, will admit that we may insert representations of the human figure or scenes from Sacred History, but that they should be represented as flat by lines and different-coloured glass, but totally without shades; by this means they say we can tell clearly the tale we wish to be told quite as well as if we used all the effects of light and shade. Another and more numerous class hold that all the skill and appliances of the painter's art may be used, so as to produce a finished pictorial representation of any particular scene or event, just as if we were painting the same upon canvas or plaster, allowing of course for the difference of material and position.

Let us see how far these varying opinions are right or wrong. It appears to us that this difference of opinion arises from a want of a due consideration of the circumstances and necessities of the thing itself; for instance, in painting a picture on canvas, we have a plain surface upon which we can place any colours we like, and blend and manipulate them to suit our purpose and the nature of our design. But if we are treating the same subject on stained-glass, the circumstances are altogether changed, and we have to adapt our design and its manipulation and distributions to these altered circumstances. Here we have to deal with a surface composed of small irregular pieces of glass, which have to be secured together by comparatively broad lines of lead. Now these broad lines of lead are, and always have been, the great difficulty in the way of treating a painting which may be strictly called a picture on glass.

On consideration, it will be at once perceived that the absolute necessity in this kind of painting of using these lead lines has created a peculiar method of treatment, in order to hide them, or rather, to cause them to be as little seen as the nature of the design would admit. Consequently it was the practice of the Mediæval painters, followed by all the best painters since their time, to place the lines of lead on the main outlines and dividing lines, so that if seen at all the leads should appear as dividing or boundary lines; but this could not be done effectually, and so it comes about that we have, even in the best examples,

broad black lines crossing the draperies and portions of the figures in places where they have no business to be, and in backgrounds and foregrounds we have a network of black lines crossing and recrossing over skies, trees, and buildings in a confusion not pleasant to look upon, and in a way utterly destructive of any attempt to paint a picture proper. If we add to the foregoing the fact that there is only one colour (yellow) that we can paint as a stain, and that each separate colour, however small, must be inclosed with these broad lead lines, we shall have some idea of the difficulties in the way of painting a picture on glass. To meet these difficulties, it will be evident that a peculiar treatment of the design is required. Now, in forming an opinion as to what is the most proper and best style of painting or design for the purpose, these lead lines must be a primary, if not the most paramount, consideration.

Nothing could be better for dividing the various colours in geometrical work than these broad opaque lines. They give the full value to each separate colour; and by their breadth they prevent one colour from impinging upon another, and the density of the lines intensifies and purifies the colours also. In fact, comparatively broad lines, whether painted or of lead, are a necessity on painted glass of any kind. All lines viewed against the light appear much less than they really are, and therefore, if not made strong, will appear attenuated and weak.

For the flat treatment of figure subjects in connection with geometrical designs, the lead lines are an advantage, inasmuch as the principal outlines may be clearly defined by them so as not to appear offensive to the eye. The foregoing are all simple and proper uses of the lead lines. But when we come to consider the productions of the highest examples of the glass-painter's art, we shall find that the real difficulties in the use of these lead lines commence.

The early glass-painters, whose productions have come down in their beauty to our day, felt the same difficulty in this matter as we do now. They solved the problem in their own fashion by a simple yet vigorous breadth of treatment, using as few lines as possible, and employing fusible enamels, which were rich in colour, and permanent both in colour and substance; in fact, their enamels became part and parcel of the glass itself, and so have been enabled to resist the wear and tear of centuries. We are afraid that this valuable secret has gone from us, or, rather, that we have never had a knowledge of it in these latter days.

Now our modern painters seem to us to persist in the endeavour to paint a picture on the glass as they would paint it upon canvas or a wall, not regarding the crossing and recrossing of the leads, which have the effect of destroying such painting, and making it a thing of shreds and patches. It is in this direction the great error lies. In using the lead lines, the most perfect window, in whatever style it is painted (all other points being equal), will be that in which the lead lines are seen the least, or rather, we may say, in which the lead lines are only seen as a necessary part of the design as a whole, and in which the design would suffer if the lines were removed.

It is further said that there cannot possibly be any shade on the glass itself, because the light passes through its substance, so that no shadow can be formed; and therefore it is laid down by these persons that it is decidedly wrong to paint a shadow upon a substance which cannot in itself cast a shade.

The fallacy of this argument will be obvious if we consider that we do not paint a shadow, but only the representation of a shadow; and also that the same objections will apply with equal force to all representations of a shadow, whether exhibited upon canvas, plaster, or other substance. We do not make a projection to throw a shadow, but only its likeness, or an imitation of the same.

It may be, and is, in fact, frequently as-

serted that in painting a picture upon glass we are simply painting a mere transparency. This is true; in a sense we are painting a transparency, for all glass painting, that is, stained and painted glass, in whatever style it is done, whether simply in lines without shadows, or in geometrical patterns, must of necessity be transparent more or less, as a natural consequence of the materials employed; but these transparencies will be either daubs or high-class pictures, according to the talent and skill of the artist employed. If the term "mere transparencies" is used in a contemptuous sense, we conceive it falls to the ground harmless, and only serves to show forth the gross ignorance or prejudice of those who use it. We think we have shown that the word cannot be used as a term of reproach when applied to glass-painting; if so we have some glorious old examples of glass transparencies left us, painted by men who thoroughly understood what they were about, and the nature of the materials they used. It will appear, from what we have said in reference to the various styles of and opinions on glass-painting, that we hold the opinion that, while a true representation of any particular scene or event may be faithfully rendered by a transparent or semi-transparent painting on glass, including the necessary shadows and tints of colour, we hold also that all these should be subordinate in degree to the nature and constructive features of the materials used; and this we conceive is what the old masters thoroughly understood and practised, using as few lines as the nature of the subject would allow, and these arranged so as to be as little seen (as lines) as possible. If these points were more generally studied and carried out, we should have better windows and fewer abortive attempts at glass-painting than we have. Our artists would occupy, if not the first position, still a much higher one than they now do, and our churches, instead of being disfigured by false art and bad painting, would, at all events, be adorned with paintings done in accordance with true principles, whatever their artistic merit might be. We commend these considerations to the careful notice of our modern school of glass-painters, with the hope that improvement may result.

THE SECRET MANUFACTURE OF ARCHITECTURE.

THE processes employed in the production of modern architectural design have been familiar to me ever since I was eighteen years old, for at that ripe age, before the time of my apprenticeship (or pupillage if you prefer it) had expired, I occupied the proud position of making my own designs for the works my master's customers—or clients—entrusted to him. Nor did my advantages stop here; for the whole of the details, and on some rare, privileged occasions, the specification, superintendence, and management of the work were freely placed in my hands. Neither was I alone fortunate, for the same advantages and opportunities which I enjoyed had been offered to my predecessors, and by two of them fully appreciated. When my venerable master signed my first design, not seen by him before the minute he fathered it, I was possessed by conflicting emotions hardly possible to describe. Pride in my work was uppermost in me, and I felt, too, a decided satisfaction at his endorsement—a feeling which, as time advanced, I regret to say, faded away—but there was a sense, or a glimmer of a sense, that I was being deprived of something, and I would have given him gladly an extra year's service to have placed only my initials in the corner of my drawings, or to have been allowed to sign them as letters are signed—So-and-so, per So-and-so. These little weaknesses of youth soon passed, for in other offices I saw the same sort of thing at work and taken by the assistants as a mere matter of course. The production of modern architectural design I

* BUILDING NEWS, Jan. 3, 1873, p. 2.

found, therefore, to be mostly a manufacture in which the head of the business might or might not take part, and when he did act, that it was chiefly in matters of accounts and correspondence. If I am rightly informed, this system still prevails in town and country; no one grumbles, no one objects, because it is taken for granted that architectural work is a business to be conducted by business men in a business manner, and the best architect is naturally enough he who employs the best hands. Sometimes the hands are unruly, and strike. Sometimes they set up a manufactory on their own account, but it is only very lately that the hand has signed his own death-warrant by laying claim directly or indirectly to the credit of the work he has produced, as something he is entitled to over and above his wage. In what is known as the manufacturing districts this claim is beginning to be recognised, and in exhibitions we have seen the names of the workman joined with his work, without in any way discrediting the manufacturer or reducing his business. Now the cases are exactly parallel; for it was the veriest bunkum that was ever uttered to talk about architects being individual artists and jealous of their art-honour; that assistants are too apt to lay claim to credit they are not entitled to, &c. The profession, from John o'Groat's to the Land's End, know this right well, and the correspondence which has enlivened the pages of *THE BUILDING NEWS* has told us no new tale. The general public, however, seem not to know, or if knowing, not to care a pin's-point about the process of manufacturing architectural designs. There are certain so-called art-patrons, who, backing up a few manufacturers that happen to be their personal friends, occasionally utter sonorous phrases about the fine art of architecture, making plentiful use of powerful adjectives. But these phrases, rooted neither in knowledge nor in faith, are not quite so much trusted now as they were in the early days of this journal. It would save a world of trouble and vexation if architects would only admit, recognise, and adopt the principle of professional advisers, or consulting referees. It is, however, just possible that some architects, with conscience filling the place that would be better occupied by something else, might shrink from exposing their emptiness even to the most liberal of advisers, for it should be clearly understood that the consulted is not to do the work of the consulter, but to advise with him as to the improvement and development of a well-defined subject. If otherwise, that is, if the consulter comes empty-handed, he should either go away empty-handed, or subside into a superintendent of the works, leaving all the art-honour and emoluments to him to whom they fairly belong; the credit of the work to be to the workman, whatever the nature of the work may be—the design to the inventor; the representation of the designs to the artist who draws it out. For example, if Mr. Ross, of Inverness, made the sketch-design, however roughly, which was developed by the drawings in the Edinburgh Cathedral competition that bore his motto or name, Mr. Ross deserves the credit of the design in inverse ratio to the degree of roughness of the first sketches; for when we talk of sketch designs or preliminary sketches, or rough ideas, we use very elastic words. My own notion of a sketch design is such a drawing as a man might jot down with pen or pencil on a sheet of note-paper or in his memorandum-book, with no more accuracy, detail, or finish than the oscillations of an express-train would permit. But most careful eighth-scale elevations in pencil I have heard described by their authors as sketch designs, whilst the merest scrawl of a plan, little better than a child's first scribble, I have heard honoured by the same much-abused title. In all disputes, therefore, of authorship of design, it is essential, in order to

arrive at sound judgment, that the first sketches made by the several claimants, and the dates thereof, be brought into court. In the disputed case of Roper v. Ross, Mr. Roper's "sketch" was a careful pencil elevation of the west front, and was almost line for line the same as that exhibited. This I know, for I saw this "sketch," directly after it was prepared. Now, if this was not altogether Mr. Roper's design, where is the prior sketch he copied, imitated, or developed? That such a sketch exists, we are assured both by Mr. Ross and his bishop. The bishop even saw Mr. Ross making it. What is it like? Where is it? When did the bishop see the performance? And why has it not been produced? These are questions that one would think ought to be easily answered. They must be answered if Mr. Ross wishes to maintain his right to be considered the author of the Edinburgh Cathedral design under his name.

It is neither Mr. Ross's fault nor Mr. Roper's that this disturbance in the architectural atmosphere should have taken place; but it is the fault of a system which has grown too rotten to hold together any longer. Whilst we may deplore the temporary loss Mr. Roper may sustain from other manufacturers, and sympathise with Mr. Ross at the rude way in which his design processes have been handled, we can feel nothing but satisfaction at the exposure, and only hope that we may have yet more of them, so that the secret manufacture of architecture may ultimately become a dangerous trade.

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NOTES ON STONEWORK.—IV.

THE Silurian strata produce many useful stones, but they are chiefly of local use. The flagstones of Lingula and Tremadoc, and the associated trap rocks, are quarried for road stone, and are found at Festiniog, Tremadoc, and Dolgelly, in North Wales, at Whitesand Bay in South Wales, and at Stiperstones in Shropshire. These beds are slightly micaceous, and frequently so calcareous as to constitute true limestones. The Llandeilo flags succeed these, and produce paving stones, roofing slates, road materials, and limestone for burning, at Llandeilo, Builth, and the Shelve district of Shropshire. The Caradoc sandstone succeeds these (Caradac, king of the ancient Britons, corrupted Caradoc), found at Caer-Caradoc in Shropshire, Horderley, Bala, and Snowdon; and at Tyrone, Wexford, and Kildare in Ireland. This sandstone is a light-coloured siliceous free-stone, and much used locally for building. To this succeed the argillaceous sandstones, shales, coarse grits and conglomerates, and sub-crystalline limestone of Llandovery, May Hill, and Woolhope, and then the Wenlock limestone, found at Wenlock Edge, Dudley, and Walsall. Near Wenlock the limestone consists of thick masses of grey sub-crystalline strata of a concretionary nature, the concretions being locally known as bell-stones, and consist of almost pure carbonate of lime. "Near Coalbrookdale the shale with which the limestone is associated is called die-earth," says Mr. Page, "because it lies beneath all the mining ground, the minerals dying out at this stage of descent." Succeeding these are the Ludlow rocks and Aymestry limestone, quarried at Ludlow, Aymestry, Sedgley, Ledbury, and the Malvern district. These lie at the top of the Silurian system, and then succeeds the great Devonian system, or Old Red Sandstone. Professor Phillips groups the Old Red Sandstone thus, beginning at the bottom:—1. The Marl series; mostly red, with pale and greenish bands, and irregular "cornstone" layers. White, dark grey, and yellowish sandstones appear in the lower part of the series, especially round the May Hill district. 2. The Flagstone series; in great

thickness, with partings of red shale and some irregular, calcareous cornstones. In the country about Milford Haven, this series is usually traversed by nearly vertical slaty cleavage. 3. The conglomerates and sandstones of red, purple and green hue; the pebbles, scattered in layers through masses of considerable thickness, are mostly of quartz, such as occurs abundantly in veins in the mica schists and gneissose rocks. The magnitude of these pebbles varies from an inch or two across to small white grains. Associated with this formation are greenstone, compact felspar, felspar-porphry, and other varieties of igneous rocks, but these are rarely interstratified with the sandstones, except in the lower group. They occur chiefly as upheaving and disrupting masses, and are themselves frequently cut through by latter dykes of greenstone, felspar, and porphyry—thus seemingly indicating a cessation of volcanic action during the main deposition of the Old Red Sandstone, but a period of great activity and disturbance both at its commencement and at its close. "Granitic outbursts are rare in connection with the Old Red Sandstone, and it may be received as a great fact that the period of granite had given way to that of the Trap formation" (Page). Professor Ansted defines trap to be the crystalline rock, composed chiefly of felspar, augite, and hornblende, combined in many ways and exhibiting great varieties of aspect. The word is derived from the Swedish *trappa*, a stair or step, because such rocks are often found in large tabular masses, rising one above another in steps. Trap, or trappan rock, is supposed to have been lava formerly ejected from fissures or craters, and often poured out under water. Basalt is its most common synonym.

From the trap rocks the best road stone is derived, as the Clee Hill Dhu stone and the Rowley Rag, now being used in London, and very extensively used for roads of great traffic in the localities where it is found.

From the fissile or laminated beds of the Old Red Sandstone are obtained such flagstones as those of Caithness, extensively used in paving, and from the same group are raised the grey slates or tile-stones. Building stone is also obtained from the thick-bedded sandstones. Tintern Abbey, of the 13th century, is of this stone. The sandstones of the Old Red formation are distributed throughout parts of Devonshire, Herefordshire, and Monmouthshire. In colour they vary from deep red or purple through shades of green, yellow, and grey, to almost white. In Devonshire, building stone occurs at Hangman Hills, the Foreland, North Hill, Newnham Park; also in the vicinity of Liskeard and of Bodmin, in Cornwall. North of the Severn this sandstone is quarried in the neighbourhood of Chepstow, Monmouth, and Ledbury.

Limestone for building is obtained from the cornstones; and some of the Devonshire limestones, as those near Torquay, furnish not only durable building-stones, but frequently marbles. The felspars, porphyries, and greenstones are exceedingly durable, but are seldom used in building, owing to the difficulty of dressing them. They make first-rate road materials, however. But the bulk of the formation is arenaceous, and the reddish colour which pervades the whole strata shows that the waters of deposit must have been largely impregnated with iron, in all probability derived from the earlier granitic and metamorphic rocks, the disintegration of which supplies the sands and gravels of the system. In Herefordshire, the system consists of cornstones and marl at the bottom, cornstones in the middle, and red conglomerate at the top; and in Devonshire, of calcareous slates and Plymouth limestones at the bottom, red flagstones in the middle, and calcareous grits and impure limestones at the top.

Marble is rather extensively worked in the Devonian formation at Plymouth, at Petit Tor, near S. Mary's church at Babbicombe, and Newton Bushell. At Ipplepen and the vicinity of Totnes a reddish variety is found,

extremely handsome. Mr. Hull states that from Barton's quarry, near Ipplepen, blocks 18ft. square are now conveyed to London. It will easily be seen that this is a mistake, and means 18 square feet, such as a block would contain that should measure 4ft. 6in. by 4ft., or 6ft. by 3ft. The quarries at Oreston, near Plymouth, furnished the stone originally used for the Plymouth breakwater, but between high and low water-marks the boring molluscs (*Pholas dactylus*) so perforated the limestone that it was thought necessary to replace it with granite, which effectually resisted the boring operations of these animals. (R. Hunt).

The north Devon marbles, black and white, from Bristow, South Tawton, and Drewsteignton, some from Chudleigh, Staverton, and Berry Pomeroy, have a black ground, with huge veins of calcareous spar traversing it in all directions.

The loftiest points occupied by this deposit are the Vans of Caermarthen and Brecon. These hills are made up of a conglomerate, composed of white quartz pebbles embedded in a red matrix, and it is this quartzose conglomerate which gives its name to the uppermost group of the formation. The highest beds of the series do not, however, says Professor Ansted, always consist of conglomerates, but are more frequently composed of beds of sandstone, hard and finely grained, and alternating with marls. The lower portion, capping the escarpment of the cornstone in Herefordshire, furnishes thick beds of valuable building-stone. The upper beds are, for the most part, less compact, and commencing as a fine conglomerate, they afterwards become coarser, and alternate with bands of red and green argillaceous marl. Fine examples of the conglomerate beds may be seen on the banks of the Wye, between Ross and Monmouth, and again on the right bank of that beautiful river to the north of Tintern Abbey. The cornstone consists of a number of argillaceous marly beds, sometimes alternating with sandstone and sometimes with limestone, affording, by decomposition, the soil of the richest tracts of Herefordshire and Monmouthshire. The lower part of the rock very often contains flaggy beds, some of which are extensively quarried near Downton Hall, the stone being of a greenish colour, and highly micaceous.

Having now traced the formation of the Old Red Sandstone, from its bed on the Silurian rocks to its uppermost member, we come to the great Carboniferous system, consisting in the main of three great formations, viz., the Carboniferous or mountain limestone, the millstone grit, and the coal measures. The limestone is full of fossils, as may be seen particularly in Derbyshire. This fossiliferous structure prevents its being worked freely with ordinary tools, and therefore it is not much used as a building material; otherwise it is a most excellent weather-stone. The chief reason, however, why it is not more used as a building-stone is, perhaps, that the sandstones found associated with it are much more easily worked. It covers the greater part of the central plain of Ireland, says Mr. Hull, and has been largely used both in ancient and modern buildings of this region. There are three members—(1) The lower limestone, (2) the calp, or middle limestone, and (3) the upper limestone. The lower and upper divisions produce a good crystalline greyish limestone, sometimes dolomitic, and in a few instances oolitic. This latter variety occurs along the shores of Killala Bay, and has been used in the construction of the Abbey of Moyné, where the sharpness of the sculpturing is still retained. The calp is a dark, carbonaceous, earthy, grey limestone, alternating with beds of dark shale and chert. The upper limestone resembles the lower, but is more evenly bedded and flaggy. The ordinary limestone of Ireland is stated to weigh 170lb. per cubic foot—from 159 to 180—and to absorb 4lb. of water per cubic foot.

The impure shaly calp weighs 160lbs. and

absorbs from 1 to 4lb. of water per cubic foot. This formation has received the name of Mountain limestone because it is generally found flanking or crowning the trap-hills that intervene between the Old Red Sandstone and the coal measures, where, from its hard and durable texture, it forms bold escarpments, as in the hills of Derbyshire, Yorkshire, Westmoreland, Fife, and many parts of Ireland. It is replete with the exuviae of corals, encrinites, and shells, these fossils forming the curious ornamental markings on its polished surface. In some localities some of the bands are dark and bituminous, forming, when polished, the black marble of the statuary. In Derbyshire black marble is quarried near Ashford, and is used for inlaying and for tables and vases, but chimney-pieces, columns, &c., are now made at Ashford, Bakewell, Alport, Buckland Hollow, and at Derby. The marbles of Derbyshire are all derived from the mountain limestone. In colour they vary from black, blue, and light grey, to russet. According to the organic remains they contain, they have various names, as bird's-eye, dog's-tooth, or mussel. In the Isle of Man, according to Gwilt's account, there are derived from the Carboniferous or Mountain limestone formation gray shelly encrinital marble from Pool-wash; black, extremely hard, and durable marble from Port S. Mary, taking a good polish; and pale marble from Scarlett. In Ireland, according to Professor Hull, there are in the same formation black marble in Kilkenny and Galway. The Kilkenny marble takes a fine polish, and when first cut is quite black, but the organic matter it contains, and to which its blackness is due, gradually passes off, and ultimately white marks of fossil forms present themselves upon its surface. The chief quarries are situated at Angliham and Menlough, along the verge of Lough Corrib. Blocks of 12ft. or 14ft. long and 4ft. or 5ft. wide, and 12in. or 14in. thick, can there be raised. Black marble is also found at Churchtown and Doneraile, in the County of Cork; at Carlow; and black and white varieties near Tralee. As to Irish marbles, see Kane's "Industrial Resources of Ireland" (1844) and Wilkinson's "Practical Geology" (1845).

The mountain limestone is typically developed near Cross Fell, Ingleborough, Pendle Hill, the Peak of Derbyshire, the Mendip Hills, Dean Forest, and the north side of the South Wales coalfield. This typical limestone is replaced in Devonshire by culm, which occupies a great trough, the axis of which ranges from east to west about 50 miles, with a breadth of from 30 to 40 miles. The edges of the trough consist of a black limestone, overlaid by siliceous flagstones, and these are followed by sandstones and carbonaceous and calcareous shales, which gradually become harder and pass into siliceous bands of a dark colour, with earthy carbonaceous partings, surmounted by a regular thick-bedded sandstone, resembling the grit-stones of the coal measures. Towards Dartmoor this order of superposition is somewhat different, for there an irruption of granite has taken place since the deposition of the strata. The sandstones of this group are generally close-grained, and of a grey or greenish-grey colour, passing occasionally into flagstone and laminated sandy shale, with fine ripple marks at the partings. The Mountain limestone as exhibited in Derbyshire is a very pure granular or crystalline sub-carbonate of lime, of grey, blue, and sometimes yellow colour (when dolomitic), with occasional lenticular or wedge-like bands of chert. Chert is defined by Mr. Page to be "a mixed siliceous rock, or rather flinty portions occurring in other strata, as in limestone; it resembles some varieties of flint and hornstone, but is less splintery in the fracture, and fusible, which latter property is owing to an admixture, less or more, of calcareous matter." In the limestone districts it is used for road material, but does not wear well, being too brittle.

The upper beds of the Derbyshire limestone

are generally dark, even black, and some beds are reddish and variegated. The whole mass appears to be composed of remains of corals, crinoids, and molluscs.

In the north-western parts of Yorkshire the Mountain limestone is a very prominent member of the Carboniferous series. It is there divided into two portions, the total thickness being about 1,800ft. The lower portion is called the scar limestone, and it forms bold bluff precipices, and is pierced in many places by large natural caverns. The upper strata are called the Yoredale rocks, and contain at least five distinct beds of limestone, alternating with freestones and flagstones.

The Yoredale grit and the millstone grit form a most important source of supply of some of the best building-stones in the country, an account of some of which we may give in a future article.

EXAMPLES OF GROINED VAULTING.

(Concluded from p. 70.)

EXAMPLE I.

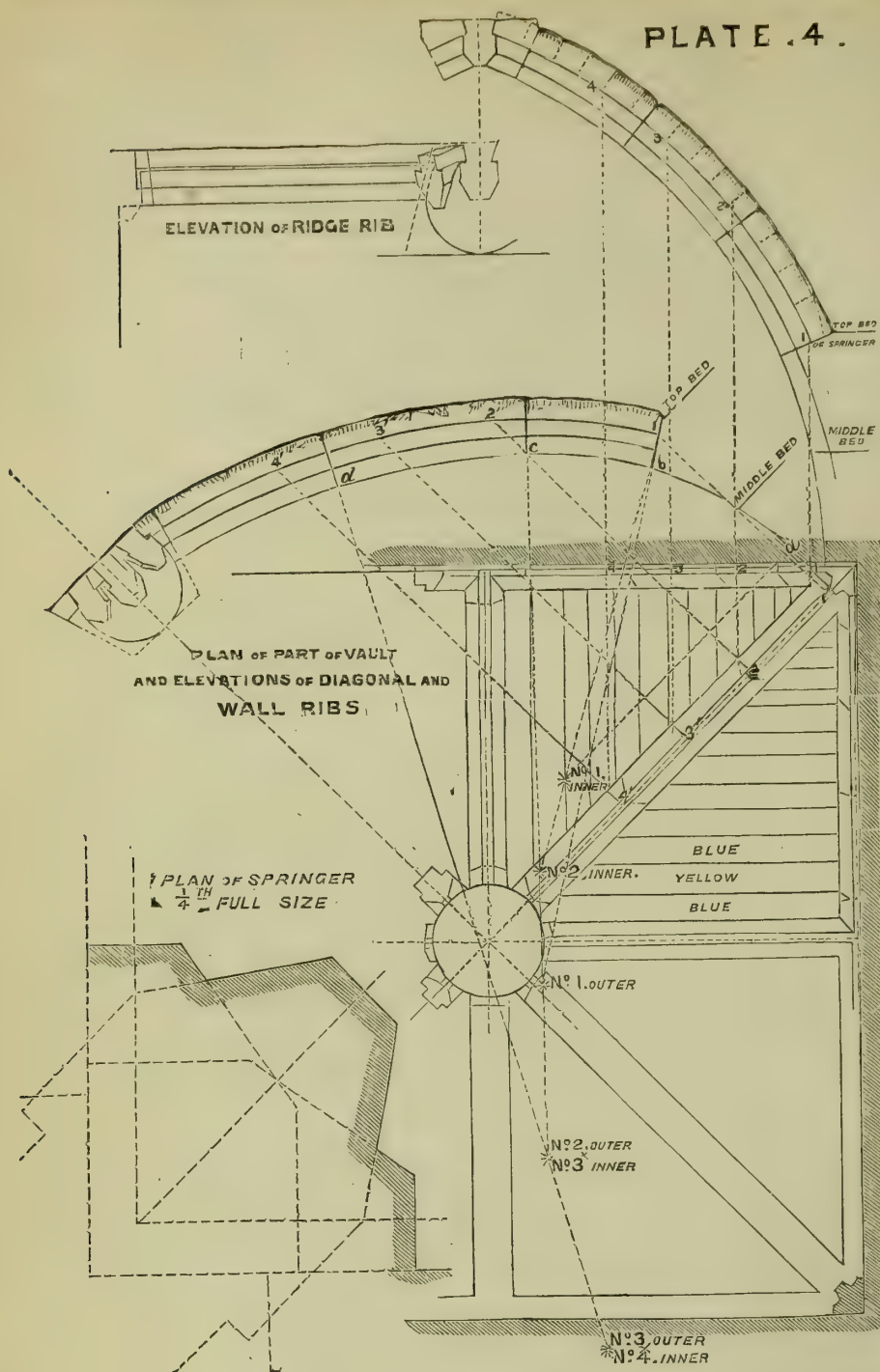
IN working the springer stones, the workman would first form the two beds of the stone truly parallel, then in the case of the lower stone he would apply the mould for the lower bed, and the developed mould for the upper one so as to be truly one over the other, marking them out, and then by means of convex templates cut to the proper curve for each rib he would guide himself in cutting away the superfluous stone from nosing to nosing of each rib. For the top bed of the upper stone he would first set out the centre lines of the ribs, and the projection of each nosing; he would then have to sink square down from these projections till at the right depth below the top bed for each nosing respectively as it measures on the drawing. He would then form the bed, or seat of each rib, by bevelling back from these points, applying the bevel on each centre line on the top bed. He would then, as before, work each rib from nosing to nosing, and complete the moulds or splays according to the section, using small reverse moulds as guides. The springer stones are in this example bonded into the side walls, that portion of each stone which rests upon the wall being left on in a line with the wall to form ashlar.

We come now to the ridge stones. As the section of the ridges is made so that it will mitre with the wall ribs, which meet it at right angles on plan and at a certain angle in the elevation, it would not mitre with the other ribs which abut against it at other angles and inclinations, it being level, as previously stated. To overcome this difficulty, as well as to give richness to the vaulting, bosses are introduced at these junctions, the sizes of which are first drawn on the plan at the intersections of the ribs, and are then drawn on the elevations, raising or lowering them to suit the requirements of the case. It will be seen from the diagrams that four of the joints of the central boss stone are arranged so that the abutments of the diagonal ribs radiate to the centres of those ribs, the boss thus forming a keystone to each pair of ribs, but the other four joints are arranged the reverse way, so as to form a support to the ridge stones, which are in one length in each quarter of the vault with the abutments for intermediate and wall ribs worked on each length.

To set out the joints of the boss for the workman, first draw a horizontal line on the elevation, level with the underside of the same. Let this be a datum line answering to the working surface of the stone. Draw the radiating joints in the elevation, so as to leave a short stump or abutment projecting beyond the circumference of the boss, and continue the joint lines down to the datum line. Adopt the same plan for the other joints abutting the ridges, see Fig. 19.

For the other bosses in the ridges a fresh datum line is taken at the lowest surface of the stone; that is, the underside of the boss at the junction of the intermediate ribs. Having drawn this line on the elevation of the intermediate rib, and produced the joint line down to it, it is drawn at the corresponding level on the elevation of the ridge Fig. 19.

The use of these datum lines and of the joints



being produced to them is this:—The workman works the lower surface of the stone to a true plane on which to set out and apply his lines, bevels, &c. This surface is represented by the datum line, and upon this surface the distances of the joint lines from the centre of the boss to where they intersect the datum line in the elevations, are laid out along the centre lines of their respective ribs, thus:—in the case of the intermediate rib, the distance from 9 to 10 in the elevation, Fig. 18, is laid on the plan or lower surface of the stone from 9 to 10^a. Then the angle formed by the datum line and the joint line in the elevation is transferred from the elevation to the stone by means of a bevel or template applied along the centre line of the rib, the stone being worked off at right angles to the direction of the centre line till it fits the bevel so applied. This forms the general surface of the joint; after that the distance from the datum line to the nosing of the rib (that is from 10 to 11) is set off down the joint surface thus formed, and the centre line squared down the middle of same, after which the section of the rib is applied from the nosing line marked thereon, the stump worked of a parallel thickness into the boss, and the moulds or splays gauged along it. The jointing of the ridges with the wall rib is arranged in a similar manner, but these are much

simpler to work, as they are at right angles on plan. In this case a mould or template is made to the exact shape of the small arms of the ribs, as shown by the elevation, and applied at the end of the stone at the proper distance from the datum, the plan of the ribs being first of all truly set out on the working surface.

The remaining portions of the curved ribs from the ridge joints to the springers are divided into a convenient number of stones, each joint radiating to the centre from which that part of the rib is struck.

We now come to the filling in. In this example two colours of stone are used in narrow bands—viz.: blue or Forest of Dean, and yellow or Huddersfield stones. In the spaces betwixt the wall and intermediate ribs, the bands are laid down on the plan at right angles to a line bisecting the angle formed by these ribs. They are spaced out along the upper edge of the wall rib in elevation, beginning with a dark or blue stone, giving a little more width to the first one than the rest, the blue bands being made a little narrower than the yellow ones, and the widths of each sort increasing as they get longer on the plan, this being a matter of taste. The distances are then transferred to the side of the rib on the plan, the lines drawn across (as before explained) to the side of the intermediate rib, then squared

across it to form starting points for the bands betwixt this and the diagonal rib. With regard to these it will be found that in an example like this, if they are set out at right angles to a line bisecting the angles formed by the two ribs on plan, they will appear not to be so in the work itself when executed. Instead of forming angles which appear to point towards the central boss, they almost appear to point the other way, especially towards the lower end of rib. To obviate this, they should be set out on the plan so as to make angles more acute with the diagonal rib, that is, to point towards the centre. In this example they were altered when partly built, by giving a little more width to the ends of the bands abutting against the diagonal ribs, and perhaps would have looked better if they had been still further increased. After they are thus laid down, the rest of the divisions are easily set up on the sides of the intermediate and diagonal ribs, and these spaces transferred to the real work by means of thin strips of wood.

EXAMPLE II.

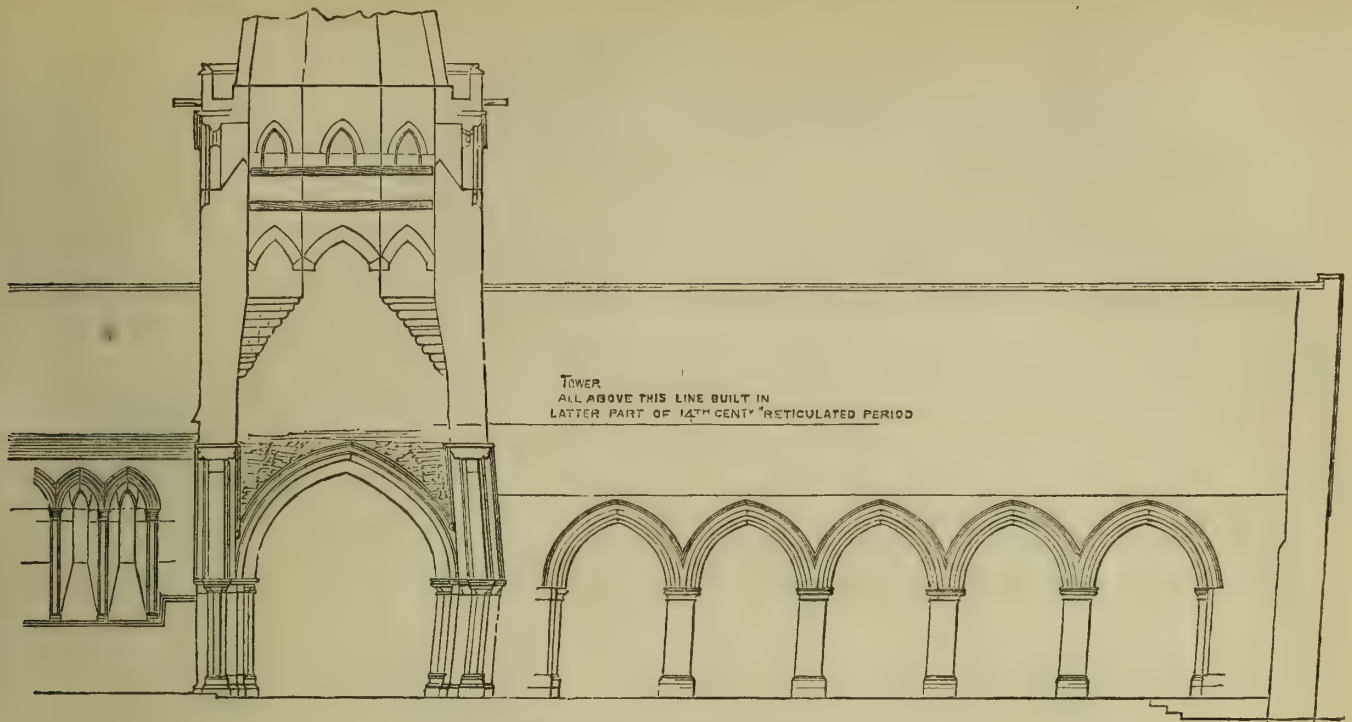
In this example (which is taken from the vestibule under the tower of the Assize Courts), as before, the plan of the vault is a square, with wall, diagonal, and ridge ribs, but without the intermediate ribs. There is also this difference in the springer plan, that the diagonal rib does not come forward enough to form a perfect square with the others. Then again, the courses of stone forming the surface of the vaulting betwixt the ribs are in this case perfectly level, and parallel to one or other of the side walls, so that the upper edges of the diagonal ribs form true semi-ellipses, and are set out by ordinates, as shown by the dotted lines 1, 1', 1', 2, 2, &c., &c., the heights of each corresponding line being equal, that is, the height of the line 1', 1', in the elevation of the diagonal rib from the point 1' in the base line to the other point 1' in the upper edge of the same is made equal to the height of the line 1, 1, in the elevation of the wall rib, and given in this particular line the point of separation. In like manner the height of the line 2', 2', in the elevation of the diagonal rib is equal to the line 2, 2, in the elevation of the wall rib. Observe, that owing to the centre line of the rib on plan being made the base line for the elevation, the ordinates for the diagonal rib have to be so set out on its base line that they shall pass through the points in the side of the rib on plan, where the ordinates of the wall ribs, as prolonged upon the plan, intersect the same.

In order to simplify the process of setting out the moulds or templates for each stone of the ribs, a system of centres and radii was arranged so as to describe a curve that would pass through the points found by the ordinate, but in doing this it was found to be impossible to keep the rib of a uniform depth and still bring it in right with the springer plan as designed, so that the lower portion of the rib is not quite parallel. By referring to the diagram, it will be seen that it is wider by half an inch at the point of separation than at the first joint above the same, from which joint it is parallel to the top. There is also a small portion quite straight, immediately above the springing, about seven or eight inches high: this leans over in that length about the eighth of an inch.

To make the rib taper as just described, it was necessary to have two sets of centres and radii as far as the tapering went, that is, from the point of separation to the next joint. It will be seen that the centre marked No. 1 inner, strikes the soffit of the rib from *a*, the top of the straight part above the springing to *b*, or the top of the springer. From that point there are two centres, No. 2 inner and No. 1 outer; the former continues the soffit line as far as the joint *c*; the latter takes the outer curve from the point of separation to the same joint. After that, one centre marked No. 2 outer and No. 3 inner, takes the whole of the rib forward as far as *d*; from thence to the top another centre, marked No. 3 outer and No. 4 inner, completes it.

In the preceding example the upper edge of the diagonal rib is the one which guides the setting out, on account of the filling in being level, as before explained.

It is impossible to make both upper and lower edges to range with the upper and lower edges of the wall ribs, except the diagonal rib be made to taper very much. If its nosing ranged with that of the wall rib, the rib



GROSMONT CHURCH TOWER.

would be about three and a half inches deeper at the point of separation than it is at the ridge.

The filling in is of alternate bands of blue and yellow stone, as before, and is spaced as shown by the dotted lines on the elevation of the wall rib.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary general meeting of this Institute on Monday evening last, in the absence of the President (Mr. T. H. Wyatt), Mr. Alfred Waterhouse, Vice-President, occupied the chair. The minutes of the previous meeting having been read and confirmed, Mr. Everard Green, of 8, Milman-street, Bedford-row, was unanimously elected as Contributing Visitor, and (after ballot) Mr. W. J. Belton Perkin, of Park-square, Leeds, was elected a Fellow, and Mr. A. Rowland Barker, of 11, Buckingham-street, Strand, an Associate.

THE ROYAL GOLD MEDAL, 1873.

In accordance with Bye-law 56, section XVII., the nomination of the Council for the award of the Royal Gold Medal of 1873 was announced by the Chairman, who said that while regretting the absence of the excellent President of the Institute, he (the chairman) was glad to have the opportunity of making an important announcement—viz., that the Council had resolved to nominate the President as the recipient of the Royal Gold Medal for this year. (Applause.) It would be remembered that last year the Gold Medal was presented to Professor Schmidt, of Vienna, and now, in accordance with the ordinary practice, it devolved upon the Council to recommend its award to an English architect. He was quite sure that every one would agree with him in saying that there could be no more fit recipient of the Medal than the President of the Institute. (Applause.) What he had done for the Institute as President would make them all feel that any distinction that they could confer upon him was well deserved. (Hear, hear.) In addition to which, their President was well known as the architect of several very successful buildings. The church at Wilton, he (the chairman) believed was one of the first works that brought Mr. Wyatt into notice, and since then he had erected a large lunatic asylum in Wiltshire—in fact, the list of his works was very great. One of the principal ones was his restoration of Wimborne Minster, which was a most charming work—indeed he (Mr. Waterhouse) did not know of a restoration more satisfactorily and artistically carried out. (Hear, hear.) Mr. Wyatt had also built enormous piles of buildings at Liverpool, including the new Exchange, the latter being an edifice

which had very much to recommend it, being extremely interesting and effective in parts. Then again, there was the large mansion which he had lately erected for Sir Dudley Majoribanks in Park-lane, S. Aidan's College, Birkenhead, and other works, all of which proclaimed Mr. Wyatt to be a very distinguished architect. (Applause.)

Mr. J. P. SEDDON then read a paper

ON THE SHORING OF GROSMONT CHURCH TOWER.

Mr. SEDDON commenced by giving an historical account of the church, which is dedicated to S. Nicholas, and is situate in a very beautiful part of the county of Monmouthshire, three miles from Penthrilas Station, and close adjoining to where the border of that county joins those of Herefordshire and Breconshire, in the diocese of Llandaff. The structure, by reason of its historical interest and architectural value, justified the pride taken in it by the inhabitants of the district; but it had wider claims to consideration, and particularly in connection with the metropolis, distant though they might seem to be, for it owed, if not its origin, at least its enlargement, to the same munificent patronage that directed the works on a grander scale at the Abbey of Westminster. Though Grosmont Church was, as befitted its position, a comparatively humble structure, yet in point of style it accorded with Westminster Abbey, and in certain defects as well as merits a certain resemblance could be traced between the two buildings. Had the nobler of these two contemporary churches been crowned (as that at Grosmont was) with a tower and spire, which doubtless were contemplated by the same royal founder, the insufficiency of the main piers of the crux to support such weight in the case of the Abbey would probably have led to the same disastrous results as at Grosmont, and a similar operation to that he was about to describe would have been necessary to save the superstructure from falling. Grosmont must originally have been a place of some note, for it was an occasional residence of Henry III., and was a favourite residence of the Earls of Lancaster. The church, the plan of which is that of a Latin cross, consists of a nave, 67ft. long by 18ft. 6in. wide; aisles, 9ft. 6in. wide, separated by arcades of five bays, with responds deeper than ordinary (obviously to give more abutment to the crux arches); central tower and spire; transepts with aisles on the western sides of the same width as those to nave; chancel; and chapel south of chancel. There is also a porch on the north side, opposite to the central bay of the main arcade. Of this structure the crux arches and transepts were, Mr. Seddon stated, the earliest portions, being of the style of the Transition between Norman and Lancet—the chancel being fully developed Lancet. The tracery and details of the chapel (named the Eleanor Chapel)

were Geometrical, while the north transept and the internal porch door would indicate a Late date for those parts. The western facade, tower, and spire were still more recent, and might be referred to the end of the fourteenth century. The aisle walls and roofs, together with the nave roof, were comparatively modern. The present aisles had, in Mr. Seddon's opinion, superseded previously contemplated, but never erected wider aisles, with compass roofs of their own (they being at present covered with lean-to roofs, forming one slope with the nave roof), since it was not to be supposed that the original plan could have had the fine western arches of the transepts on the mean angles formed by the present aisles. Many years had elapsed since Mr. Seddon was first called in to examine the church, and then it was tottering from old age. In that part of the country it must always have been difficult to obtain proper building-sand, and the loamy sand at command soon destroyed the value of any amount of lime mixed with it. From this cause the mortar of the walling throughout had become little better than earth, and the whole of the external walls had become grievously dilapidated. The earth on the north side of the church had become heaped up some 7ft. or 8ft. against the walls, and a rude flight of steps was carried up on the eastern side of the north transept, blocking up its access to get access to the ringing stage of the tower, apparently no other or proper means of approach to it having ever been provided. Under the great weight of the tower and spire, the crux arches had been crushed and twisted out of shape, and this pressure had been transmitted in the directions of north, south, and west by the several arches, which had themselves become distorted so as actually to thrust outwards the end walls of the nave and transepts. The more solid walls of the eastern side of the transepts and chancel had yielded less, but still to some degree. The whole eastern limb, viz., the chancel and Eleanor chapel, by far the richest architecturally, was in the worst condition, and imperatively needed rebuilding. Under the circumstances described, however, it seemed a perilous operation to undertake to do so, as even the temporary removal of such support as they gave to the central tower might accelerate the ruin of the rest of the fabric. The necessary funds having been found, however, in 1869-70 the chancel and Eleanor chapel were, with great care, almost entirely taken down and rebuilt under Mr. Seddon's directions, and a new means of access to the belfry-stage devised by partitioning off the western portion of the chapel, and the insertion of a circular stone staircase in the south-east angle of the tower, leading to a gallery across the western end of the chancel, a doorway being made in the eastern face of the tower under the chancel roof. Careful examination

was made, before and after the execution of this work, of the state of the crux piers and arches, and marks set to show whether these yielded at all by reason of the settlements in the new masonry. This, which was mostly to be feared at the north-east angle pier, did not seem to have taken place to any great extent. However, Mr. Seddon received reports from time to time that the original mischief was spreading, and he therefore caused a close examination to be made at the end of last year, from which it appeared that the cracks were surely though slowly extending, particularly in the north-west pier. In consequence of this, he reported that in his opinion it was essentially necessary that the tower and spire should be so shored up and supported by centres as to be independent of the piers—which, as funds were procured, could be made good, after which the restoration of the arches and superstructure could at any time be taken in hand. He estimated the cost of this preliminary work at about £400, and received instructions from the Vicar to direct it to be done at once. He intrusted the contract to Mr. Thomas Williams, of Cardiff (the builder who had so successfully rebuilt the chancel), and the supervision of the works to Mr. W. E. Martin, of 11, Park-street, Westminster, and Hereford. The failure of the substructure of the tower was primarily traceable to two causes: firstly, errors in design; and, secondly, errors in construction. The design was in fault from the weight of the tower being carried upon insufficiently-bedded arches; and the construction, because of the imperfect execution of the dressed stonework and the masonry of the walling. From the first cause (imperfect design) four distinct classes of failure were to be traced, viz.:—(1) spreading of the arches at their springing; (2) flattening of the arch curves—this neutralised the keying, and rendered the arch insecure by the liability of the voussoirs to fall out; (3) thrusting of the vertical supporting piers under the tower arches out of the perpendicular; and (4) transmission of the thrusting force to all adjoining piers, arches, and walls, throwing them out of the normal stable condition—verticality. From the second cause (imperfect construction) three classes of failure might be traced, viz.: (1) the crushing of the wrought-stone facings which formed the casing of the piers; (2) the bursting asunder or “drawing” of the bonders of the various members of which the piers were composed; and (3) rents or fissures in the walling generally. The most prolific causes of failures in buildings generally were two, namely, unequally-yielding foundation trenches, and uncompensated thrusts from roofs or arches. The case under consideration was a singular example of failure from the latter cause, an equally unyielding foundation having contributed in some degree to intensify this failure. Writers of books on buildings generally assumed it as a fact not to be questioned that the solid rock foundation, roughly levelled or stepped where necessary, was the foundation most to be desired, but an attentive consideration of the present case would lead to the belief that such a foundation, if not absolutely dangerous as the base for a building erected in the ordinary way, was at least very undesirable unless extraordinary precautions were used in the selection of the materials for the walls, in the bonding, and in the elimination of all unequal settlements from the greater number of mortar joints in any one portion of the walling than in any other on the same level. In the case of Grosmont Church, the function of the tower piers was to transmit the weight of the tower to the foundations; the latter being of rock, and incompressible, the piers became crushed between two unyielding forces, which would not have been the case had the foundation been of a partially yielding nature, such as a stiff clay or gravel. Taking the various classes of failure enumerated in detail, Mr. Seddon proceeded to speak, firstly, of the spreading of the tower arches at the springing. The four arches carrying the tower spread as follows:—North arch, 584ft. (7in.); east arch, 375ft. (4½in.); south arch, 75ft. (9in.); west arch, 625ft. (7½in.). This spreading had not taken place equally on both sides of the original central line to each arch; the abutments to some of the arches being more solid and stable than others, remained almost in their original positions, whilst the spreading had taken place on the side of the centre line towards the weakest abutment. The spreading of the arches led naturally to the second class of failure, viz., flattening of the arch-curves. This flattening had taken place regularly. The arches preserved

in some parts their original curves, whilst in other places the curves had been forced into straight lines. The general outlines now assumed by the soffits of the arches were irregular lines, not amenable to any known mathematical curve. Spreading of the arches also involved the third class of failure, viz., the thrusting of the piers supporting them out of the perpendicular. It was evident that the piers could not have remained upright when the arches spread, except on the supposition that the springers of the arches slipped back on the abaci of the caps; but this would have been impossible, for the vast weight of the superstructure augmented the friction between the two stone surfaces to such an extent as to make the last stone of the cap and the first stone of the arch practically one stone. Hence the number of inches the faces of two opposite stones were out of plumb became the correct measure of the spread of the superincumbent arch. The fourth class of failure noticed was the transmission of the thrust of the tower arches to the extremities of the building in all directions. It would be well to remember that these forces commenced and continued to act whilst the walling generally was “green,” and the mortar in a soft condition, facilitating to some extent the accommodation of the surrounding abutments to the thrusting forces without involving any sudden, violent, or dangerous fractures. The forces generated by the thrusting of the north and south tower arches were in the direction of the nave arcades to the westward, and the chancel flank walls to the eastward. The latter being comparatively solid walls, on account of the narrowness of the lancet window-openings, had sustained the thrust in a fairly efficient manner; but on account of the large openings and small piers in the nave arcades, the latter formed but an indifferent abutment; hence every pier and arch was thrust westward, the west gable itself being thrust out of the perpendicular and overhanging its base 5½in. The east and west tower arches, acting through the transept flank walls, which were their abutments, had thrust out of the perpendicular the north and south transept end walls, the former 4½in., and the latter 8½in. An inspection of the ground plan of the building would show the north-west and south-west piers to be those most deficient in abutment, and it was found that these two piers, which had been considered the most safe, were, in reality, in the most dangerous condition. The south-west pier had to be cased some forty years since with carefully-coursed wrought masonry, increasing the area of the tower by about 10ft. superficial, and the present extremely dangerous condition of the north-west pier compelled its reconstruction before any other portion of the building. The first class of failure arising from the second cause (i.e., errors in construction), was the crushing of the dressed stonework in the pier facings. This had taken place from the undue concentration of the weight on this facing. The backing, being composed of rubble walling, with a greater number of mortar-joints than in the facing, had settled down, leaving the casing to do the work of carrying the tower, and thus reducing the working area of each pier from 18ft. to 8-34ft. The second class of failure under this head was the “drawing” of the head-stones, or bursting asunder of the piers. This was a very unusual mode of failure, and was due in this case to imperfect footings under some members comprising the piers. The footings were crushed or squeezed away from this particular part of the foundations, hence the bursting or drawing of the bonders or headers immediately over this defective work. The last class of failure to be noted was that most commonly found in nearly every building, ancient and modern, namely, splitting of the walling in a direction at right angles or inclined to the beds, commonly called “settlements.” Settlements resulted from the non-elastic nature of the materials composing the walling, no one part of the walling being free to sink or settle down, or change its position vertically or horizontally, without fracturing or splitting the stone, bricks, or mortar-joints in a greater or less degree, always in proportion to the depth of the settlement. From the description already given of the movements of the arches and piers with their abutments, it would be no matter of surprise to find the masonry of the walls generally in contact with the tower structure thrust and crushed in every direction horizontally as well as vertically. The entire subject afforded an instructive example of the effect

produced by a weight of over 600 tons acting on four pointed arches for a space of five hundred years, and served to demonstrate conclusively the necessity of neutralising such thrusts effectively, whether such thrusts be created by the exigencies of style or design. It having been decided in the autumn of 1869 to restore the chancel of Grosmont Church, the opportunity of seeking to determine whether the failure of the tower substructure was at all progressive was seized. With this object all the fissures in the stonework were filled with cement, and the extent of the fissures lineally determined by drawing lines across the ends of them in transverse directions. The structure thus prepared was left until after the chancel had been rebuilt, up to the end of 1872 (about two years) when a careful inspection of the parts so prepared revealed the following startling facts:—(1) that all the fissures which had been sealed up with cement were open again, and (2), that the transverse terminal lines of the fissures of 1870 were left 2in. or 3in., and in some cases 6in. behind by the extension of the fissures up to 1872. These discoveries indicated the dangerous condition of the tower, and Mr. Seddon therefore recommended that immediate steps should be taken to restore the four disabled tower piers and arches, and in the event of the funds not being sufficient to effect the restoration, at least to shore up three of the arches, thus relieving the piers of their weight, and to “needle” the fourth arch, leaving a clear space under it for its restoration, should the funds obtainable be sufficient to cover the expense. The idea suggested itself to restore the piers and arches by taking out damaged stones here and there and replacing them with other sound stones, thus effecting a restoration with comparative safety and by slow degrees; but on consideration this plan was abandoned, because some parts of the piers would, of necessity, need re-casing or re-building, of course vertically. This would have had the effect of reducing the width between the piers to something like 9in. less than the width of the arch at the springing, which would have been a reversal of the proper way of treating the arches, viz., by leaving them as originally constructed—2in. narrower at the springing than the space between the piers separating them. It was therefore decided that the piers and arches should be entirely removed and rebuilt, using all the old stones not damaged, and that this system should be first tried upon the arch and piers on the north side, the arch proposed to be “needled,” this being in the most unsafe condition of the four. As in constructing an effective system of supports to the tower arches a safe unyielding bottom was a primary consideration, it was determined in this case to clear away the entire space immediately under the tower and tower arches, and to fill the space so cleared with carefully made cement concrete, well rammed. On commencing the excavations, plank runs were laid down through the church and across the churchyard to pits or graves dug to receive the human remains disinterred from beneath the tower. At about 2ft. below the floor level, five distinct springs made their appearance, evidently the drainage from the hill on the north side of the building. These springs flooded the space already excavated, preventing further progress. To remedy this, a drain 6ft. deep was cut through the south transept, and discharged through the south transept wall into the churchyard. The excavations were continued until one solid rock was reached, at an average depth of 5ft. under the floor level. The whole of the soil removed contained human remains in various stages of decay, and some of the graves were hollowed out of the solid rock. All human remains disturbed were reverently cared for, and interred in the churchyard. The entire space dug out was now filled in with cement concrete, well rammed, 135 tons of concrete having been used. A drain was laid on the rocky bottom under the concrete, to drain the springs, which continued to flow from the north side of the building. A finer concrete was spread upon the surface between the piers under the tower arches, and on this a bed of cement, 18in. wide, was floated off to a level to take the centerings. The shorings to each arch were constructed in two separate portions—the lower portion or “tressel,” and the upper portion, or centering proper. This system was adopted to facilitate the “wedging-up” or “striking” of the centres when and where

required. The exact outline of each arch was obtained by scribing the soffits of the inner member of the arch to which the centering was to fit on a skeleton template of $\frac{3}{4}$ in. board, sufficiently wide to include the whole curve of the arch, which template was securely fixed against the side of the arch during the scribing. This template was shaped to the line so scribed, and the permanent framing worked to it; thus the templates when fixed fitted accurately to the irregularities of the arches. The timber used in the shoring generally was from 10 in. to 12 in. square; some was selected 14 in. wide, to allow of getting out the curved backs without reducing the working section of the timber below 10 in. by 10 in. All the joints in the framing were tenoned, the tenons being 2 in. thick in the centre of each piece, and from 2 $\frac{1}{2}$ in. to 3 in. deep. The framework was fitted together on the nave floor first, and having been numbered at the joints, was knocked to pieces to facilitate its removal and re-erection under the tower. Each tressel was afterwards built up in its proper place, and when the three tressels were securely fixed in their respective archways, a temporary scaffolding was erected upon them to make a platform for the putting together and hoisting of the centres. The springing-piece of each arch was laid down on its side in that arch, and the remainder of the centreing was framed together and secured by $\frac{3}{4}$ in. wrought iron dogs. A "tackle" was rigged up to, the bell-beams with a fall to the tower floor, and each centre was then hoisted to its proper position under the various arches and securely wedged up to the bearings with oak wedges. In ordering the first lot of timber for this framing, it was assumed that timber in the log, with one side only sawn, would answer every purpose required, as well as timber sawn all round; but this proved to be a mistake, as it was found to be an impossibility to square to the tenons, mortices, shoulders, and bearings, without having at least three sides of every piece sawn die-square. There being no sawpit near the building, this timber was squared with adzes and planes where required, causing some loss of time, but the next consignment of timber, having three sides sawn square, much facilitated the work of fitting together, and made much better work in every way. Three arches having been shored up with centering, as described, the fourth arch was treated as follows:—A hole about 18 in. square was knocked through the tower wall over the coping of the arch, and about 2 ft. above it, to allow sufficient head-room for the introduction of a hammered stone discharging arch over the wrought stone arch. Two more holes were knocked through the wall of the same size, about 2 ft. lower down on the other side, about half-way between the centre of the arch and the transept flank walls. Three holes were thus made to take needles at distances of about 4 $\frac{1}{2}$ ft. apart. Needles 12 in. by 12 in. were inserted through these holes, and supported by uprights inclining inwards at the top, and stiffened at the height of over 5 ft. by means of straining pieces secured by dog irons. The walling over the needles was pinned up and wedged in every case with flat stones, bedded in cement, and when the cement had set, the timber centre was fixed to the arch, the key renewed, and all the archstones safely taken down one by one. One half the piers on either side were also renewed, and the entire space occupied by the arch and piers cleared away to allow of the erection of the new work.

In conclusion, Mr. Seddon said that the work of preparing this paper and the drawings with which it was illustrated had been seriously hampered owing to the absurd postal regulation that no parcel can be sent through the post above 18 in. in length. Owing to this, several drawings were absent, and he thought the Council of the Institute might with great advantage to the profession endeavour to get the former regulation restored.

The CHAIRMAN remarked that Mr. Seddon's paper was a very practical and interesting one, and was just the sort of paper that was most valuable, as it recounted the manner in which difficulties had been overcome. It was extraordinary that the west wall of the church should have bulged out to such an extent owing to the giving way of the central piers of the tower, which were so far from the west wall. As to the postage of drawings, he believed that the subject was engaging the attention of the Council.

Mr. EASTLAKE said the matter had engaged the attention of the Council, but the Post-office authorities had replied to the Institute's representations

by saying that they were very sorry for the architects, but saw no sufficient reason to induce them to alter their regulations.

Mr. L'ANSON remarked that there was hardly anything in the paper to discuss. It was a very important practical paper, and the work had been carried out with the great care which Mr. Seddon always bestowed on his work. He should like to know, however, whether the mortar, which was described as having been made with a very loamy sand, had been, in fact, so deficient that from the time the work was built up to the present it had been gradually giving way under the superincumbent weight. Mortar, even when composed of the best materials, if encased in very thick work, would be years before it crystallised, and before crystallisation took place of course the work would not be thoroughly strong. He never heard of any mortar not having, from the time of its use centuries ago, crystallised sufficiently to assume a solid shape, and remaining uncrystallised, and so giving rise to the settlements which seemed to have taken place in Grosmont Church. He had great pleasure in proposing a vote of thanks to Mr. Seddon for his paper, which was a model of what such a paper should be.

Mr. DAWSON, in seconding the motion, said that as to the mortar he understood Mr. Seddon to say that the sand used hardly deserved its name. Now, if it was not in the nature of a somewhat pure siliceous, crystallisation could never take place at all. As to the bulging of the west wall, he recollected an instance of a church in Lincolnshire—he forgot the name—where the tower piers had all gone in the same way towards the west, although not so much as 5 in., which was a very great divergence from the perpendicular. The drawings which Mr. Seddon had shown in connection with the shoring of the tower were very valuable, especially to the young architect, and he regretted that in consequence of the bad weather the attendance was so thin.

Professor KERR said he understood Mr. Seddon to say that he regarded a foundation of solid rock as prejudicial in some cases to a building, inasmuch as it was impossible for the building to yield slightly to the foundation, so as to ease the settling of the walls themselves. He (the Professor) did not know if the theory was original, but it was perfectly new to him. The Mediæval builders, although said to be most scientific constructors, did occasionally have a mishap, but he had heard that evening for the first time that Mediæval builders—in Wales, at all events—allowed a building that had become twisted while it was green to proceed—not only so, but to proceed while the distortion was increasing. These were both rather striking admissions, and he should like Mr. Seddon to say a little more upon the matter.

Mr. SEDDON said that as to the mortar, he might remark that in many of the old buildings of Herefordshire and Monmouthshire, and, indeed, in many of the modern buildings, the walls were really put together with earth, and not mortar at all. When he rebuilt the chancel, it was simply tottering on this account, as there was no cohesion whatever. In carrying out works in that county it was almost impossible to get good mortar, and he was afraid that a good deal of his mortar would not stand much better than the old. There was no sand in the county. Sand could not be brought fifty miles, especially when there were no railways. With regard to the crushing of the piers and the character of the foundation, when building a central tower and spire, where the pressure of the superincumbent weight would vary in different parts, it was desirable, in his opinion, to have a foundation which would slightly yield to those parts which sustained an extra pressure. As to the Mediæval builders having continued to proceed with the work, it should be remembered that the building took a considerable time to complete. Perhaps they had a first-class architect to set out the work; then it became neglected for a while, and when proceeded with was under the direction of some very inferior man, for the work in the tower and spire and external walls was of very inferior character. The central tower was never contemplated, in his opinion, by the first architect of the building; and he did not believe that Westminster was intended to have a central tower. There were very few Early English towers and spires, most churches of that date being intended to have a lantern, and no doubt this was originally intended at Grosmont. Probably the later men did not exactly know the construction, and thus were led into the error of

constructing towers. There was a great deal of inferior work in the Late Decorated and Perpendicular times; the builders of those times certainly built with great recklessness, but for this we could not blame those who set out the original lines of the building. In such a remote part of the country, again, the village churches must have been erected by very inferior men to those who worked in the great towns.

Professor KERR wished to ask a question of a practical character: If the sand was so loamy as to be perfectly incohesive, and if the foundation was rocky, how would it be to calcine the sand, and so render it partially siliceous and partially argillaceous?

Mr. SEDDON thought it would answer very well.

Mr. EASTLAKE asked if Mr. Seddon had any authority for his assertion that Westminster was never intended to have a central tower? It was certainly not probable, seeing that the piers were not strong enough to sustain it.

Mr. SEDDON replied that he had no other authority than was afforded by an examination of the structure. The central tower at Chichester was not intended from the first, in his opinion, and would probably come to grief, and he might say the same with regard to Salisbury.

The vote of thanks having been accorded by acclamation, the Secretary, Mr. Eastlake, proceeded to read a letter from Mr. J. Barber, of Leeds, on "Warming and Ventilation," in reply to a letter by M. Pauli, of Brussels, read before the Institute a few weeks ago. A paper by Mr. Barber, "On the Warming of Public Buildings" was postponed, owing to Mr. Barber's absence.

It having been announced that at the next meeting the result of the Pugin Travelling Studentship competition of this year would be made known, the meeting terminated.

UTILISATION OF THE SEWAGE OF LONDON.

THE Metropolitan Board of Works had under their consideration on Friday last the late trial of the A B C process of the Native Guano Company, for the conversion of the sewage of the Metropolis into manure. Between the 27th August and the 30th November, 1872, 11,672,737 gallons of sewage were experimented upon, being 1-343rd part of the average flow of sewage discharged at Crossness, and 1-686th part of the sewage of London; and about 2-7ths the quantity proposed to be treated by the company, who intended to have erected two tanks, each capable of containing 125,000 gallons, by the agency of which the company stated they would be enabled daily to effect the conversion into solid sewage matter the deposit from 500,000 gallons of liquid. The total expenditure amounted to £895. 3s. 3d., thus giving the cost of manufacture, taking the dried and wet residue as perfect native guano 141-7199 tons at £6. 6s. 4d. per ton, exclusive of rent, interest on capital, depreciation of plant, &c. The chemist of the board, Mr. Keates, reported that he had examined 148 samples of the effluent water, and found upon the whole that its state was extremely good. Water kept in closed vessels had an odour of sewage in two days, which after the third day became less, and ultimately disappeared. The stored guano emitted no smell, although fermentation took place. The value of the manure and other products of the sewage was but £1 per ton.

The report of the Works Committee stated that it had been proved to their satisfaction that the process could not be adopted with any hope of profit to the ratepayers, and recommended that it be referred back to the committee to make arrangements with the Native Guano Company for the removal of their works from the Crossness Pumping Station.

Mr. Newton, in proposing the adoption of the report, said the committee had arrived at the conclusion that the process was not, commercially speaking, a success; that it was not adapted to the works of the Board; and that, therefore, there should be an end to the proceedings. He hoped the Board would not consent to the proposal of the company for a further trial.

A new lych-gate has just been completed at Aylesbeare, Devon, from the designs of Mr. E. H. Harebottle, of Exeter. The walls are built with local stone, pierced and filled in with pitch-pine tracery. The roof is of pitch-pine and covered with ornamental Staffordshire tile.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SELECTED DESIGN FOR THE CATHEDRAL CHURCH
OF S. MARY, EDINBURGH.

Last week we gave the North Elevation of Sir Gilbert Scott's design for this Cathedral, and this week we give Two Bays of the Choir—south side, and Two Bays of the Nave. The Ground-plan and Sir Gilbert's Report to the Trustees will be found in another part of to-day's impression of the BUILDING NEWS. We have been favoured with other views of this design, which will be given in an early number.

GROSMONT CHURCH: SHORING OF TOWER.

We give two page drawings illustrating Mr. J. P. Seddon's paper, as read before the Royal Institute of Architects on Monday last. At the same time we beg to record our hearty thanks to Mr. Seddon for giving us an opportunity of illustrating his able and instructive paper, a report of which will be found elsewhere. We shall do a similar service next week to Mr. Tarver's paper, which will be read before the Architectural Association this evening. This is the first time, we believe, that papers read before our architectural societies have been reported and illustrated at the same time. We shall be glad to do this whenever the authors of papers will render us the necessary co-operation.

"BUILDING NEWS" SCHOOL-PLANNING
COMPETITION.

We give this week the selected design for this competition. The author is Mr. Frederick Sampson, of Grove Terrace, Kirkgate, Wakefield. For particulars see Report of Arbitrators, page 83. The following is Mr. Sampson's report, which accompanied his plan:—

PLAY-GROUND.—In the first place, I refer you to the ground-plan, which shows entrances from the boys' and girls' school into the play-ground. This I believe to be a good point, because the girls or boys can use the play-ground when the infants are not in it. If this was thought to be non-advantageous, the doors might easily be blocked up.

HEATING.—With regard to the heating of the building, this I would do by means of the ordinary open fire-places, believing as I do that nothing is more cheerful to a child than to see a good blazing fire; and if this system would not act, hot-water pipes might easily be run round the different rooms.

VENTILATION.—As will be seen by the sections, a trunk runs along the roof; into this I intend the foul air to proceed, and then into the flue placed between the smoke-flues in the chimney-stacks: so that the heat from the smoke-flues and behind the fire-places will have some power in extracting the foul air. The ventilation of the girls' rooms is by a trunk between the joists running into the said flue.

With regard to the cost, I have calculated up the contents of the building, and make it out to contain 152,000 cubic feet, or thereabouts.

152,000 c. ft., @ 5d. = £3,166 13 4 Building.
450 0 0 Fittings.

£3,616 13 4

INSTITUTION OF SURVEYORS.—The next meeting will be held on Monday evening, February 10th, 1873, when a paper will be read by Mr. E. J. Castle, entitled "The Origin of Parochial Relief." The chair to be taken at eight o'clock. The following candidates will be balloted for:—As Members—John Morgan Davies, Froodvale, Llandilo, Carmarthenshire; Henry Drew, Exeter; Richard Gouthwaite, Lumley, near South Milford, Yorkshire; Thomas Miller Rickman, 8, Montague-street, Russell-square, W.C.; John Woodcock, 20, Darlington-street, Wolverhampton; as Associate, Walter Feilde Ingram, 25, Gresham-street, E.C.

WORKS OF THE LATE MR. GEORGE
MASON, A.R.A.

THERE is exhibited on the walls of the Gallery of the Burlington Fine Arts Club, in Savile-row, a collection of pictures and sketches, by the late Mr. George Mason, A.R.A., whose decease, on the 22nd of October, 1872, we briefly noticed in our issue of the 2nd of November last year. This collection, which comprises nearly seventy subjects, including some of the best-known pictures of the artist, is arranged with taste and discrimination, and affords an opportunity that is seldom met with of judging of the aims and capabilities of their author. The paintings, which are all in oil-colour, are arranged as nearly as possible in chronological order, the earliest in point of date being placed nearest the entrance; but this rule has been to some extent departed from, in order that the larger compositions might occupy central places, thus:—"The Harvest Moon" (52), exhibited at last year's Royal Academy, is hung in the middle of the south wall of the Gallery; "*Nelle Maremme*," exhibited in 1859, is hung at the end of the room, and the "Evening Hymn" (27) and "Girls Dancing by the Sea" (13), exhibited in 1868 and 1869 respectively, balance each other upon the opposite sides of the fireplace. Mr. Mason, who was in all probability known only to the public generally by his late works, had two distinct styles. A prolonged residence in Rome, and a study of the costume and landscape of the Campagna, had a strong influence in the formation of his earlier style, in which his subjects were always taken from Italian sources. The two sketches "*La Fontana dei Giganti*" (6), a view of the celebrated fountain in the Trastevere, at Rome, near the so-called Temple of Vesta, and the "*Villa Cenci*," are literal transcripts from Nature, boldly coloured, but rather hard in manner, and not at all successful in representing the peculiar atmospheric effect of an Italian sky. The same may be said of the two finished pictures, representing "Cattle at a Drinking Place in the Campagna" (5 and 6), painted evidently at about the same time. Of these two pictures, which are merely variations of the same theme, No. 6 is the most elaborated, and is noticeable for its brilliant colouring and sunny effect, although even here the vivid expression of the landscape is wanting. In the small sketch of "Girls driving Cattle," the Castle of Petrella (the scene of the murder of Giacomo Cenci) in the distance, near Rieti, on the border of the boundary between what was the Papal States and the Kingdom of Naples, we have the germ of the sentimental landscape which was afterwards so successfully worked out by the artist in his later works. Nothing can be more perfect of its kind than this unpretending sketch. It is painted in a very low key of colour; the sun has just set, and night is coming on with that suddenness which is peculiar to Italy; in the distance looms the stronghold of the Cenci dark against the sky, on the summit of a hill clothed with thick woods, completely realising Shelley's description of the

"savage rock, the Castle of Petrella;
'Tis safely walled and moated round about."

In the foreground two peasant girls are hurrying some cows home from the pasture. The contrast between the associations awakened by the Mediæval castle in the distance and the peaceful occupation of the peasants is admirably suggested, and although the sketch is slightly painted, and was probably intended as a study for a picture, it is to be doubted whether any further elaboration or the advantage of a larger canvas could have added force to the idea as here set forth. It must be confessed that Mr. Mason was an artist of limited powers of invention. His finished pictures, as a rule, show no improvement upon his first sketch of the subject, and in some instances the point and vigour of the original sketch has been almost entirely lost by being reproduced on a larger scale. Nos. 37, 41, and 54, representing a girl driving a calf across a moor, are all repetitions of the same subject, with some trifling variations of detail, and the leading idea in all is the same as that in No. 2, the scene being transferred to Scotland instead of the Abruzzi. The effect of these compositions is, however, not so powerful as that of the sketch before remarked upon; they are evidently adaptations, and the element of terror, infused by the Castle of Petrella is but ill-supplied by the gloomy moor swept by the winter blast.

Perhaps the most agreeable picture in the collection is "Evening: Matlock" (14), belonging

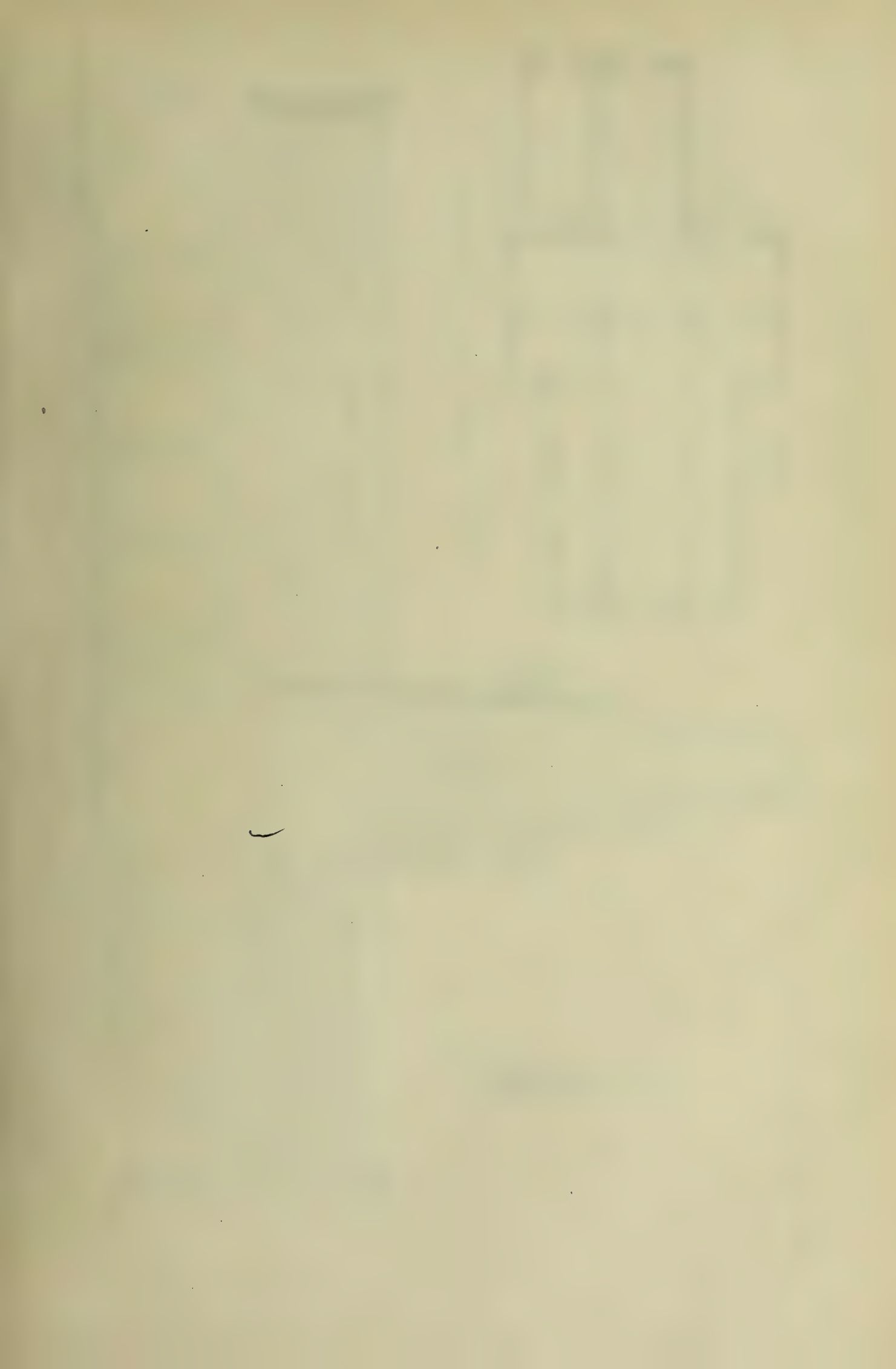
to the Marquis of Westminster. A girl is returning from gleaning, a few sheep are in the foreground, and in the distance are seen some gleaners at work. The colour is deliciously pure, the foreground well made out, without over-elaboration, and the atmospheric effect is wonderfully expressed.

The study of a "Milkmaid" (17) is introduced into the picture "Only a Shower" (47) without any apparent modification to suit the enlarged scale and increased number of figures; indeed, it would appear as if this figure were the *motif* of the picture, and that the other figures were added merely as accessories to it. Nos. 48, 56, and 71 are all nearly identical representations of the same subject—"Returning from the Plough," and it is curious to observe that we find the whole theme fully worked out in the small sketch (71), which is not more than four inches wide and one inch high. The effect of this sketch is much the same as if one were to look at one of the larger pictures through the wrong end of an opera-glass. Again in the study "Love" (68) belonging to Mr. G. Aitchison, of a young girl in a swing, we find the same exhaustive treatment; the figures are merely indicated, but the whole subject is most carefully and thoroughly thought out—nothing is left to chance or to the spectator's imagination; the painter's intention is expressed in the most perfect manner.

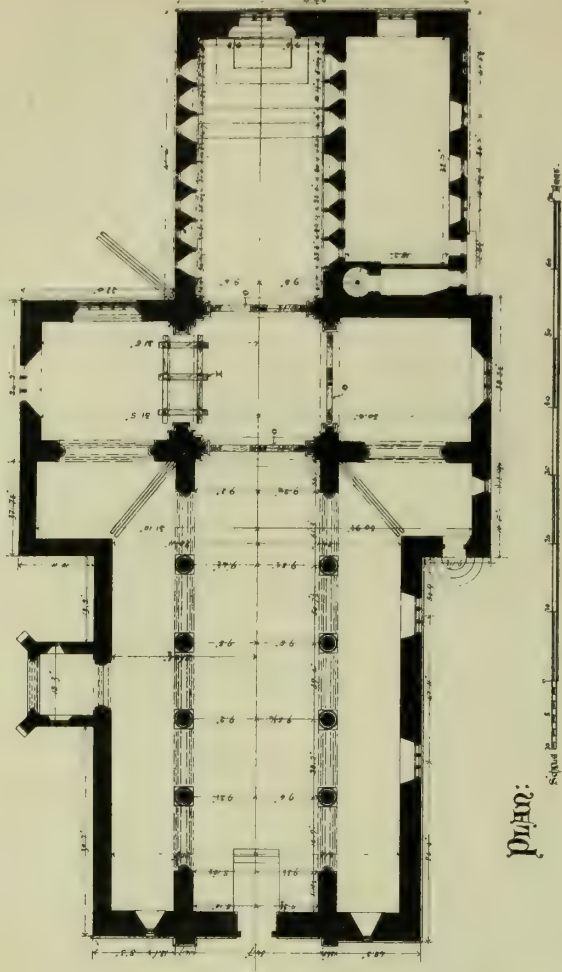
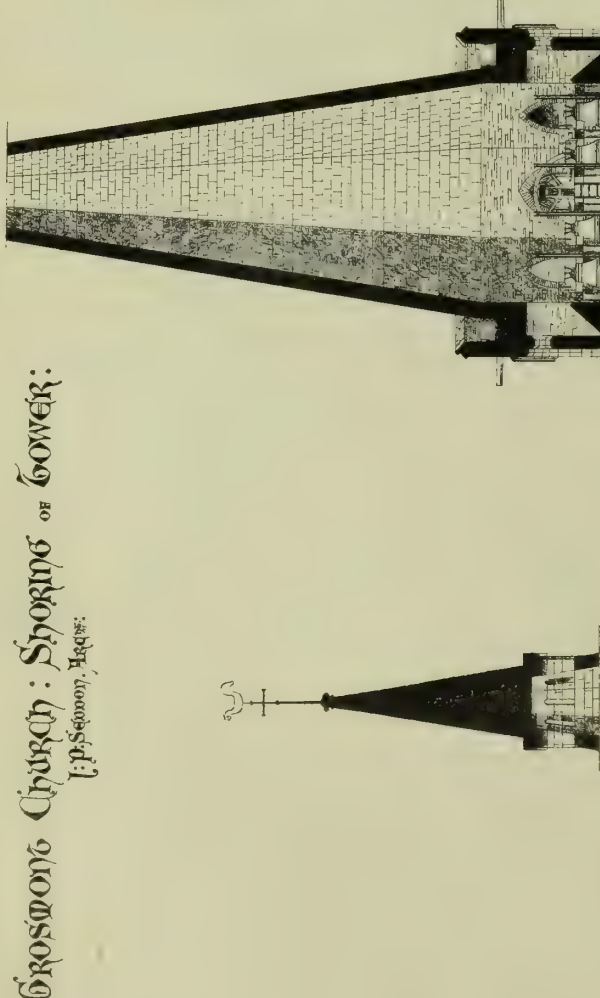
Mr. Mason passed nearly twenty years of his life in Rome, but although he was a constant contributor to the Royal Academy Exhibitions, and his pictures were known and appreciated in art-circles, it was not until the year 1859, when he exhibited his large picture "*Nelle Maremme*," an Italian peasant family of the environs of Rome removing their household goods in a bullock-cart, that he attracted the attention of the public. This picture, No. 32 in the present collection, was exhibited in the International Exhibition of 1862, and together with the friendly advocacy of Mr. Frederick Leighton, R.A., procured both fame and patronage for the artist, and opened to him the doors of the Royal Academy, although it is said that at the time of his election as Associate that the President openly avowed his ignorance of his name and works. After the painting of this picture, however, although it is evident from a comparison of his various compositions that his predilection was in favour of Italian subjects, he abandoned his earlier style of painting and devoted himself, after his settlement in England in 1858, almost exclusively to the study of English pastoral life, and developed that peculiar phase of sentimental landscape with which his fame is chiefly associated. But although he chose his themes in England and illustrated rustic subjects, his treatment is invariably Classic and Academic; this is seen in what was perhaps his most successful work, "Girls dancing by the Sea" (13), exhibited in 1869 at the Royal Academy. The landscape (with the exception of the sea) is thoroughly and unmistakably English; but the figures have no evident nationality—they might be peasants of the Campagna, or of one of the islands in the Gulf of Venice, or they might have been copied from an antique Greek vase. The sentiment, too, of the picture has nothing in common with the present day, or of the scene which it represents—the effect does not arise naturally from the subjects presented, but is produced by the evident presence of the artist's mind in his work.

There is an indescribable charm in all Mr. Mason's compositions, which is only to be explained by the possession by the artist of a highly poetic faculty and a sympathetic nature. That his faculty had but a limited range is clear from a contemplation of the sketches and pictures here exhibited. He had no versatility, and constantly repeats himself, and yet those very repetitions have somehow the effect of novelty. This limited range of ideas was due, in all probability, partly to a delicate temperament and partly to a scrupulous fastidiousness of taste, which led him to shrink from new paths or fresh experiments. The same peculiarity is observable in the works of Flaxman and Wordsworth, between which last and Mr. Mason there are many points of resemblance. The author of "A Winter Evening's Walk" could not have desired a better illustrator. Mr. Mason was, like the poet, an earnest student of Nature in her least known and inobtrusive moods; he had the same simplicity of purpose, and few have been better able to express on canvas—

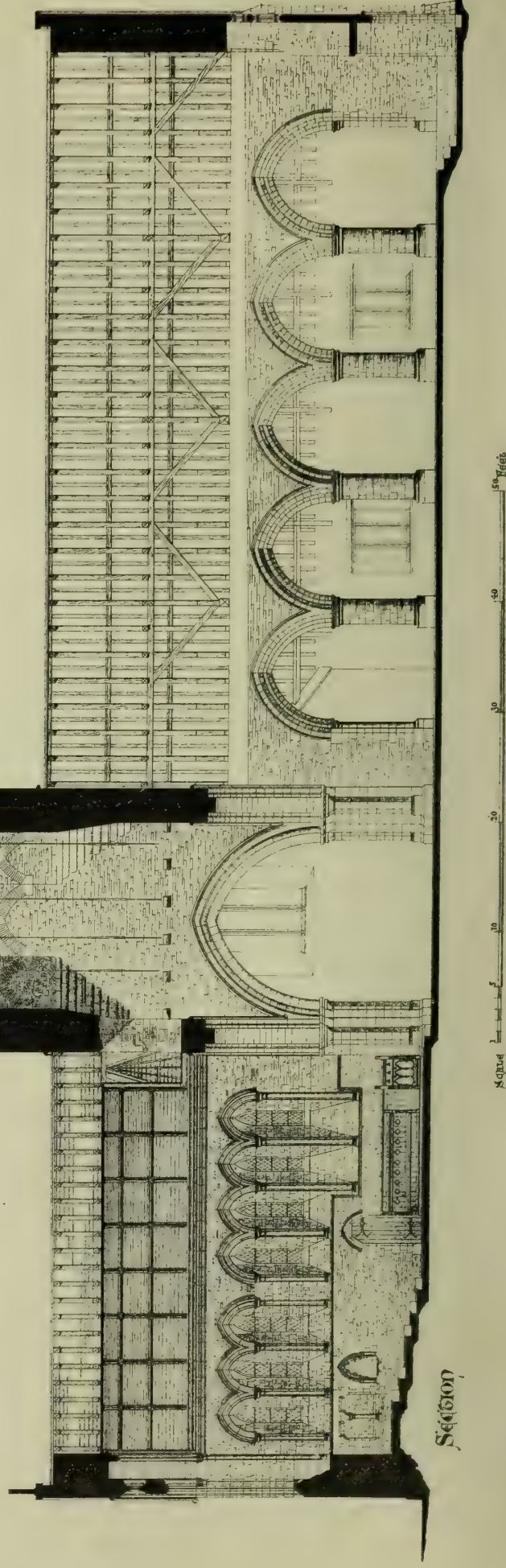
"A softness still and holy,
The grace of forest charms decayed,
And pastoral melancholy."



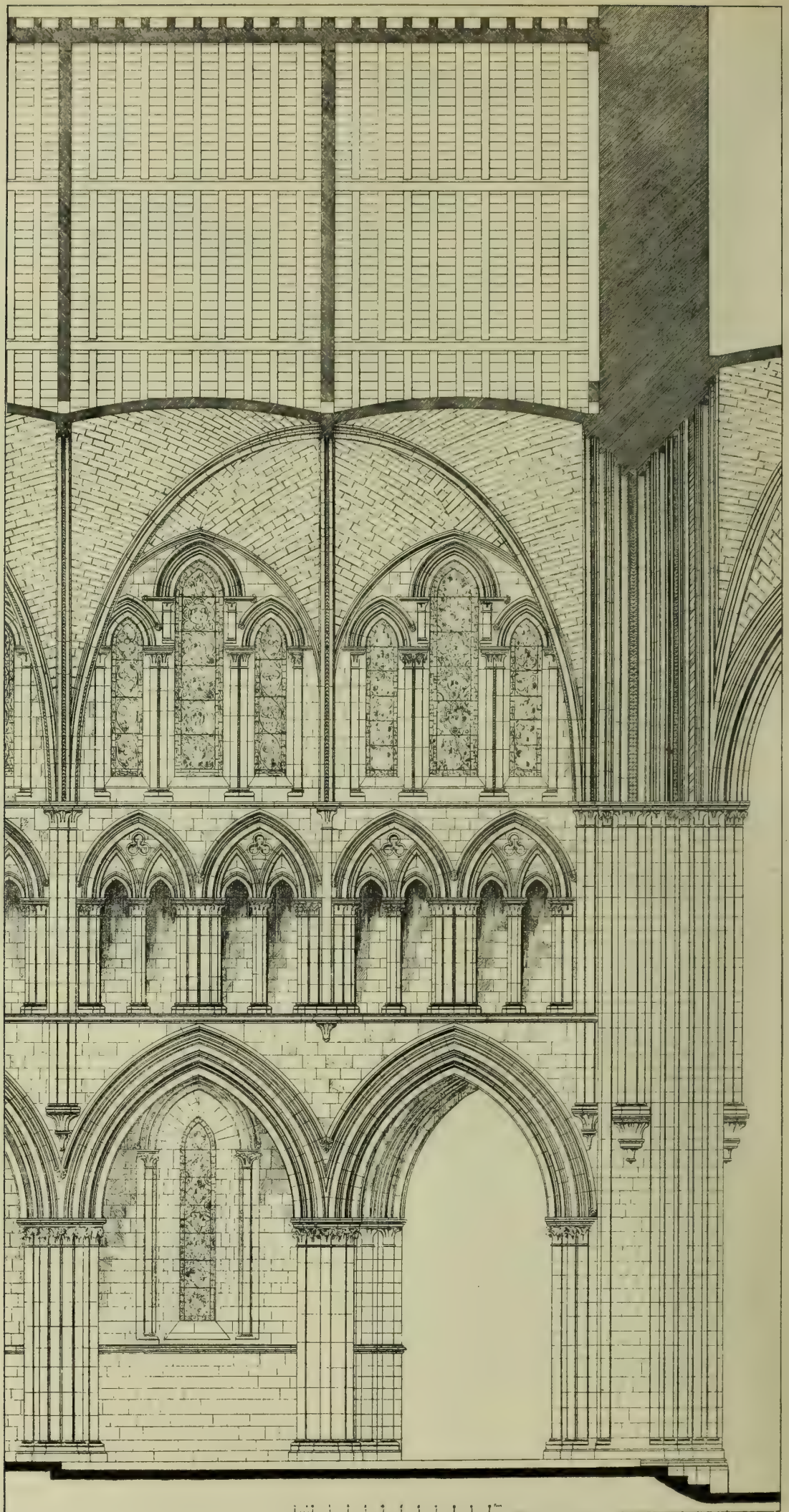
Grosvenor Church : Shoring of Tower :
[P. Section, Right.]



Plan:



Section



2 BAYS OF THE CHOIR. SOUTH SIDE.

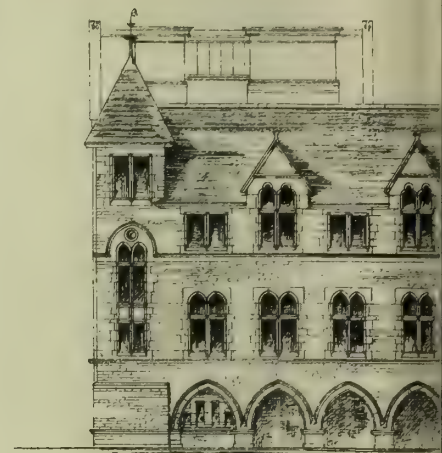
Photo-Lith. & Printed by James Macintosh, 51, Gray's Inn Road.

SELECTED DESIGN FOR S. MARY'S, EDINBURGH.—SIR GILBERT SCOTT, R.A. ARCHT.

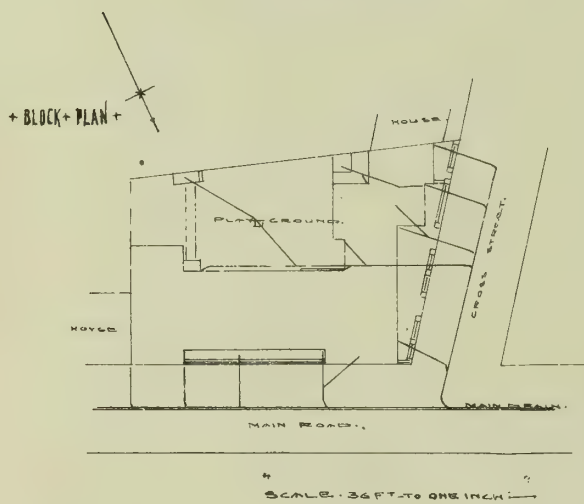
+ BUILDING NEWS SCHOOL



+ BASEMENT PLAN +



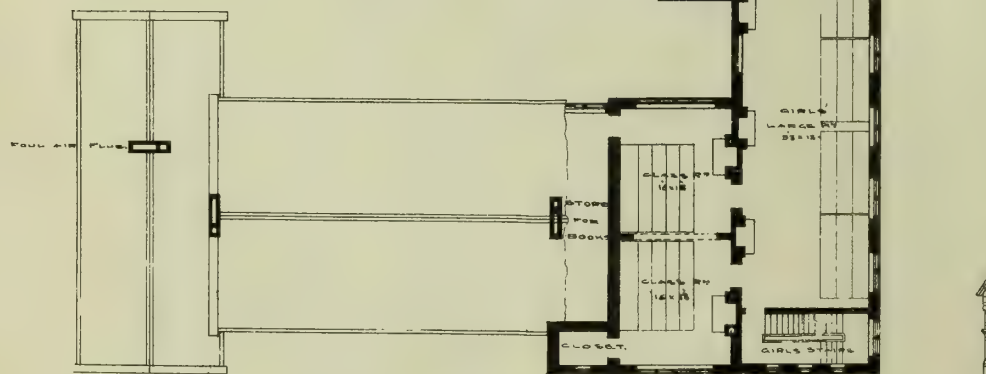
+ ELEVATION TO RIGHT



SCALE: 36 FT TO ONE INCH



SECTION

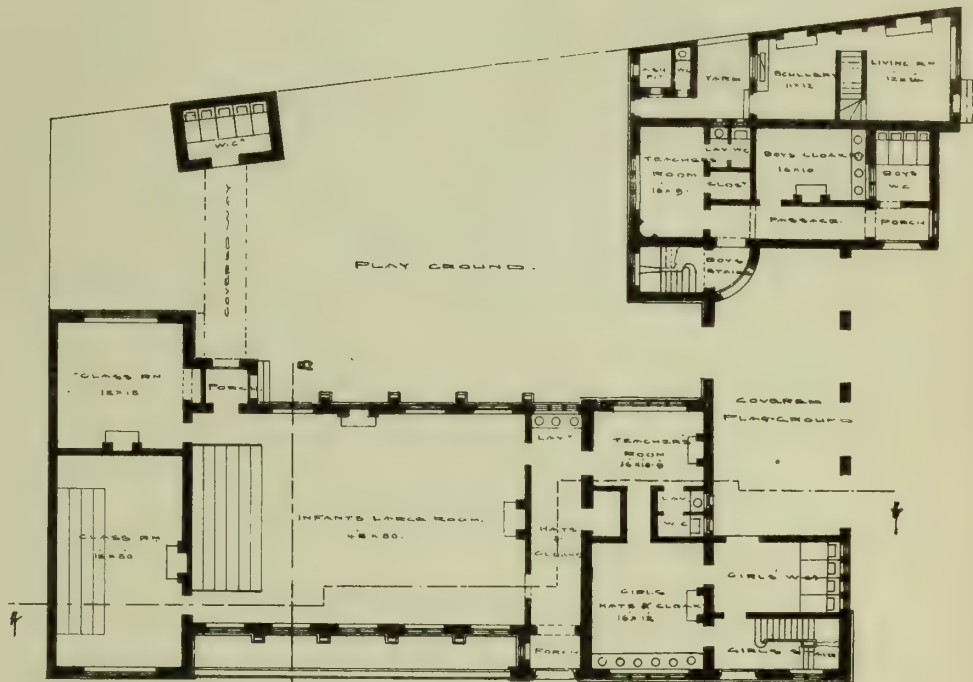
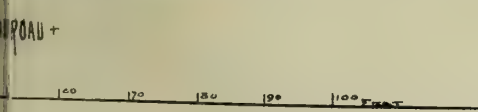
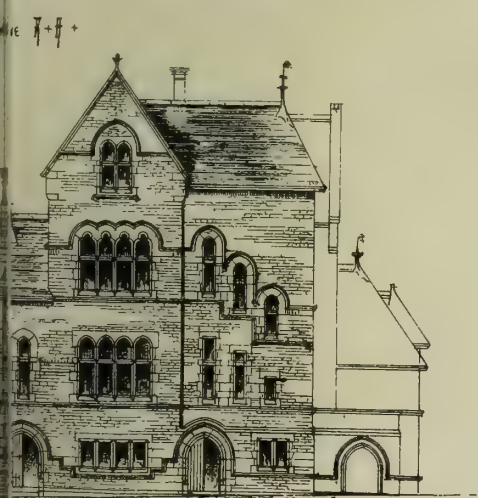
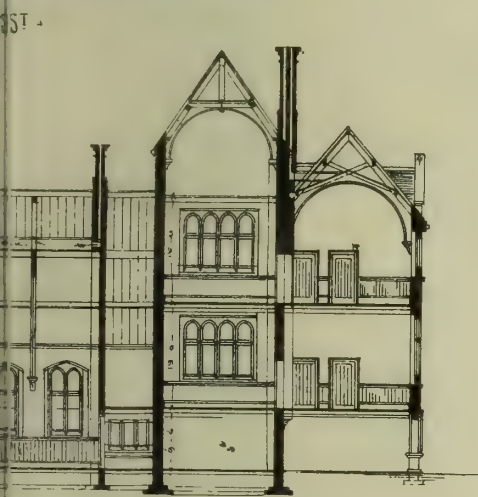


+ FIRST FLOOR PLAN +

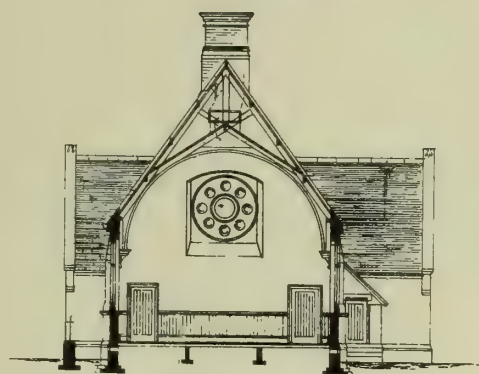


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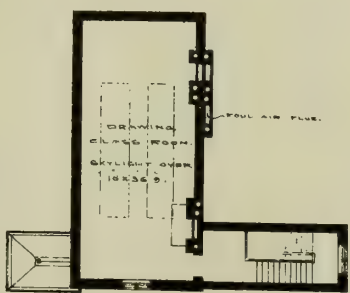
COMPETITION+



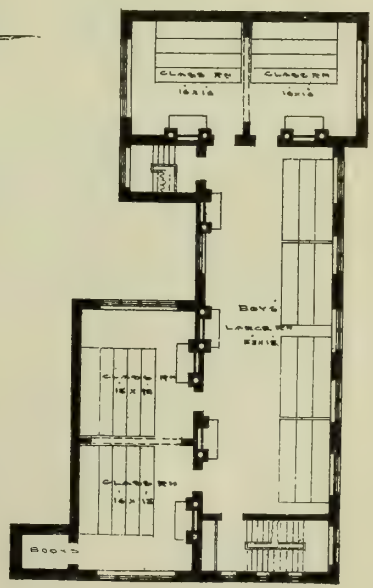
+ GROUND PLAN +



+ SECTION - B.B +



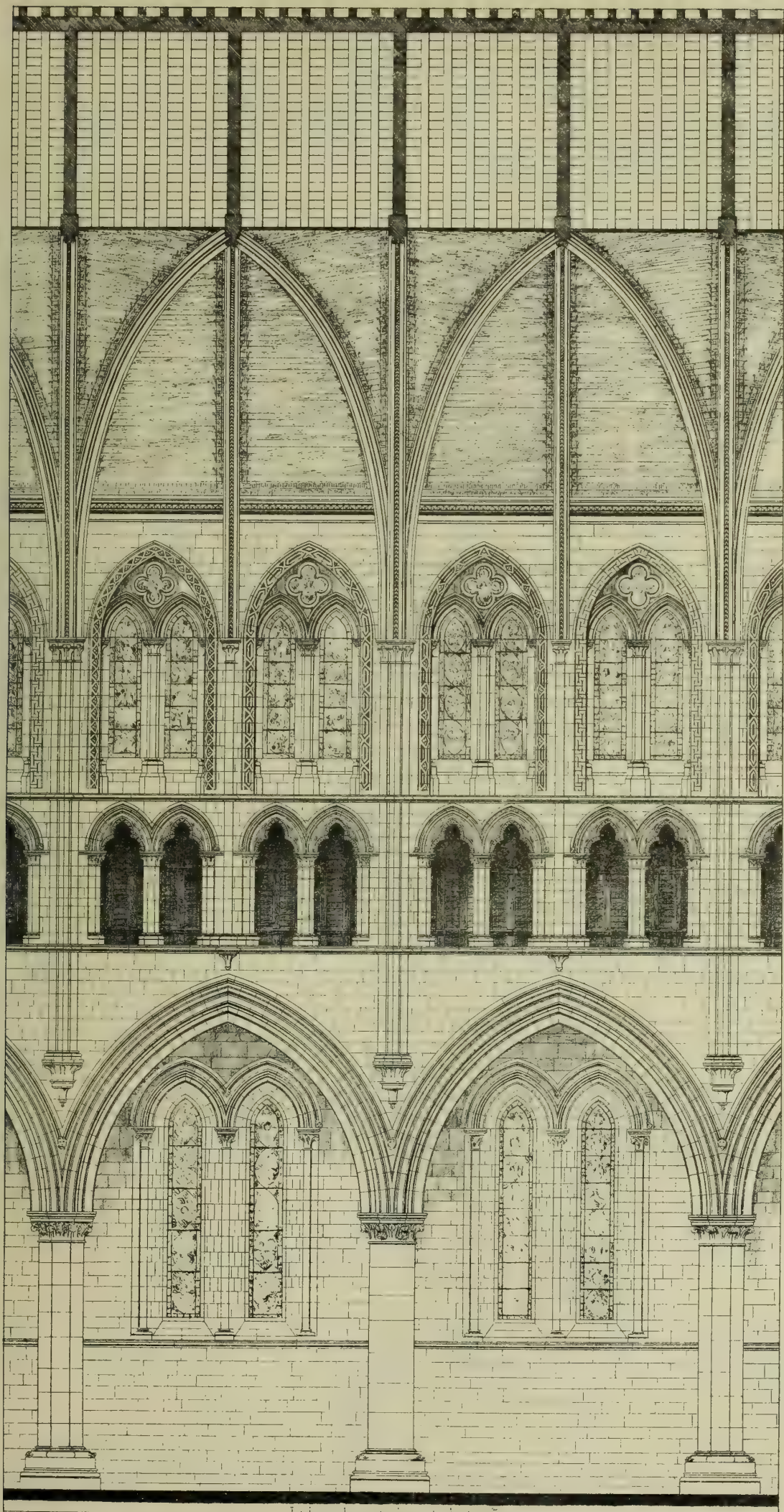
+ TOP FLOOR PLAN +



+ SECOND FLOOR PLAN + "

We live to learn

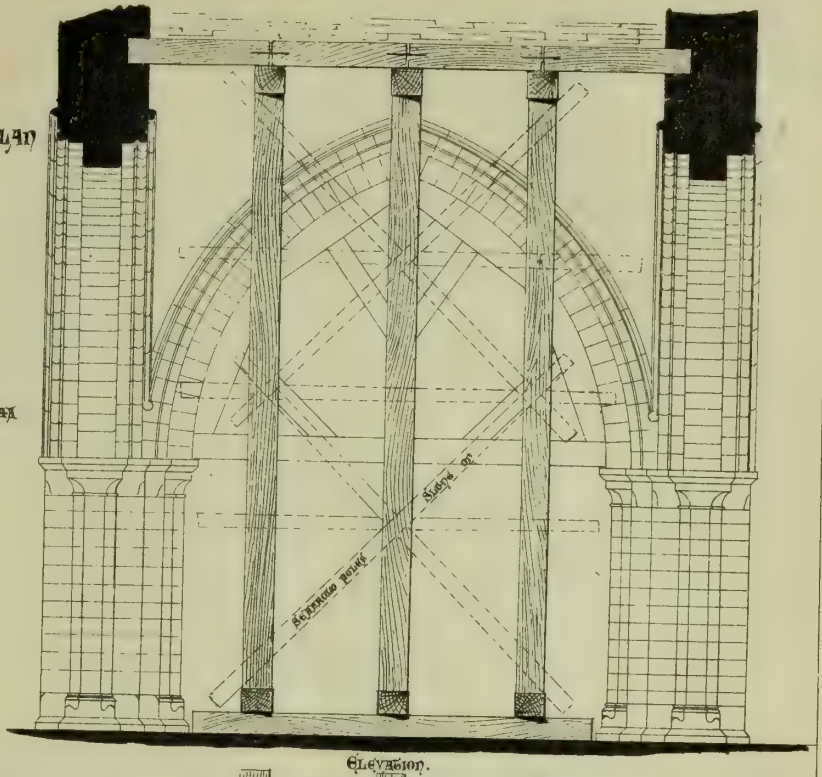
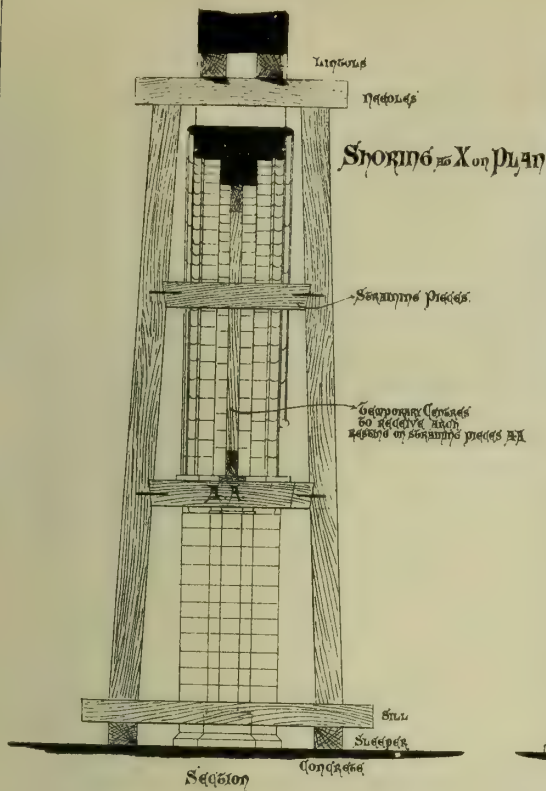
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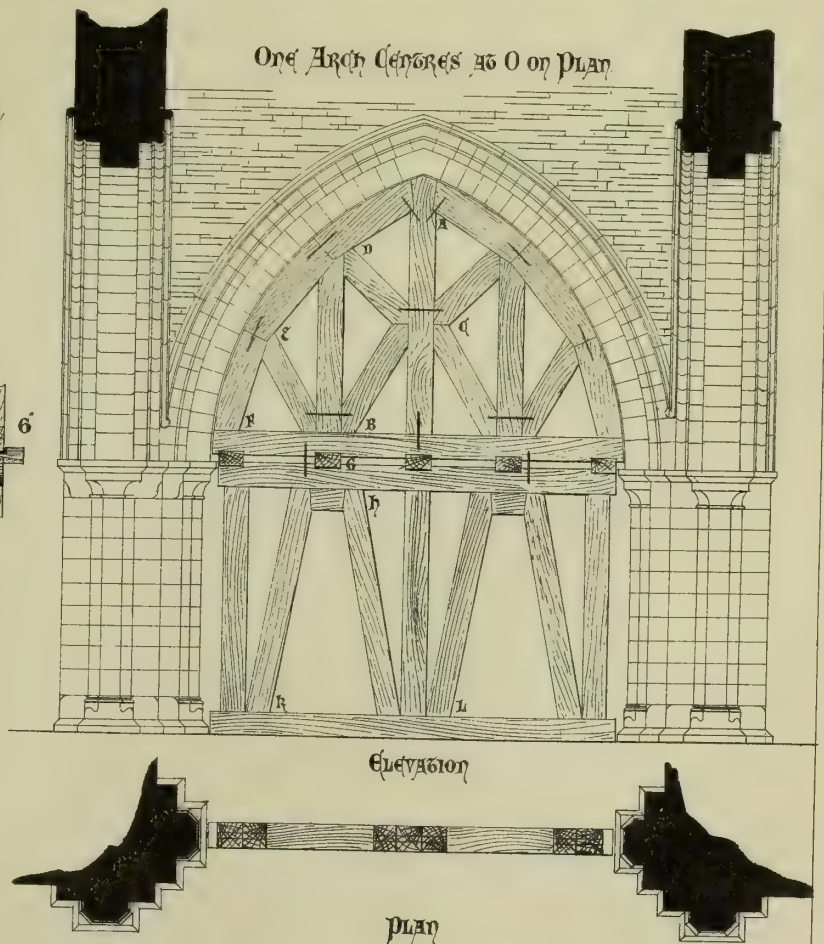
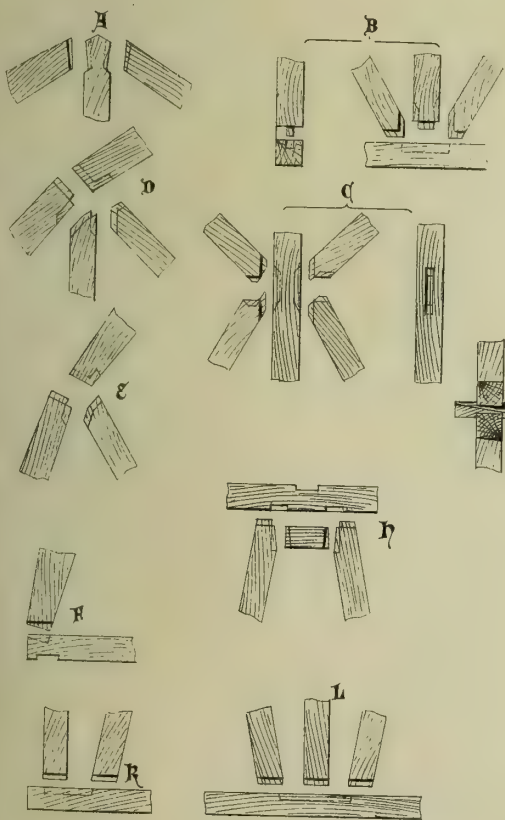
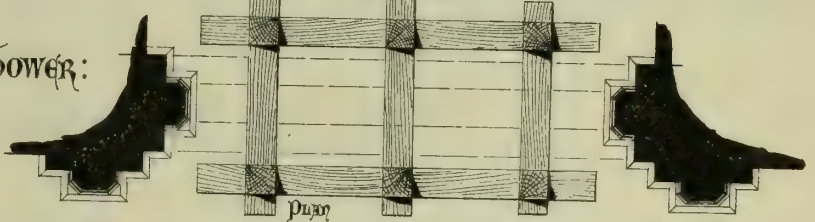
2 BAYS OF NAVE

Photo-Lith. & Printed by James Aikman, 51 Gray's Inn Road, W.C.

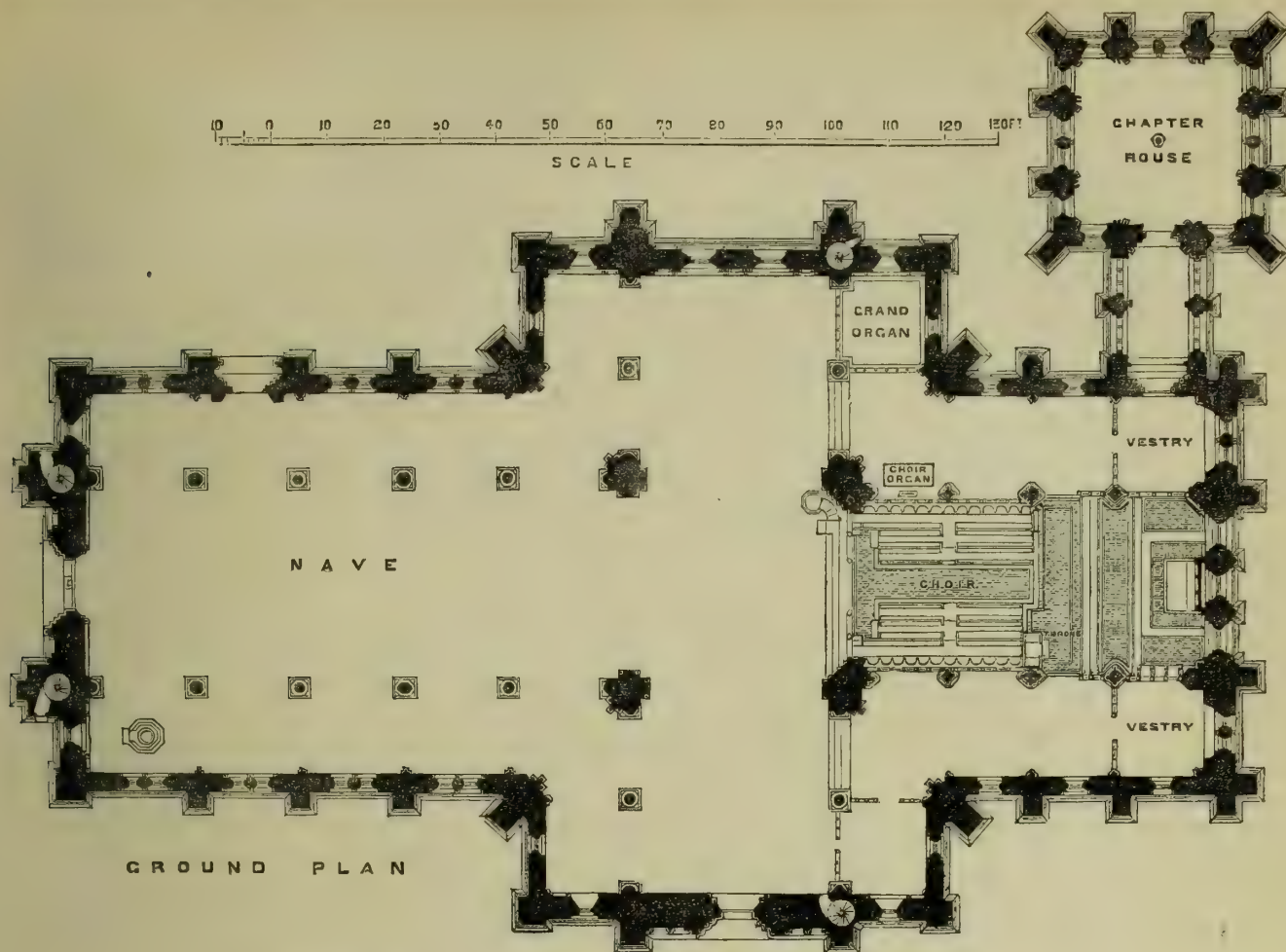
SELECTED DESIGN FOR S. MARY'S, EDINBURGH.—SIR GILBERT SCOTT, R.A. ARCHT.



GROSVENOR CHURCH: SHORING OF TOWER:
J.P. SEDDON ARCHT



Scale 1/4" = 1' 0"



PLAN OF SIR G. G. SCOTT'S DESIGN FOR EDINBURGH CATHEDRAL.

THE SELECTED DESIGN FOR THE NEW EDINBURGH CATHEDRAL.

WE give this week two more illustrations of Sir Gilbert Scott's design for the erection of the new Cathedral of S. Mary, Edinburgh, and a ground plan of the building. We also append the report submitted to the Trustees, in explanation of his design, by Sir Gilbert Scott:—

TO THE TRUSTEES, &c.

My Lord Bishop and Gentlemen,—

In compliance with your invitation, I submit for your examination the designs I have prepared for your proposed Cathedral Church of S. Mary, at Edinburgh.

In designing a Church which is to take the rank of a Cathedral, and that in the Metropolis of Scotland, and which must nevertheless be capable of being erected for a moderate sum, one has to consider carefully what are the architectural, and what the ritual, essentials of a cathedral, as distinguished from a church of less dignified rank.

It would not be easy to define the essential differences found to exist among ancient churches between a cathedral and an abbey, or even a great collegiate church. The latter were often promoted to the higher dignity, and were found in every way fitted for it. Our own question, however, lies between a cathedral and a parochial church; and, even here, it is not so easy as it might appear to define the difference, inasmuch as many large parish churches equal and even exceed in scale and dignity of aspect cathedrals of the smaller size. In the present instance even, the proposed dimensions of the Cathedral are equalled by those of some parochial churches and in some instances the ritual arrangements of such churches, may also be on a nearly equal scale.

Our aim, then, must, I think, be *positive* rather than *relative*. The Church must, both within and without, bear such unmistakable credentials of high dignity, as to be obviously suited to its rank as the Chief Church of the diocese, and that which its chief pastor adopts as more especially his own; and perhaps the great essential is that the Choir should be of such ample dimensions as to allow the diocesan clergy, from time to time, to assemble there in the presence of their Bishop.

There are, however, no universal rules for the form of a church of cathedral rank. If we were to say that it should have a *central tower*, it would at once occur to every one that many abroad and several in Great Britain have not that feature.

If we were to moderate this demand, and say that it should at least be *cruciform*, it would be replied that we have in Britain at least two—*Dumblane* and *Llandaff*—which are not so; and so on, no feature can be

named which is the special and unvarying characteristic of a cathedral. All, then, which can be demanded for it is that it should be as dignified a church as the circumstances at command will permit, and that it shall, as a rule, be the noblest church in the city and diocese in which it is placed.

Although, however, a cruciform plan and a central tower are not indispensable characteristics, it must be admitted that both are in a high degree conducive to dignity of aspect, and are consequently most desirable features in the Cathedral Church. No plan is so noble or impressive as that which is founded on the cross; and the cross-plan is never so emphatic as when a central tower crowns its intersection.

I have, therefore, chosen, as my (more normal) design, the customary and typical form of a cruciform church, with a central tower, only making the central crossing with the nave and transepts unusually wide in their proportions, so as best to provide for congregational purposes, and so constructing and planning the supporting piers of the tower as to offer the least practicable amount of obstruction to view and voice.

I have in this design given *Aisles* on either side to the transepts as well as to the other arms of the cross, which tends to produce a great amount of space in the part most useful to the congregation. As, however, you appear to lay special stress on this point, I have considered other methods of providing for it.

Had I been called in without being subjected to the ordeal of competition, I should have laid before you several methods of arrangement for your consideration and choice, giving you my views upon each. Competition, however, is attended with this great practical evil: that it interferes with that power of confidentially laying the whole case before you which is customary when an architect of known experience is called in at once as your selected adviser.

There are at least *three* schemes which I ought to submit for your consideration, but your conditions would appear to demand that if I should lay each before you I should accompany each by the great list of drawings which you demand, a labour which would exceed my command of time. I have, however, ventured on one alternative scheme, for which a very few drawings would have sufficed; but out of conformity with your terms, I have treated it as a distinct design rather than a mere variety, and given it a complete set of drawings of its own.

This design, distinguished as design B, is founded on the celebrated alteration made by Alan de Walsingham in the Cathedral of Ely, where, on the fall of the central tower, he omitted to rebuild the four great piers which had supported it, but—stepping onwards to the next in every direction—converted his central space into a vast octagon. This plan, though less dignified in external aspect, has very great practical

advantages as regards the actual uses of the church, through its affording a great and unobstructed space, in front both of the choir and the pulpit, for the congregation.

In neither design, however, have I introduced a lantern rising high above the general elevation of the interior,—that being injurious to the acoustic qualities of the church; and, with the same view, I have shown all parts of the roof as vaulted either with stone or wood, *i.e.*, the choir and the aisles with stone, the nave, crossing, and transepts with wood; the latter being particularly favourable to sound.

In my design B, I have, to avoid undue length, shown the choir as projecting a certain distance into the central octagon; an arrangement very favourable to acoustic objects; but, lest this should not find favour, I have, by a fly-leaf, shown an extension of the choir which would keep it wholly within the eastern arm of the cross.

Could I have afforded time for the preparation of a third design, it would have had a central tower with a shortened eastern arm; the choral arrangements extending westward into the crossing. The nave would have been widened for congregational objects, and the organ placed in one transept. The aisles of the nave in the two bays next to the transept would have been extended in width to provide for more persons near to the pulpit, &c. I do not, however, like this plan so well as the two which I have worked out.

In my design B, as I could not have a central tower, I found that I must either place the tower in some irregular position, which seemed hardly to suit the site,—or I must have a façade with two towers. Were this, however, as is most usual, at the *west* end, it would be attended with the disadvantage of placing the best façade towards the less frequented quarter: I have, therefore, so far deviated from custom as to make my twin steeples to flank the *eastern* instead of the *western* front, so as to be seen centrally as you approach through Melville Street.

This arrangement, though less customary, is not contrary to precedent, as many old churches on the Continent have their twin towers both on the east and the west, and some even to the transepts.

If, however, a *western* façade be preferred, you will easily imagine the change, by fancying the lower windows of the east end omitted and a portal introduced in their stead, or rather by imagining the central portion of the west front substituted for that shown between the towers in what is now the eastern elevation.*

Returning to the internal arrangement, I will mention that I have not ventured to show a high choir—

* This second design did not go before the Trustees, a question having arisen as to how far it was consistent with the programme.

screen, fearing that objections may be felt to it, but have shown a low screen or septum like those at Florence, Monreale, &c. I should, however, as a matter of taste, rejoice to substitute the higher form of screen. Nor have I shown close screens or canopies on the side of the choir because they render the choir-aisles unavailable except for passages.

I have provided for the organ in this manner:—The lighter parts, especially the "choir organ," with the keys and the organist's seat, I have placed close to the first bay on the north of the choir; but the larger and more cumbersome parts I have placed in the eastern aisle of the north transept immediately behind, a place where the sound would spread itself freely through both choir, transepts, crossing, and nave. The communication would be by trackers passing beneath the floor of the aisle. There is, however, the possible alternative of placing the organist and the choir organ, &c., as already mentioned, but placing the heavy parts in the triforium of the choir and transept. The arrangements of the choir will speak for themselves.

The seating of the nave, &c., would be by means of chairs.

The question you have suggested as to the place for the congregation during ordinary daily services, as distinguished from their place on greater occasions, I have carefully considered; but do not see any necessity (but the contrary) for providing a distinct position.

It would seem to me a great pity that the services on minor, though the most frequent, occasions should be in a less dignified place than at other times. It is an arrangement not known in this country, excepting for early services, nor do I think it desirable.

The question whether at ordinary week-day services any part of the congregation should be admitted within the choir seems one which should be left to the decision of the Bishop and Clergy. It is not essential to the arrangement to decide it while planning the Cathedral; as, if not so admitted, they would simply occupy the space in front of the choir screen according to their numbers.

Though the choir of a parochial church should be so planned as to hold no more than the clerical and choral bodies, that of a cathedral should do more: it should be capable of containing in addition, so many, at least, of the diocesan clergy as are likely on any great diocesan occasion to assemble.

This renders the choir somewhat larger than would on ordinary occasions be needed. I would not by any means on Sundays or on festivals allow this excess of room to be occupied by the congregation, but whether the rule be so severe at ordinary daily service, is a question I would not take upon myself to decide.

In both designs I have placed the Chapter-house near the north-eastern angle, approached by a cloister-like passage. I have not provided it with stone seats, thinking it improbable that they would be used. Its design is really a square, but by a peculiar treatment partakes also of the octagon, making, as I think, a pleasing and picturesque variety from the accustomed forms.

I have provided several Vestries, *e.g.*, for the Bishop, the clergy, and the choir.

In selecting the variety of Architecture on which to found my design, I have met with some little difficulty. I desired that it should not, at the least, be discordant with the finest of the Scottish examples, but here we have an *embarras de richesses*, for we find in Scotland innumerable examples of nearly every period. Putting aside the Norman, we have glorious examples of the Transitional style, as at Kelso, Jedburgh, S. Andrew's, parts of Holy Rood, &c. We have the developed Early Pointed, as in the greater part of Holy Rood, the whole of Glasgow, Elgin, and many other grand examples; the Earlier Decorated, as at Dunblane, Sweetheart Abbey, &c., and the later styles in very many others.

I have myself, however, been most impressed by the earlier phase of the Early Pointed; a style which especially unites the architecture of Scotland with that of the North of England, and is one capable, as I think, of the greatest possible degree of dignity united with a reasonable amount of simplicity and any amount of beauty. It always strikes me as more noble than the more developed Early Pointed, while it is both more simple and far more dignified than any variety of the "Decorated" style. The north aisle at Holyrood is a fine example of it, as are many parts of Jedburgh, and most of S. Andrew's Cathedral. In England one of its finest examples is in a border county. I refer to the exquisite sanctuary of Tynemouth Priory, which unites the severe dignity of the Transition with the richness of the developed Early Pointed. On this variety then, I have founded my design. In no other, whether in Scotland, England, or Wales, do we find nobler composition, more carefully studied detail, or a closer union of simplicity with architectural beauty. But the style of S. Andrew's, Glastonbury, and S. David's, needs no apology from any British architect.

In following this style, however, I have avoided merely transitional features, such especially as the round arch, and have made my style purely and strictly Pointed, though, as at Jedburgh, I have not scrupled to introduce, here and there, ornamental details which retain reminiscences of the Norman. No one who is acquainted with the Western portal, and the little cloister doorway at Jedburgh,—two of the most exquisite gems of architectural art in this island—will find fault with this.

In placing the church upon the ground, I should be disposed to make the axis coincide with that of Melville-street, so that the eastern part, with the

central or the flanking towers (as the case may be), may be well seen down that street. Its western facade would, in a similar manner, be seen from Grosvenor-crescent.

As I presume that several ecclesiastical residences will be needed, I should suggest that one should be placed a little back from the S.E. and S.W. angles of the ground, and the others picturesquely distributed about the northern end of the ground, in which place also should stand the Episcopal Residence.

I should most unquestionably retain East Coates House.

In a part of Edinburgh so essentially new, it is a most happy circumstance to possess upon the Cathedral site a veritable old Scottish building. It is very picturesque in its design, and will become more so by careful restoration.

Its internal accommodation is open to improvement, and I have no doubt that by judicious treatment it may be made a comfortable residence, while its presence will add much to the picturesque grouping of the ecclesiastical buildings.

I intend the building to be wholly of stone. I reserve the power to make a careful selection of stone for the different works, should I be entrusted with the work, according to the position of the different parts, and also with reference to cost. My present impressions are in favour of Dalmeny stone for the external wrought work; Hales, Cragleith, and Redhall stone for rough walling, and plain external facing, which is to be in irregular courses. Whether the internal plain wall-faces will be of wrought stonework must depend upon cost.

The choice of the internal wrought stone must depend upon its functions and position. Parts carrying much weight would probably be of Dalmeny stone; other parts may be of Fifeshire or other stones less costly to work.

The ribs of vaulting to choir, aisles, and other parts vaulted in stone to be of one of the stones last alluded to. The filling in between the ribs will be either of wrought stone, stone in irregular courses, or rubble faced with plaster, according to circumstances.

I have made a calculation as to the cost, which gives a result as favourable as I could anticipate; but as such works as this are rarely erected in our day, I will not pledge myself to meet your views with minute accuracy, but content myself, as I should have done had I been selected your architect without competition, with carefully aiming at the prescribed sum; and I believe that, with care and reasonable economy, and possibly with the aid of some safety-valves, it may be realised, though it would not be wise, in a matter proverbially so much of a lottery as the cost of a large building, to pledge oneself too minutely. My object has been to give the best and noblest church which your conditions appear to admit. I have made this my anxious aim, but beyond this I will not bind myself further than to say that I believe I have realised my aim with very reasonable accuracy. Some of the more decorative fittings, such as the reredos, may be looked for as individual offerings; and the painted decorations would not be included.

I will ask one favour. As I have given nominally two designs, though really two varieties of the same idea, I will beg of you, if the matter comes to a vote, to view the two as one, so that I may not run the risk of being outvoted by my own supporters.

My name not appearing, it may be right to say that I am an experienced church-builder, and can refer you, though it will be needless, to a long array of ecclesiastical works; and, should I be honoured by your appointment to this great and important work, I shall devote my best energies and my most anxious exertions to rendering it worthy of the Diocese of Scotland's chief City; and worthy also of a place among the architectural monuments of that famous metropolis.

One thing I see I have omitted. I refer to the clock; but I cannot bring myself to disfigure the tower (or towers) with a prosaic dial. For the clock and its works the room is ample, but, in a district where every house is replete with time-pieces of every variety, I would conjure you not to disfigure your cathedral with clock-faces, but to be content with chimes, which may be constructed with any degree of horological or musical elaboration.

THE BUILDING ACT.

WE published in our impression a fortnight ago the greater part of a paper read by Dr. Liddle on this subject, before the Social Science Association, and we now give the substance of the discussion which ensued.

Colonel BERESFORD, M.P., who presided, in inviting discussion, said he was glad to find himself identified on that occasion with what had been somewhat infelicitously described as "the policy of sewage." The subject which had been treated in Dr. Liddle's paper was of incalculable importance to the public health, and therefore to the national welfare, and he only wished that the House of Commons comprised a few members possessed of such experience as Dr. Liddle was able to bring to bear upon the matter.

Dr. HARDWICKE remarked that the subject was of great importance, not only as a matter of hygiene, but because it was possible that in the next year or so an efficient Building Act might

be obtained, not only for the Metropolis, as was proposed by the wretched Bill of last year, but for the whole of the country. His experience of the sanitary defects of the Building Act was pretty considerable, inasmuch as in the district for which he was medical officer of health, during the last five years there had been something like 500 houses per annum built, the majority of them on such wretched foundations as were afforded by the sites of slop-shoots. Indeed, all over London it was the usual plan for the owners of building estates to take off a good deal of clay from the surface of the ground, for the purpose of making bricks, and the place of this clay was supplied by the sweepings of macadamised roads, such refuse consisting largely of organic matter, sometimes to the extent of 15 per cent., as he had found by analysis. This organic matter was not only deposited beneath the floors and walls of houses, but was used for mixing the mortar, and so strong were these road sweepings in organic matter that in many instances the bilious matter contained in the horse-dung turned the mortar yellow, despite the lime that was used. Houses built of such mortar were really, as Dr. Liddle had stated, disease traps. The exhalations from the foundations and walls must necessarily be highly injurious, and hence it was that so soon as a new block of houses was tenanted, a fresh crop of sickness sprang up. Another frequent practice of the speculating builders was to shoot "dry rubbish" on the sites of the houses which they intended to erect. One great cause of these sanitary blunders in building was to be found in the fact that the Metropolitan Board of Works (which body had the administration of the Building Act) had not a sanitary officer to appeal to. It was a very singular thing how it came to pass that a body having jurisdiction over nearly the whole of the metropolis in the matters of drainage and sewerage had never had any special officer whose duty it should be to see that the works which the Board undertook were carried out with a due regard to sanitary science. (Hear, hear.) He had had a good deal of experience in pulling down houses under the Artisans' and Labourers' Dwellings Act, and, although that measure was capable of being made very useful by certain modifications, it was, as it at present existed, practically unworkable. (Hear, hear.)

Mr. HOLLAND said that the paper was characterised by much good sense, but he must take exception to one point. He deprecated the notion of intrusting the administration of the Building Act to the various local boards, which authorities, as Dr. Hardwicke had stated, neglected their duties with regard to the formation and maintenance of roads, &c.

Dr. LIDDLE said he only wished the carrying out of the sanitary provisions of the Act to be under the supervision of the local boards.

Mr. HOLLAND, continuing, said he thought it was exceedingly important that the whole of the buildings in the Metropolis should be under one central board or authority, whether the existing Metropolitan Board, or any similar authority. There were at present no less than thirty-nine local boards in the metropolis, and it was utterly impossible to imagine greater nuisances than were the thousands of trumpery little local boards which existed in the country; and the Metropolitan local boards were no exception. One thing that operated most detrimentally to the proper carrying out of the Act was the unsatisfactory manner in which the district surveyors performed their duty (No. no.). They pretended to do their duty in conjunction with private practice of their own; but they attended to their own private business first, and let their official business "get into a corner." (Expressions of dissent.) Twenty years ago a return was published, in which it appeared that £32,000 a year was spent in fees to these district surveyors; and he should like to know what they did in return for those fees? Where was there a worse built town than London? Was there a district in which buildings were more shamefully "scamped"? He knew of none. Did we hear from any other part of England of such dreadful losses of life by fire as continually occurred in London? No; although it was a primary duty of the district surveyors to guard against such catastrophes. They looked at the letter of law, and perhaps enforced it, but its spirit was totally lost sight of. They allowed houses to be built with mere lath and plaster party-walls. ("Not true.") In fact, it was notorious that architects and district surveyors did not understand their duties (Oh, oh!), or, if they did, they did not perform them (Oh, oh!). There was a large collec-

tion of stuffed animals at the British Museum; but one of the animals they had not was an architect with brains, and he believed it would be a long time before they got one. (Order!) If instead of the district surveyors they had proper boards, with proper medical and sanitary officers, the whole of the provisions of the Building Act would be carried out with a due regard to sanitary requirements, and if surveyors were necessary in order to see that the requirements of the Act as to construction were carried out, such surveyors ought to be required to devote their whole time to their duties, and should be paid by fixed salaries, and not by fees. Well-built and healthy houses were hardly to be had in London, even though an exorbitant price were paid. The room in which the meeting was assembled was a fair specimen of what architects provided for the community. There they were, shut up in a hole and almost gasping for air. Again, there were churches in which three passages on the ground floor and a staircase from the gallery all led to one door, which was the only means of exit for a large number of people. On the occasion of a sudden alarm of fire in such a building, thirty or forty people would inevitably be crushed to death. Look at Exeter Hall, again, with its labyrinthine passages and staircases; what would be the result of a sudden panic in the building during the performance of an oratorio? Something disastrous. Such matters as these, he contended, justified him in speaking as he had done. ("No.")

Mr. GEORGE GODWIN said he had not anticipated taking any part in that discussion otherwise than to assist Dr. Liddle in obtaining improvements in the Building Act; but after so unfounded and so gross an attack upon the district surveyors as had been made by the last speaker, he felt bound to rise. (Applause.) He had the honour to be a member of the body known as district surveyors, and he was compelled to protest in the strongest language he could command against such unwarrantable assertions as had been made by Mr. Holland. (Applause.) The district surveyors had not the power to compel builders to build properly; their duty was to see that the Building Act was carried out, and he maintained that they did this for the most part in the most conscientious manner. (Hear, hear.) There were many weaknesses in that Act, some of which had very ably been brought under notice by Dr. Liddle. One of the provisions of the Act which was especially weak was that with regard to concrete foundations, for it did not say what kind of concrete was to be used, or what should be the thickness or extent of the concrete. Very frequently the walls of a house were run up upon 6in. or 9in. of concrete of the most trumpery nature, the Act being complied with in the letter but not in the spirit. As to the ventilation of rooms, the district surveyors had no power to enforce any arrangements for this purpose; and if they had, it would be very difficult to exercise that power, considering the ignorance on the subject that prevailed among the public, and the extra cost it would entail. Dr. Liddle had dwelt very strongly upon the necessity for proper ventilation; but it should be borne in mind that it was the Metropolitan Management Act which had to do with drainage, and it was no part of the district surveyor's duty to see that the drainage was efficient. Before a man could build it was necessary that he should submit his plans to the local board, and it was the duty of the surveyor to the local board to see that all drains were properly made and connected. Dr. Liddle's paper and the discussion upon it were of especial value at the present time, and if no unfounded attacks were made upon the district surveyors, the Social Science Association might profitably keep this subject under its notice, as a new Act was in preparation, and he was informed, would be brought in very soon after the meeting of Parliament. Now was the time, therefore, to strengthen the representations which had already been made by the District Surveyors' Association and the Royal Institute of British Architects, with the view of securing as perfect an Act as possible. Most of the suggestions made in the paper had already been under the consideration of the Metropolitan Board of Works, and any temperate and judicious statements, such as those made by Dr. Liddle, would no doubt receive due attention. Mr. Holland, however, had called upon the district surveyors to do what was beyond their professional province, even if they had the power under the Act.

Dr. Ross, Medical Officer of Health for S. Giles's, corroborated what Dr. Liddle had said with regard to the 29th section of the Act, and

was also of opinion that the Artisans' and Labourers' Dwellings Act was a very useful and practicable measure if judiciously administered; but great difficulty was experienced from the fact that while a block of tenements was undergoing alteration or rebuilding, the inhabitants crowded into the previously overcrowded courts and alleys of the neighbourhood. The Act had, however, proved a great benefit in S. Giles's.

Mr. EDWIN CHADWICK, C.B., said that in his own immediate neighbourhood, although what might be called the general death rate had decreased, yet the rate of mortality was found to increase with the erection of every fresh street of houses, thus showing either that there were sanitary defects in the Building Act, or that the provisions of the Act were not enforced. Without imputing any dereliction of duty to the district surveyors, who were, to his knowledge, a most respectable body of men, he was convinced that the Act was extensively evaded. The district surveyor could not be always on the spot in order to see that rubbishing materials were not put into the buildings in his district. He concurred with Mr. Holland as to the question of administration, and he thought all business men would bye-and-bye concur with him. Wherever there was business enough to be done by one man giving his whole time to that service, that plan should be adopted.

Mr. BALDWIN LATHAM said that, as a former district surveyor, he knew that there were no more efficient public servants than were the district surveyors. (Hear, hear.) Their duties however, were entirely structural, although of course it was easy to see that the structural often, if not always, included the sanitary conditions of a building. He desired to see a good Building Act passed, applicable not only to London, but, with certain modifications, to the country at large. Great abuses existed in connection with the building bye-laws of local boards, because the speculative builders took care to secure seats at such boards. In his opinion, no builder ought to be eligible for election as a member of a local board. (Hear, hear.)

Professor DONALDSON said he agreed almost entirely with the substance of Dr. Liddle's paper, and thoroughly approved of its spirit. The Building Act certainly required amendment in its sanitary as well as in its strictly structural provisions, but it seemed impossible to prevent all the evils that had been alluded to, especially that of removing the surface soil, for this would be an interference with the rights of property. He, however, thoroughly endorsed what Mr. Godwin had said as to the unreasonableness of making district surveyors responsible for the defects of the Building Act.

Mr. SEDDON said that the evil was a growing one, and required a decisive remedy. What might not have been done had the matter been taken in hand ten, twenty, or thirty years ago? London had doubled since then, but in the most hugger-mugger, brutal way conceivable. He hoped that in the new Act some attention would be paid to the roofs, which were at present far too flimsy and thin, either as a protection against the weather, or as a precaution against fire.

Mr. Thomas Marris, Mr. Banister Fletcher, and the Chairman having made a few remarks, Mr. Liddle briefly replied to some of the points raised in discussion, and the proceedings were brought to a close by the adoption of the following resolution, which was moved by Mr. Pears, the secretary of the Social Science Association, and seconded by Mr. White:—"That the paper be referred to the Committee of the Health Department, with a view to considering the desirability of making representations to the Local Government Board in favour of the amendment of the Act."

THE NEW CAMBRIDGE PROFESSOR OF FINE ARTS.—The election of a Slade Professor of Fine Arts at Cambridge, in the room of Sir Matthew Digby Wyatt, whose term of office has expired, took place on the 30th ult., when the choice of the electors fell upon Mr. Sidney Colvin, M.A., Fellow of Trinity College. Mr. Colvin is a frequent contributor to periodical literature on the subject of the Fine Arts, and has published "Children in Italian and English Design." The stipend attached to the Professorship is about £350 per annum.

Sir J. Lubbock is preparing a bill, to be brought forward early next session, having for its object the preservation of the megalithic monuments of the United Kingdom.

Civil Engineering.

THE INSTITUTION OF CIVIL ENGINEERS.

At a meeting of this Institution on January 28th, T. Hawksley, Esq., president, in the chair, the paper read was "On Cylindrical or Columnar Foundations in Concrete, Brickwork, and Stonework," by Mr. John Milroy, Assoc. Inst. C.E. In this communication a description was given of an attempt which had been made by the author, acting partly in concert with Mr. J. W. Butler, Assoc. Inst. C.E., to render concrete, brick and stone more easily available for cylindrical foundations. After alluding to brick cylinders, which had been in use in India for centuries, and had more than once been suggested for home works, it was remarked that probably the engineers for the trustees of the Clyde navigation had been the first to adopt them in connection with a great and important undertaking. In 1869, the trustees requested Mr. J. F. Bateman, M. Inst. C.E., and Mr. J. Deas, M. Inst. C.E., to report on the best means for providing a large and progressive extension of quays, suited to the present and future requirements of the harbour of Glasgow. With a view to obtain a greater depth of water than could be had alongside the existing quays, their attention was directed to iron cylinders, and subsequently to brick cylinders. The result was that, in 1870, an arrangement was made with the author, in conjunction with the late Mr. Brassey, Assoc. Inst. C.E., to construct in brick cylinders, to some extent as an experimental work, the Plantation Quay, an extension westward of the wharves on the south side of the Clyde. After a brief introductory description of this work, the author confined his remarks to a novel manner of making the brick cylinders, to the mode of sinking them, to the form of the shoe, and to the general arrangements adopted in the execution of the work.

The Plantation Quay was founded on a hundred brick cylinders, sunk in a continuous line close together, so as to form a length of 400yds. of quay. The wells were 12ft. in external diameter, and 2ft. 4in. thick, thus having an internal diameter of 7ft. 4in. Their shape was circular, except at the points of contact, where they were formed with tongue and groove, i.e., a square projection fitting into and sliding in a corresponding recess in the adjoining well. From the bottom of a trench, which was cut down nearly to the level of low water, the cylinders were sunk about 36ft.; but the earth on the river side was removed when the sinking was completed, and dredged to a depth of 120ft. below low-water level, thus leaving a length of about 14ft. of cylinder beneath the dredged bed of the river. The cylinders were only carried up 2ft. above low-water mark; a plug of concrete was then lowered to the bottom of each cylinder, to give it a proper bearing, and to protect the rest of the filling from disturbing influences, when the cylinders were refilled with the sand and other materials which had been excavated. On this foundation, suitably prepared, the rest of the quay was built as an ordinary retaining wall.

The shoe originally specified was that common in India—a flat annular plate with, projecting downwards from the plate, outer and inner iron shells which met, and enclosed a circular wedge-shaped space. As this shoe was expensive, the author devised a shoe consisting of a short length of iron cylinder, about 4ft. 6in. deep, surmounted by an annular plate, which was also supported by radial brackets. The annular plate was about 18in. in breadth; and the bottom courses of brickwork, which were bolted to the plate, were corbelled until the full breadth of the wall was attained. Instead of constructing the cylinders brick by brick, *in situ*, as was the custom in India, the author resolved, with a view to the expeditious execution of the work, to pursue the novel course of making them in rings, in frames placed on a platform near the line of the quay, and then to put them together, *in situ*, after they had been allowed to consolidate. Close to the line of the cylinders, over which was erected a high gantry, with a steam traveller, a wooden platform was laid with a low gantry carrying a steam traveller. On this platform the rings were moulded in frames, which were constructed of wood in four sections bolted together. Annular layers of wood were fixed to the platform, in such a way that their outer edges might keep the frames in place, while their inner edges served as guides in shaping the eye of the rings. When a ring had been built up with bricks and Portland cement and had partially set, the frame was removed, and the ring, which weighed between 9 and 10 tons, was allowed to stand a few days to consolidate thoroughly. When the ring had become thoroughly indurated, it could be removed by means of the travellers and a line of rails, either to be fixed in place or to be stored up for future use.

The sinking of a cylinder thus constructed was effected by means of the Milroy Excavator, a description of which had already been read before the Institution. The ground through which the cylinders were sunk consisted principally of sand.

but the first three cylinders were impeded by old piles and tie-rods; about a dozen cylinders in the centre of the line encountered a bed of rotten sandstone, from 2ft. to 7ft. thick, and a nest of boulders, which were frequently met with throughout, had to be brought up in sinking the last ten cylinders. The whole of the one hundred cylinders were sunk between the months of August, 1870, and January, 1872, but from that period a large deduction should be made for those occasions on which the sinking was wholly or partially suspended.

The causes already referred to, and the unavoidable jamming of the cylinders, rendered very heavy weighting necessary. A load of 7cwt. per superficial foot of frictional surface was required; and to provide for this load, 900 tons of cast-iron weights were kept on the ground. The weights were circular, of the same diameter as the wells, 5in. thick, and each weighed about 5 tons. A heavy load could thus be piled up in a small space, and at the same time there was no risk of the load tilting the cylinder by unequal distribution, as was often the case when rails or pig-iron were used. In sinking the last few feet the usual load was sixty-two iron rings, or 810 tons, which with the weight of the shoe and brickwork (120 tons), made 430 tons as the load necessary to overcome friction.

Such was the system pursued by the author in making and sinking the cylinders of the Plantation Quay. The use of frames in the manner described was found to secure straightness and uniformity of size, a reduction of the external friction by a smooth surface, and an avoidance of confusion in the line of the cylinders. The chief advantage, however, was in the decided increase in the rate at which such a work as a quay wall could be executed.

In practical construction, concrete differed from brick cylinders only in this, that they must be made in frames or moulds, and that an internal as well as an external frame must be used. In choosing between them, the question was chiefly one of expense. When their relative cost was equal, concrete was perhaps to be preferred, as the process of mixing the concrete and filling the frame was so simple that it could be carried on, under proper surveillance, with unskilled labour. In this connection, mention might be made of the application by Mr. J. W. Butler of Mr. Ransome's artificial stone "apenite," on the same system as that employed by the author. Having conceived the idea that it was admirably adapted for the construction of cylinders, he made and sank, in 1871, at the Hermitage Wharf, on the Thames, some experimental cylinders with complete success. They were 8ft. in diameter, and 9in. thick. The courses or rings were moulded in frames, and were cemented together with the mixture of which they were composed.

From such illustrations, it was evident that by the use of frames or moulds, not only might the old form of brick well be constructed more quickly and satisfactorily, and concrete and other materials be made available for cylindrical foundations, but every variety of form might be produced, suited to every variety of construction and of situation. Without pausing on the different modifications, the author drew attention to a further extension of the system, suggested by the difficulty experienced in sinking loose cylinders in lines or groups. The difficulty was to a great extent overcome—1st. By forming combinations of cylinders, incorporated with or moulded into each other, and sinking them together; and, 2ndly. By so shaping them that a number of combinations could, if necessary, be tied into each other in a simple and efficient manner after they were sunk. The most satisfactory way in which a combination might be produced was by incorporating two, three, or more cylinders, so that their contours overlapped each other; and the combinations might be simply interlocked by producing at the points of contact a space or hole, which could be excavated and filled with concrete. Illustrations of such arrangements for the foundations of quay walls were given and explained.

In conclusion, the author directed attention to the advantages which non-metallic cylinders possessed in comparison with iron. The principal one alluded to was that the first expense at present prices was much in their favour, with this important difference: an iron cylinder was after all nothing but a skin to which a weight-bearing body or lining must be given; whereas brick and concrete wells were themselves capable of sustaining considerable pressure. In short, iron cylinders, besides being dearer, must, when sunk, receive at least a lining, which it was evident could itself be sunk without the costly addition of the metallic skin.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

(FROM OUR OWN CORRESPONDENT.)

A REGULAR meeting of this Society was held at its rooms in New York on January 8th. A paper by Charles B. Richards, M.E., of Hartford, Conn., recording "Experiments on the Resistance of Stones to Crushing," was read.

The specimens tested were old and dry samples, well selected, of various American building-stones, worked into 1 and 1½ in. cubes, with flat and smooth faces.

The testing machine used was built, after a long experience, with two smaller and similar machines. It is arranged to weigh the strains upon a sensitive platform scale of 50 tons capacity, and is well adapted to quickly give accurate results.

The specimens were crushed between the plane faces of two hardened steel hemispheres, the curved portions of which were seated in corresponding cavities of steel blocks fixed in the machine. Single thicknesses of "lace" leather were interposed between the stones and metal surfaces: thus the pressure was uniformly distributed. It was in all cases applied to the faces of the cubes parallel to the natural bed of the stone, and carefully increased to rupture by pouring shot into the hollow weight by which the strain was caused.

Tables were presented, giving the minimum, mean, and maximum resistance to crushing per square inch of the specimens tested. 16 specimens of granite from 6 quarries gave from 8,620 to 15,622 pounds, minimum; 9,838 to 18,778 pounds, maximum strength; and 10 specimens of white marble from 3 quarries, gave from 3,905 to 12,917 pounds, minimum; and 5,976 and 13,972 pounds, maximum strength—each being 1in. cubes.

The specimens failed by breaking up into slender prisms and pyramids, with axes normal to the pressure.

A brief paper by F. Collingwood, C.E., of New York, upon "Rock Drilling" was also read.

In it was stated that a percussive steam drill with 3in. cylinder and 6in stroke, making 300 to 375 strokes per minute, would drill in the coarse gneiss rock, common on New York Island, 1½ holes, 3in.; 1½ holes, 4½in.; and 1in. holes, 5in., per minute.

Joseph P. Davis, C.E., of Boston, Mass., compared the late Chicago and Boston fires, and suggested a question for discussion, and one on which information is much needed—namely, Fires and their Management: the best Appliances and Methods for Putting them Out.

Upon the motion of M. N. Forney, M.E., of New York, a committee consisting of Messrs. Ashbel Welch, of Lambertville, N.J., John Griffin, of Phoenixville, Pa., Max. Hjortzberg, of Chicago, Ill., and two others to be named by the chairman, were appointed to make an investigation, by means of a circular of inquiry sent to each member of the Society, and by such other methods as the committee may choose to adopt, to determine the following points:—

- 1.—The best form for standard rail sections for the railroads of this country.
- 2.—The proportion which the weight of rails should bear to the maximum loads carried on a single pair of wheels of locomotives or cars.
- 3.—The best method of manufacturing and testing rails.
- 4.—The endurance, or, as it is called, the "life," of rails.
- 5.—The causes of the breaking of rails while in use, and the most effective way of preventing it.

The committee to report the results of their investigations at the next annual convention of the Society.

THE NEW LAMBETH WORKHOUSE.

ON Saturday afternoon last about sixty of the members of the Architectural Association visited the new Lambeth Workhouse, which has been erected on a site, formerly vacant, extending from Renfrew-road, Lower Kennington-lane, to Pleasant-place, St. George's-road, on the very confines of the parish of Lambeth, and within a few yards of the Newington boundary. The workhouse has been erected to accommodate 800 inmates, and to afford relief to between 700 and 800 out-door paupers—there being a very large out-door poor in the parish. The buildings occupy a site 9½ acres in extent, and the foundation-stone was laid on the 3rd April, 1871. The principal entrance will be in the Renfrew-road, adjoining the new Lambeth Police-court. Two porters' lodges are provided here—one for the day porter and the other for the night porter. The members having assembled at this entrance, they were conducted over the buildings by Mr. Aldwinckle,

* 14 specimens of sand-stone from 3 quarries gave from 5,806 pounds minimum, and 8,956 to 10,928 pounds maximum strength.

one of the architects from whose designs the works have been carried out. The main entrance to the administrative department is in the centre of the indoor or residential part of the workhouse, nearly opposite the Renfrew-road gateway, and is somewhat Oriental in character, consisting of three horse-shoe arches supported on rather slender cast-iron columns with ornamental capitals. In the upper part of this block of buildings is the chapel, light to which is admitted at one end by some large windows over the main entrance. On the ground floor of this block are the masters' and matrons' apartments (provision being made only for married officers), and the master's office and parlour are so arranged that from either he can command a full view of the entrance, and see who or what passes in or out at the gate. Other offices are also provided on the ground floor of this block, including a good-sized room which has been set apart as a visitors' room, where the inmates can see their friends when they call. Adjoining this block on the ground floor are two large dining halls, top-lighted, 61ft. by 43ft. each, one for men and one for women, and capable of seating 400 diners each. These dining halls adjoin each other, but are divided by a brick wall, having an open arcade near the roofs, which are of iron, and distinct for each hall. Each dining hall has direct communication with the kitchen by a large hatch. 21in. of seat and table is allowed to each person, and the distance between the back of each seat and the front of each table is 2ft. 11in. The heating of the dining halls, chapel, and other large apartments, such as the waiting hall for out-door paupers, is to be effected by hot water apparatus. The kitchen is large and spacious, and lighted from the roof, which is of iron. One of Benham and Sons' large kitcheners is provided, in addition to a special apparatus on a principle somewhat analogous to Captain Warren's, whereby a leg of mutton, for instance, is cooked in its own moisture only, with a loss of not more than about 5 per cent. in weight, whereas on the ordinary plan of boiling in water the loss is something like 25 per cent. This apparatus cost £250. The kitchen supplies both dining halls, to which it has access by separate hatches. Adjoining the kitchen are a scullery, crockery store, and other offices and stores. Large and well-lighted sewing rooms are provided in this block for the able-bodied women of good character, who will be employed in making up clothing. It may here be stated that the new Lambeth Workhouse is to be, with the exception of aged people,* entirely an "able-bodied" workhouse, there being no sick or children. So stringent was the Local Government Board on this point, that they would not allow of any provision for a medical officer being made in the architect's plans. It is intended, also to adopt a thorough system of classification of the inmates, who will be divided into good characters, bad characters, and "worse" characters. The portions of the building devoted to the bad will be shut off from the parts occupied by the "good" by iron gateways, while the "bad" and the "worse" will have separate dayrooms and dormitories; this applies to both sexes. The chapel measures 60ft. by 45ft., is sufficiently lofty, and has a light and simple hammer-beam roof. Sittings are provided for 500 inmates, the males on the one side and the females on the other, 18in. of space being allowed for each person. The seats have backs. There is no gallery. The chapel is well lighted by windows at both ends. A rather ungainly rostrum at present occupies the space immediately in front of the altar, and will effectually hide the latter from a very large number of the worshippers if the Guardians insist on retaining it in this position. The chapel will be lighted at evening service by three coronæ on each side, suspended from the hammer-beams. The visitors next proceeded to one of the dayrooms for 100 able-bodied women of good character, one of the residential blocks being taken as a specimen of the remainder. This dayroom has four large tables, and six fire-places, and fixed seats run round each of the day rooms, although chairs will also be used. A dayroom 68ft. by 36ft. for 50 women was next visited. The height of the dayrooms is 12ft. throughout; the Poor Law Board wished to reduce it to 10ft. The construction of the walls and ceilings of the rooms is not concealed. The walls are left of naked brickwork, colour-washed, and the rolled iron central joists and their supporting columns are painted and left exposed. The floors of the

* Separate sleeping rooms will be provided for a limited number of old married couples.

rooms are of $1\frac{1}{2}$ in. stuff, iron-tongued. These floors were chosen by the architects as being stronger than fire-proof floors—at all events very much more rigid. Cold air will be admitted to the dayrooms and dormitories through gratings in the floor (opening by means of keys), and the vitiated air will pass away through perforated zinc panels in the ceiling, communicating with metal-lined vitiated air passages between the joists and passing into the chimney flues, this ventilation being accelerated at night, when it will be most needed, by star burners beneath the perforated zinc panels, the star burners being surmounted by enamelled iron gas-hoods, pendent from the ceiling by means of central tubes which carry off the products of combustion into the vitiated air channels before named. Independently of this means of ventilation, however, there are fresh air inlets and foul air exits arranged alternately every few feet apart near the tops of walls; these were insisted upon by the Poor Law, or, as it is now called, the Local Government Board. Cisterns are provided on each floor, in order to reduce the pressure on the valves, but there are large tanks on the top of each building which supply these cisterns, and on the top of the central tower. The closets in connection with the dayrooms are out of doors. Ascending to one of the dormitories, 68ft. by 36ft., the visitors found that provision had been made for four rows of beds, a stout wooden partition 5ft. or 6ft. high running laterally down the centre of the room; the two middle rows of beds will be placed head to head, with the partition between the heads, the two outer rows of beds being placed with their heads against the walls. The beds will be 2ft. 6in. wide, and will be 4ft. from centre to centre, thus leaving a space of 18in. between each bed. The closets are placed at the ends of the dormitories, although shut off. All the closets are provided with water waste preventers, in accordance with the new water regulations, although the workhouse water supply will not be obtained from a company, but from an artesian well on the premises. The visitors next proceeded to the laundry, where powerful machinery has been fitted up. The boiler-house and engine-room were then inspected. The boilers are two in number (one being in use at a time), and are of the variety known as "Howard's Patent Safety." The engine is by Robinson, of Rochdale, and is of 30 (nominal) horse-power, having both high and low pressure cylinders, rendering it practically two engines. The well is in the engine-house. The well proper is 115ft. deep, and 5ft. in diameter, and there is in addition about 250ft. of boring, the boring pipe being 12in. in diameter for some depth, then 8in. until the chalk is reached, where there is no pipe, the chalk being simply bored. The drying closets are very extensive and complete, the "horses" being of galvanised iron, and the closets are heated by steam. Having examined the corn-mill (where will be ground all the corn used on the establishment), the visitors inspected the wood-chopping shed, stoneyard, and one or two other minor departments, and then proceeded to the Official buildings, which comprise board-room, committee-rooms, clerks' offices, and a large waiting-hall for out-door paupers, 80ft. by 30ft., the elegant yet simple open wood roof of this hall—which is constructed on the same principle as the roofs to the annexes of the Exhibition of 1862—being much admired. At one end of this waiting-hall is a separate entrance for out-door paupers, and at the other end the store for the food to be distributed to the applicants. On one side of the hall is the distributor's office, semi-circular on plan, and around it runs the passage for access, 9ft. wide; arranged around the semi-circle on the outside of this passage are small offices for eight relieving officers. The partitions on each side of the passage are glazed. By this means a check is had upon both the recipients of relief and the relieving officers, and in this way a difficulty, which was one of the conditions of the competition, has been overcome very satisfactorily. It remains to be said that the workhouse is built upon what may be called the pavilion system, communication being had between the blocks by enclosed and window-lighted corridors on the ground floor, and covered but open-sided corridors on the first floor, there being, of course, doors at each end of the first-floor corridors. The ground-floor corridors are paved with slabs of Valentia slate, with tile borders; while the floors of the corridors above are of Phillips's patent fire-proof construction, covered with Portland cement. The board-room is a handsome apartment, 34ft. by

23ft.; and the table is in the form of a horse-shoe, round the outer edge of which the Guardians will sit, there being a small slightly-raised dais in the centre of the horse-shoe, as it were, on which applicants for relief coming before the Board will stand. The whole of the works are practically completed, with the exception of the engineering work, which is the most backward; but the building will be ready for occupation on the 25th of March, on which date the Guardians will take possession. The general facings of the walls are of stock-bricks, with red and black strings and dressings, the springers and some other features being in Bath stone. The board-room was the last portion of the building visited, and here a considerable stay was made, for, to the visitors' surprise and delight, the horse-shoe table referred to was set out with some very substantial creature comforts for them, provided by the kindness of the architects, Messrs. Parris and Aldwinckle. Mr. Aldwinckle, who presided (in the absence of Mr. Parris through ill-health), proposed as the first toast, "Success to the Architectural Association," coupled with the name of Mr. J. Douglass Mathews, the President.

Mr. MATHEWS, in responding, said that he thought one very good proof of the Association's success was to be found in the fact that a member of the Association (Mr. Aldwinckle) was joint architect of the important and well-planned series of buildings which they had just been over. (Applause.) He concluded by proposing the health of the architects, Messrs. Parris and Aldwinckle, and expressed the thanks of himself and the visitors present for their kindness in allowing the buildings to be inspected, and for their hospitable entertainment. (Applause.)

Mr. ALDWINCKLE, in reply, said that he thought he could not do better than give some general account of the building. He said it was now more than three years ago since some fifteen architects were invited to compete for the erection of these buildings. The plans were adjudicated upon by Mr. Henry Currey, the architect of St. Thomas's Hospital, who decided in favour of their (Messrs. Parris and Aldwinckle's) designs. Twelve months elapsed before the contracts were signed, owing to the large number (40) of contract drawings which had to be prepared, and to the time which it took to take out the quantities. Since the contract had been signed everything had gone on smoothly, and the Guardians (and particularly the Building Committee) were extremely well pleased—so much so, indeed, that they had taken the somewhat unusual course of entrusting the carrying out of the fittings to the architects, and had commissioned them to buy the whole of the furniture, leaving the matter entirely in the architects' hands. (Applause.) The contract amount was £44,390. Subsequently, however, it was found necessary to raise the building, owing to the entrance being rather lower than the level of the surrounding neighbourhood. This necessitated an extra outlay of something like £1,600. The Building Committee entrusted the architects to get the engineering work done. The amount of the engineering contract for the laundry and cooking apparatus was £3,500; the contract for the mill, £500; and for the engines and boilers, £1,500. The contract for the fittings was £3,500. The architects were also asked to enclose some surplus ground belonging to the Guardians at a further cost of about £1,000, thus bringing the total cost up to about £61,000, exclusive of furniture. In concluding, the Chairman proposed the health of the builders, Messrs. Crockett, Dickenson, and Oliver, who had carried the works out in a most satisfactory manner. (Applause.)

Mr. OLIVER having responded,

Mr. ALDWINCKLE explained that there was no partnership between himself and Mr. Parris in the ordinary sense of the term; they were simply acting jointly with regard to the designing and carrying out of these buildings. Mr. Parris, however, being unable to attend to the details of the work himself, had deputed his principal assistant (Mr. Wright) to act with Mr. Aldwinckle in the matter, and Mr. Wright had acquitted himself of a most delicate task in a highly creditable and able manner. He therefore proposed "The Health of Mr. Wright." (Applause.)

Mr. WRIGHT responded, and concluded by proposing the healths of the Hon. Secs. of the Association, Messrs. Paice and Clarkson, who both briefly acknowledged the compliment.

Mr. ALDWINCKLE, in proposing "The Press," said that to the Architectural Press, and espe-

cially to the BUILDING NEWS, the Association must feel deeply indebted for the time and attention bestowed in reporting its proceedings so fully and so well. (Applause.) The recent BUILDING NEWS competitions evinced great public spirit on the part of the proprietor, and could not fail to be of great benefit to the profession generally, and not merely to the younger members of it. (Applause.) Those competitions were eminently successful, and he hoped that the Association included within its ranks some at least of the authors of the premiated designs. (Applause.) With the toast he coupled the name of our representative, who briefly responded.

Other toasts followed, the proceedings being agreeably enlivened by the singing and humour of a Mr. Hunter, who is proposed as a member of the Association, and who cannot but prove a great acquisition to the Association on all festive occasions.

We hope shortly to give a plan or plans of the buildings.

ON RENDERING WOOD INCOMBUSTIBLE

A FORTNIGHT ago we briefly called attention to the paper read on the 22nd instant before the Society of Arts, by Mr. D. O. Macomber, on rendering wood incombustible. The following is a detailed statement of the means by which he attains his end:—

When a tree, taken in its live and growing state, is cut down, the process of evaporation or seasoning commences. At this time all the pores of the tree are distended, and at certain seasons are full of sap. To expel this sap from the pores while the log is in its natural state, and to introduce the substance which will render the wood for ever incombustible, is now the desideratum.

All timber in seasoning "shrinks," or is contracted. This is entirely owing to the expulsion of the water from the sap-tubes, and the consequent contraction of the walls of these tubes. When the water is expelled by evaporation, if it has contained any substance held in solution, a portion of that substance will be left as a deposit upon the walls of these sap-tubes or cells. If this substance is of an incombustible nature, although it were so thin as to be invisible to the naked eye, yet, as it is equally spread upon both sides of each partition of the tubes or cells, it renders the entire log, and consequently every plank, board, or lath cut from the log, incombustible.

After the sap-tubes have been emptied of the moisture which has been the sustaining aliment of the tree, and they have collapsed, or nearly closed up, no immersion in liquid, even though it should be kept at boiling point for an indefinite length of time, will thoroughly and uniformly permeate the wood so that the centre of a log or plank will be as perfectly saturated as the outside.

The following is the manner which Mr. Macomber has adopted for the purpose of expelling the natural sap or moisture from the green timber, and introducing the liquid which will render such timber for ever after incombustible. At an elevation of about 40ft. above the log, he has a reservoir containing, say, 500 gallons, with a depth of liquid of at least 8ft. From this reservoir a 2in. pipe descends perpendicular to the log. The log, which is double the length of the boards intended to be cut, is sawn nearly in two, transversely, at its centre, leaving a strong "curb" or joining piece on the underside—not cut through. By raising the centre with wedges, or a screw, this transverse cut will be opened, mostly at the top, but partially down to the bottom. Into the cut a cord or wire is introduced, prepared for the purpose, and laid around the cut just inside the bark of the log, bringing the ends together, to meet at the top. By removing the wedges, or turning the screw down, the two ends of the log will close again tightly, with the exception of perhaps a sixteenth of an inch, according to the size of the cord or wire, which is held so tight as to prevent the escape of any liquid.

A hole is then bored on the top of one of the logs, towards the cut, at an angle of 45 degrees, so that it will fit just into the cut, and into this is introduced the bottom of the vertical tube which is connected with the reservoir above, the tube being diminished in size at the bottom to allow it to fit tightly into the bore, which reaches the cut just inside the cord at the top. When ready, the stop-cock at the top of the tube is opened, and the full pressure of the 40ft. of liquid allowed to flow into the pipe. The space at the ends of the two logs is instantly filled, and the pressure is

very great, forcing the liquid into every pore of the timber each way alike. In a short time the natural sap is forced out of the ends of the log, and is followed by the prepared liquid, which is equally limpid. As soon as the latter begins to appear at the ends, a process which takes but a few hours, the process is ended, the preparation is shut off, the logs are divided, and are then ready to be sawn into boards, joists, laths, &c., and the stuff will season in the usual way. Mr. Macomber asserts that the weight of the timber is very little increased as compared with other stuff not prepared. But the whole of the timber is thus permeated from centre to circumference, and will not blaze at any amount of heat to which it may be exposed.

With regard to the effect this process will have upon the durability of timber, Mr. Macomber thinks there are the strongest reasons for believing that it will protect from all decay by moisture, fungus, or salt water. Of one thing he is certain—timber prepared in this way will never be attacked by worms or borers; and the white ant, so destructive to timber in warm climates, will not touch it. The importance of this, in relation to ship-building, is second only to that of the impossibility of its destruction by fire.

There are three substances which, combined in proper proportions, are used for preparing the timber, but, as he has not patented his process, Mr. Macomber did not state what they were. Seasoned timber of any kind cannot be rendered incombustible, but can only be partially protected by immersion. Any wood, even when fully prepared, can, if steadily exposed to a high heat, be carbonised; but it cannot be fanned into a flame. With regard to the cost of the process, Mr. Macomber thinks that, on a large scale, all woods may be rendered incombustible at an increase in price of about 20 per cent.

In replying to the discussion that followed the reading of his paper, Mr. Macomber stated that the adoption of his process would not add more than $2\frac{1}{2}$ per cent. to the weight of the wood, and that it would not discolour it, or offer any obstruction to tools in working.

Building Intelligence.

CHURCHES AND CHAPELS.

FAULHOUSE.—A new (Roman) Catholic church, at Faulhouse, N. B., is approaching completion. The building is in the Early English style, and consists of nave and sanctuary, with vestry and choir gallery. The main entrance is in an end gable. Over the doorway is a neatly tracered circular window, and on each side of the door is a double lancet window. It is proposed to erect a belfry and spirelet over the apex of this gable. The side elevations have buttresses and lancet windows, and the roof is open to the ridge. The plans are by Messrs. W. and R. Ingram, Glasgow.

NEW ROMAN CATHOLIC CATHEDRAL, LONDON-DERRY, IRELAND.—This edifice, the foundation-stone of which was laid twenty-one years ago, is now almost completed. The primary object of interest in the interior is the high altar and chancel, seen to great advantage under the subdued light from the great arched eastern window. The chancel is cut off from the aisle by a massive and artistically-wrought railing, surmounted by a binding of richly-veined white marble. The high altar is of Caen stone, and presents a rare specimen of exquisite sculpture. On either side is a smaller altar, both of which are elaborately carved, and of Caen stone also. The whole three are relieved with pilasters and dressings of Galway and Cork marbles. The pulpit is of stone, the same as the altar, and struck out in panels carved in relief. The pointed roof, almost lost to the sight in its height, is supported on a double series of massive stone pillars. The gas-light brackets are of coloured foliated brass. The organ, by Telford and Telford, of Dublin, cost £15,000.

BUILDINGS.

CITY FLOUR MILLS.—The plans for rebuilding the City Flour Mills are now complete. The estimated cost of restoring the fabric and the machinery to their original status is about £40,000, nearly the whole of which falls upon the insurance companies. It is said to be the opinion of some of the experts who have investigated the circumstances of the fire that sufficient precaution was not made in the original building to

prevent a fire in one floor spreading to the other. The hatchways at the stairheads were of wood instead of iron, and the casing of the machinery was of the same combustible material. There appears to be some reason to fear that the same error may be committed in the reconstruction of the building.

MIDDLESBROUGH.—The erection of commodious buildings for the "Erimus" Club, is to be immediately proceeded with, at a cost of £2,500, from the plans of Messrs. Weatherill and Moses, architects, Stockton-on-Tees, whose designs were selected in a limited competition. This club derives its name from the motto in the Middlesbrough coat of arms, "Erimus."

SCHOOLS.

BRISTOL.—The new schools for the parish of S. Simon, Baptist Mills, were opened last week. The building consists of a girls' and an infants' schoolroom, with class-rooms and offices. It is constructed of red brick with stone dressings, is surrounded by a spacious playground, and has been erected by Mr. J. P. Stephens, of York-street, from the designs of Messrs. Medland and Son, of Gloucester. Accommodation has been provided for two hundred girls and two hundred and fifty infants. The cost of the undertaking, including the site, has been about £1,800.

LISS, HANTS.—These new elementary schools for the District School Board are now completed, and were opened on the 4th January last. They are erected for 170 scholars, consisting of mixed school for boys and girls, 32ft. by 20ft.; class-room, 20ft. by 14ft.; and infants' school, 18ft. by 20ft.; with porch, cloak-room, masters' residences, and complete offices. The entire cost was £1,120, including boundary walls round about half an acre of ground. They are built of local stone and coloured brick, and are completely fitted up. Mr. S. T. Woodburne, of Liss, was the builder; and Mr. Thomas Rook Maples, of Queen's Chambers, Chapel-street, Bedford-row, London, W.C., the architect.

LIVERPOOL.—New National Schools in connection with the Church of S. Paul, North Shore, Bootle, near Liverpool, were formally opened on Wednesday evening, Jan. 29. The buildings consist of boys', girls', and infants' schools, with proper class-rooms, cloak-rooms, &c.; are fitted with lavatories, and all conveniences, and have been built in accordance with the Privy Council regulations. Dimensions:—Two boys' schools, 66ft. by 18ft. and 51ft. by 18ft.; boys' class-room, 18ft. by 14ft.; girls' school, 77ft. by 18ft.; girls' class-room, 18ft. by 14ft.; infants' school, 64ft. by 24ft. The buildings have frontages to S. John's and Brasenose-roads. Externally they are of plain brick, relieved by coloured bands, patent arches, and red stone sills. Internally the walls are pointed, lime-washed, and then painted three coats oil, to a height of 5ft. above the floors. All internal wood-work is stained and varnished. The fittings are of pitch pine, varnished. Architects: Troughton and Prescott, Cambridge Chambers, Lord-street, Liverpool. Contractors: Borough and Son, Leycester-street, Liverpool. Amount of contract, £1834; to hold, say, 650 children—230 boys, 150 girls, 270 infants.

LONDON.—At the meeting of the London School Board on Wednesday, Mr. C. Reed, M.P., reported that the Works Committee had obtained 12 tenders for the erection of schools on the site in Battersea-road for 899 children. The highest was £8,748, and the lowest £6,728. The lowest had been revised, and the estimate now presented was £6,728. For the erection of a school on the site in Olga-road, Hackney, there were 13 tenders, and the lowest was £6,628, the highest being £8,302. Tenders had also been made for excavating for the foundations of the new offices and making the main drain. The highest tender was £885, and the lowest £617. The committee recommended that the lowest tenders should be taken, and he moved accordingly. The motion was carried.

NEW ELEMENTARY SCHOOLS, GRAYS, ESSEX.—The above schools, erected from the designs of Mr. Thomas Rook Maples, of Queen's Chambers, Chapel-street, Bedford-row, London, W.C., are now complete. They are built of stocks and red bricks, in a plain and substantial style, for 350 children (with complete offices and two residences), for the Building Committee. The builder's estimate was £1,750, but this was reduced to £1,550, which will include the cost of boundary walls. The schools are one story in

height, and consist of girls' school, 20ft. by 44ft. in centre; boys' school, 48ft. by 20ft. (which can be thrown into girls' school by means of folding-doors when required) at a right angle to centre of same; and infants' school, 52ft. by 21ft.; class-rooms at back, with the residences (which are two stories in height, with cellars, &c.) respectively at ends of boys' and infants' schools. The site is square, and half an acre in extent.

NORWICH.—S. Miles' Schools, Norwich, built from the designs of Mr. J. B. Pearce, have been opened. The style is Gothic, and the schools are of red brick with white stone dressings. Each school-room is 80 feet by 20 feet, the lower room being 15 feet high, and the upper room 11 feet to wall plate, and open to the ridge. Attached to each room is a convenient class-room, measuring 14 feet by 20 feet. The rooms are lined to the height of 4 feet with dado boarding. On the ground floor there is accommodation for 200 infants, and on the first floor for 200 girls.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—J. M.—P. S. D.—A. S. G.—Severn.—S. B. C.—E. M. B.—T. C. S.—E. T. C.—Country Assistant.—W. H. T.—J. P. S.

AN esteemed correspondent suggests that the BUILDING NEWS should give illustrations of the recently-built pilgrimage churches of La Salette and Lourdes, as interesting contributions to the history of modern architecture. We would gladly do so if any one would inform us how we could get the necessary drawings.

E. H. T.—See Mr. Roper's and E. W. Godwin's communications elsewhere. You say that if this policy of publishing the real authorship is continued, many architects "will tremble in their shoes." Let the truth be told, whoever may tremble. Be just and fear not. You say that "more than one architect is execrating the BUILDING NEWS for ventilating the question so unscrupulously." We are sorry for it, and will endeavour to be resigned to our fate.

Correspondence.

EDINBURGH CATHEDRAL COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—I should have preferred the discussion as to the authorship of the design submitted by Mr. Ross for the Edinburgh Cathedral to have passed without rendering it necessary for me to take part in it. Your having, however, asked for a statement from me, and in the face of so much correspondence, I have no alternative but to state exactly my connection with the work, which I trust will be sufficient to close a discussion calculated to do so much personal injury—not only to Mr. Ross and myself—but to the profession generally.

I saw Mr. Ross in London for about an hour, by appointment, as already stated, never having seen or heard of him before, during which time we made all preliminary arrangements; and I think I remember Mr. Ross making a sketch of a plan. It was, however, very slight, and could not have taken him two minutes. Whether or not the sketch in any way resembled the finished draw-

ing, I cannot now say, not having since seen it. The following morning I met Mr. Ross at his hotel, in order to accompany him to various London churches. He then showed me various photographs and sketches, of a *very late*, mostly Flamboyant, style of architecture; but whether the latter were original, or simply transcripts of old buildings, I cannot sufficiently remember, for I was not at the hotel twenty minutes, nor did I take any notes or drawings with me.

A few days after this interview, and upon my own responsibility—for I had no instructions from Mr. Ross to do so—I made a very rough plan, and from that plan made an eighth scale pencil-drawing of the west front, together with a bay or so of the nave, and other details. A few of my personal friends saw me at work upon the drawings, for I had them under consideration some time, and I also showed them to Mr. E. W. Godwin, with whom I then had the advantage of working, who admired and remarked upon them. A few days before I went to Inverness I sent these drawings to Mr. Ross, and upon my arrival he showed me several drawings that were prepared by himself or under his direction. These were also of a *very late* style of Gothic architecture, and were at once put aside, and the drawing I made in London brought forward and discussed. Mr. Ross having to leave for some days, and I having well studied my drawing, I set to work and copied it in every detail, the first set of drawings made being simply the working out of third design without alteration.

I had, however, before completing the first set of drawings, to leave, owing to pressure of work in connection with a London architect, and during my absence notice came extending the time for sending in the Cathedral designs, and allowing £20,000 more for the building. This, of course, necessitated an entirely fresh set of drawings, and on again setting to work, I copied for the second time the west front, without alteration in design, but improvement in drawing. The other drawings were also copied in spirit, with the introduction of more delicate detail and enrichments rendered possible by the extra outlay.

I had very excellent assistance from Mr. Ross's principal draughtsman, Mr. Robertson, who drew the north elevation and cross section from my drawing, and after I left, I believe, the entire east elevation. During the last week I had the assistance of another of Mr. Ross's draughtsmen, Mr. Mackintosh, who drew and lined in the plans for the other drawings.

The whole of the work—with the exception of the pencil-drawing I made in London—was done at Mr. Ross's private residence and under his supervision.

I think I have now given a true history of the whole affair—open, of course, to Mr. Ross's correction.

I cannot, however, conclude without acknowledging Mr. Ross's exceptionally straightforward and gentlemanly bearing towards myself whilst working for him, and to deny most strongly that I have in any way been instrumental in circulating this rumour that has been so long afloat; and when I found that Mr. Ross had denied assistance, I wrote then and asked him to acknowledge, in some *slight way, help from me*—seeing clearly that such acknowledgment was necessary to put matters straight, and not from any wish of my own to connect myself publicly with the work. I was too thankful to Mr. Ross for having given me the opportunity of working upon such a building.

I have done no more for Mr. Ross than I have done for others, nor has Mr. Ross acted differently to the majority of London and country architects, and it seems unjust and unfair that he should be thus treated as a "scapegoat" in order to expose a practice that is thought by

some to be prejudicial to the interest of Art, but that has always prevailed.—I am, Sir, &c.,
GEO. FREETH ROPER.

7, S. James's-place, S.W.

[Between the statements in the above letter and those in Mr. Ross's letter, three weeks since (see BUILDING NEWS, p. 91) there is essential and irreconcilable antagonism. The main allegations of the two letters cannot be true. Mr. Ross, in that letter, wished the world to believe that he, and he alone, was the author of the designs for the Edinburgh Cathedral, and that he only procured a draughtsman's assistance in preparing them for competition. Judging from the evidence which has come to us from various quarters, and from Inverness included, the design for the Edinburgh Cathedral with the motto "Fidelitas" was not Mr. Ross's either in foundation, spirit, or physiognomy. But in order to dispel all illusion in the matter, let Mr. Ross submit his original sketches to a competent and disinterested architect—say, for instance, Mr. Christian, who was consulted by the Trustees of the projected Cathedral. A similar suggestion has been simultaneously made by Mr. E. W. Godwin and by an Edinburgh architect, in our impression to-day. In fact, Mr. Ross and Mr. Roper having spoken, this is about the only thing that can now be done. If Mr. Ross objects, judgment will go by default.—Ed.]

SIR,—In common with many others, I am not a little disappointed with the very meagre reply of Mr. Ross to the letter of "Cui Honor Honorem."

Mr. Ross's first letter is intended to convey the impression that the entire work in connection with his design was done in his own office and by himself, aided only by such assistance as one is entitled to make use of. The letter of "Cui Honor Honorem" has now forced him to admit that designs were prepared in London by an accomplished artist, and based upon no fuller information or assistance than one frequently receives from a client who can, or fancies he can, use his pencil, and has some acquaintance with the leading examples of the ecclesiastical architecture of the middle ages. The rumour that Mr. Ross is not the author of the design submitted by him is not confined to London; it is prevalent in Scotland, and has been the cause of much talk among those acquainted with Mr. Ross's executed designs.

It was reported here that, pending the decision of the Walker Trustees, Mr. Ross was questioned regarding the authorship of his design, and that in order to prove that it was his, he would produce his original sketches. Mr. Ross should now do so, and at the same time produce evidence, from some of his executed designs, that he is really entitled to claim the entire credit of the design submitted in his name.

I enclose my card.—I am, Sir, &c.,

AN ARCHITECT.

Edinburgh, 3rd February, 1873.

PURCHASED PLUMES.

SIR,—I am glad, for the honesty and truthfulness of the architectural profession, that the question of the authorship of Mr. Ross's designs for Edinburgh Cathedral is being sifted, and which ever way the case ends, some good may be expected to come of drawing attention to what is, I fear, a not very uncommon proceeding. What would be thought of a similar course of dealing in painting?

Let us suppose that a young or indifferent artist, having received an order for a portrait, went off to some eminent painter, struck a money bargain with him, not only for the benefit of his advice, but for the use of his brush, and then coolly exhibited the joint work as a "Portrait of Lady Longacre, by Scumbles," complacently receiving all the credit bestowed upon the painting? Would it not be a fraudulent conspiracy on their part to deceive the public? I say "public," because in all probability though professional artists might detect the imposition, none of them would care to take the trouble and responsibility of denouncing the cheat. The consequence would be that, on the strength of the specimen, orders would be given which, if similar aid could not be purchased by the painter, would only end in disappointment and loss of money.

I would here observe that no one would offer any reasonable objection to a skilled architect being consulted by his junior, and even paid for his services, but the assistance ought to be freely and openly acknowledged, and the concealment of it is equally discreditable to both parties. But to illustrate my argument I would give a case that is in my own knowledge. A local architect obtained the premium in a competition for a local building, with a set of plans constructed in reality by a London architect, and very good they were. The local papers resounded, in their simplicity and ignorance, the merits of "our talented townsman," who received the tribute with the complacency of Pecksniff, but though the job was speedily detected by the profession, they held their peace. The consequence was, that on the strength of his putative paternity of the good work, the architect got an order from a neighbouring gentleman, such as does not fall to many architects of real ability; but, wise in his generation, he again had recourse to London, and the "Roman hand," which is a somewhat peculiar one, was again visible in the undertaking. Another local squire, on the strength of these two works, also gave him an order, which the architect flattered himself he could do on his own head, so London had no share in it. The result was that the client, who had some knowledge of architecture, rejected the designs and adjourned the order *sine die*.

In these remarks I have had in view the interests of the public as well as the profession. The former, as a rule, knows nothing of art, and ignorant of the fact that there are architects and architects (the latter class often pronouncing the first syllable soft), thinks that any man who calls himself one is as good as another. Occasionally, if an important work is to be carried out, recourse is had to some leading member of the profession, but as a rule, Squire Broadfields, if he has no architectural acquaintance, patronises the architect nearest to him, without troubling himself with a thought as to his fitness. It would be no difficult matter to name as many architects with good practice, as good ones without any, as witness in the latter category the late Mr. W. W. Deane, of whom you gave an obituary notice. But whether architects are good or bad, they should stand or fall rather upon their own deserts, or the public ignorance of their respective merits, but not by hoisting

FALSE COLOURS.

QUANTITIES.

SIR,—In reply to "A Student," he is quite correct in his method of measurement, although some, in fact most, surveyors would take the item thus—

20ft. 0in	} Digging to trenches, part filled	
3 6		in and rammed.
4 0		

Where, however, the filling in, as in large works, is made a separate item of, "A Student's" method gives the exact result.

With respect to the first paragraph, 3in. may be sufficient, but it is better to keep to the customary rule.

B. F.

THE SYSTEM OF SUPPLYING QUANTITIES.

SIR,—The writer of the article upon this subject contained in your number dated 31st ult., calls into question the decision of the Institute, that architects taking out their own quantities should be paid for this, as for their other work, directly by the employer. He states, "This compromise, though well intended, is illogical," and "Again, if the payment by the contractor as a part of the contract be the simplest and least troublesome mode, there does not seem to be any objection."

With your permission, I desire to show that however simple and convenient his system might prove, the decision of the Institute is the reverse of illogical. "The payment by the contractor as part of his contract" of the whole of the architects' fees would doubtless be in many cases the simplest and least troublesome mode of obtaining the full amount to which the architect might consider he was entitled, but to this mode I imagine there exist many very great objections.

The quantity-surveyor was originally employed by the builder or builders, and was consequently paid by them, and to his employers alone was he responsible for the accuracy of his work. If the job fell to the ground, his employers, the builders, were still the only persons to whom he could look for payment. From many causes it has gradually become the custom for architects to nominate the

surveyor. By the acceptance of the quantities with the surveyor's name attached, a builder signifies his acceptance of the services of such surveyor. The surveyor, on the other hand, by the acceptance of his fees from the builder, signifies his acceptance of such builder as his employer, and acknowledges his liability to make good to such employer any damage caused by errors and omissions in the quantities. Hence it arises that in cases where the client nominates and pays the surveyor, and the custom which has the effect of law is departed from, it becomes necessary, in order to define the position of the parties, that a tripartite agreement be entered into between the client, builder, and surveyor, whereby the builder discharges the client from responsibility for error and the surveyor accepts the position of responsibility towards the builder. Under existing custom, the client is the employer of the surveyor until the accepted builder appears on the scene, and should the job fall through, the client is the person liable for the surveyor's fees. It would appear, therefore, that the sole logical reason for the transfer of this liability from client to builder is that the old relation between surveyor and builder should be restored, and the surveyor made responsible to the builder for the accuracy of his figures.

Now in cases where the architect takes out his own quantities, although the payment of his fee by the builder may render him legally liable for errors, can any one quote an instance in which the liability has been discharged otherwise than at the client's expense? This being so, the sole reason for the payment by the builder of the architect's fees for taking out quantities is the difficulty experienced by the architect in getting the money from the client—a reason which would apply with almost equal force in favour of the payment by the builder of the architect's commission.

The most satisfactory solution of the whole question is, I consider, that architects capable of doing so should take out their own quantities and measure up their own work. In taking off the quantities they gain a better insight into the work and are enabled to serve their clients, first by avoiding excessive provision of work and material, and, secondly, by reducing to a minimum the necessity for extras. From his knowledge of the work contemplated by the contract, of the executed building, and the circumstances under which variations have occurred, no person is better able than the architect to measure up extras and omissions, and to form a just estimate of their value. These are all services rendered to the client, and should be paid for by him. Otherwise the architect would subside into a mere servant of the builder, who would contract not only to erect the building, but, in addition, to provide and pay a suitable architect.

The question of responsibility for correctness of quantities is a difficult one to deal with. The present system is not at all a satisfactory one, as it is a well-known fact that surveyors cover their liability, except in serious cases, by adding a certain percentage on the fair measurement, or by providing what are known as nest eggs. A further chance of meeting any claim the builder may have against them occurs in the measuring up, and it must frequently happen that excessive measurement and prices are allowed on the mere statement of the builder that the quantities have been short, in order that the surveyor may be saved the serious amount of trouble that would be involved in a refutation of the charge.

I would suggest that the quantities and prices should form part of the contract; that the builder should have power to challenge the correctness of the quantities at the end of the job, but that if, on measuring up, it was found that the quantities with the extra works fairly covered the work executed, the builder should pay for the measuring up.

The subject is one that cannot be discussed in a few words; but I fear that I have exceeded the limit of space which you may feel justified in granting to it.—I am, Sir, &c. C. H.
3rd February, 1873.

ARCHITECTURAL TECHNICAL TERMS.

Sir,—No one can read the papers on "Dilapidations" and "Quantities," which Mr. Fletcher has, and is now, contributing to your journal, without being at once impressed with a sense of their value. Will you and Mr. F. pardon me for offering a suggestion which has occurred to me while reading these papers. Every lad, on entering the profession, constantly finds himself at a loss to know the meaning of some technical word which he meets with in a specification or bill

of quantities, or even in many books on architecture or building. His employer, or the gentleman to whom he is article, if he have the will, has rarely the leisure to supply the required information; and it is but few lads of the age at which pupils generally enter an office who have the assurance to be perpetually asking the principal questions. Although he may be perfectly willing to do what is, after all, no more than his duty, they fear to bother him. And any one who has had much experience of architects' and surveyors' offices, knows how the pupil will fare if he trust to obtaining his information from his seniors and co-workers in the office. Of course there are shining exceptions to this, as to every rule; but, for the most part, jealousy, ill-nature, and various other causes conspire to prevent our young friend getting much out of them. If he turn to the existing dictionaries and glossaries of architecture, he will find that, though they give him page after page of explanation of such terms as "narthex," "piscina," "reredos," &c. (which he may perhaps come across once in six months), upon terms of every-day occurrence, such as "verge," "filleting," "munting," "withe," they are dumb. The glossary in "Gwilt's Encyclopedia" gives more information than any other source I call to mind, but even that is very imperfect, and the book is moreover too high-priced to be readily available. The consequence is, our pupil goes on until he arrives at an age when he is positively ashamed to confess his ignorance by asking, and so remains in ignorance still, till perhaps accident enlightens him as to the meaning of one after another of the words which previously formed part of an unknown tongue to him. A striking illustration to this is afforded by a letter in the "Intercommunication" column in your current number, wherein a gentleman (who, from his signature, is a full-blown architect), asks the meaning of the word "creasing," used by Mr. Fletcher in one of his able articles.

If the latter gentleman, when he has exhausted his present subject, would give, in a series of papers, a dictionary of the many technical terms used in the callings of a surveyor or a builder, he would be performing a task for which it is evident, from his present writings, no one could be better qualified; and you and he would, I am convinced, be doing a real service to many enquiring young (and probably to some more mature) minds.—I am, Sir, &c. A. L.

Intercommunication.

QUESTIONS.

[2777.]—Malt Kilns.—Will some obliging reader favour me with particulars or sketch of the construction of malt kilns? If there is a work giving information on the subject, I should be glad to know of it.—YOUNG ARCHITECT.

[2778.]—Bonding Brickwork.—May I ask to be informed, through your Intercommunication, the proper mode of bonding brickwork laid in English bond, which is described as "of alternate courses of whole headers and stretchers"? In laying this out for a thick wall, it appears to me that a long straight joint in the middle of the wall is a certain result, as shown at A A in the sketch of a plan of three-brick wall. Will some kind friend put me right?—A YOUNG BRICKLAYER.

[2779.]—Distance.—Can any correspondent of the BUILDING NEWS give me an answer to the following question? To find by a section line the distance of the point A from the plane of B B. By taking a section line through C C, it will give a different result when taken through D D.—H. B.

[2780.]—Chimney Stalk.—Will a circular chimney, say 20 ft. high, with an equal sized void of say 7 ft. diameter, from top to bottom, answer the purpose of draught better than one built in the usual way, with void, say 7 ft. at top and 15 ft. or 16 ft. at bottom? An answer from theory and practice will greatly oblige.—A CONSTANT READER.

[2781.]—Selenitic Mortar.—Will any one who has used this kindly give me the result of their experience both from a practical and economic point of view? Is road sand or ground burnt ballast with a good admixture of sharp sand suitable for the process?—G. B.

[2782.]—Circle upon Circle.—Will any correspondent oblige by giving lines for working a moulding round a circular arch in a circular wall, the following being plan and elevation of the same, showing the required moulding at spring of arch? I have the stones already wrought, but am at a loss how to work the moulding.—A COUNTRY BUILDER.

[2783.]—Concrete Arches upon Iron Girders.—Will any of your readers kindly inform me if any builder can, without infringement of any patent or register, execute the concrete arches in cement upon iron girders as applied to manufactories, stores, and other buildings?—J. J. F.

[2784.]—Measuring Sawing.—Having been called upon to measure work where Bath stone has been used, not accustomed to such work, I am at a loss to know how the quantity of sawing is found; for instance, in plain work such as quoins, &c.?—Will feel obliged for such information as will enable me to obtain the same.—BOAZ.

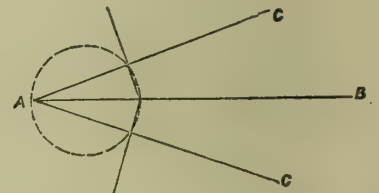
REPLIES.

[2760.]—Cracked Ceilings.—"E. B. J. K.'s" reply to "A Plasterer" is, no doubt, a correct one, as if the course recommended by him of having each coat thoroughly dry before the next is applied, any shrinkage or cracking of the first coat does not affect the second, and so on. But in applying the floating or setting coats to the dry undercoat, should not the latter be well wetted? Otherwise it will rob the new coat of its due share of water, and dry it too quickly.—HAWKBOY.

[2770.]—Woodwork and Hot-water Pipes.—The temperature of water in pipes for heating purposes never reaches 212° Fahr., or boiling point, and of this it loses somewhat in passing through the metal pipe. The temperature of water and steam within a locomotive boiler reaches as high as 370° Fahr., and although these boilers are invariably closely covered with wood-lagging inside their thin sheet-iron covering, there are no instances of the wood firing by being in contact with the boiler. This should be a sufficient answer to Mr. A. L. Tate's inquiry in last week's BUILDING NEWS. The woodwork may get so very thoroughly dried by constant proximity to hot-water pipes as to be more readily inflammable by a casual spark, but it is as likely to expect that boiling water will not quench a fire as to expect woodwork to be fired by the temperature of boiling water.—JOHN BARBER.

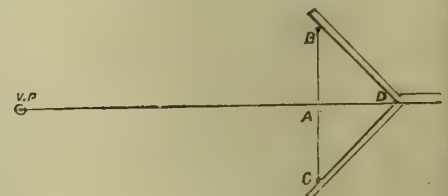
[2770.]—Woodwork and Hot-water Pipes.—In the Dictionary of Architecture, under the head "Ignition," will be found a very good reply to the question. It is, perhaps, too long to quote in its entirety, but it is there said that—"The late Mr. Braidwood, in evidence, stated that by long exposure to a heat not much exceeding that of boiling water, or 212°, timber is brought into such a condition that it will fire without the application of a light. The time it might take, he thought, was from eight to ten years." I am glad you have kindly allowed the question to re-appear, for assuredly it is an important one. In connection herewith, I may add that charcoal has been known to take fire unexpectedly under friction, heavy pressure, and sometimes when powdered, if it absorbs too freely moisture from the atmosphere.—NODS.

[2774.]—Centrolinead.—"X. Y." can fix or clamp this instrument as follows:—Draw a line A B between two



given lines C C, so as to be terminated by them. Set each of the angles of the centrolinead to each angle formed by the cross lines. Put a pin in each angular point formed by the cross line with each of the given lines, then place the central edges of the legs upon the pins, one on each, and draw the lines required by the central edge of the blade.—W. R. A., Uckfield.

[2774.]—Centrolinead.—In reply to "X. Y." I had considerable trouble and uncertainty in finding the correct position for the studs and arms of the centrolinead some years ago, so I investigated mathematically the construction of the instrument, with the result of being able to fix them exactly in a few seconds. The explanation is rather long, but the working out short. If "X. Y." care to have the mathematical proof, I will send it him on receipt of his name and address. Rule the horizontal line, and place the studs any convenient distance from



line of heights. The studs must then be fixed equidistant from the horizontal line, and the line joining the studs must be exactly at right angles to the horizontal. The distance of the vanishing-point being known, the distance from V P to studs is also known. A B, A C should be about 8 in.; 7 in. or 9 in. may be taken, but for convenience sake 8 in. will be the best. Divide the square of A B by the distance from V P to A. This will give the length A D, which must be marked off on the horizontal line. Join B D, C D; then place the short arms along these lines B C, D C, keeping the long arm close to the horizontal, tighten the screws and the instrument is set. Example.—Length from V P to A 72 in., from studs (B or C) to A 8 in. Then $\frac{8^2}{72} = \frac{64}{72} = \frac{8}{9}$ inch = the distance A D, which is the angle of the two arms when they touch the studs. Suppose the studs were 9 in. above and below A, then $\frac{8^2}{72} = \frac{64}{72} = \frac{8}{9}$ inch = the distance A D. By always fixing B and C 8 in. from the horizontal, you have merely to divide 64 by the distance of A to V P to give you A D, an operation easily kept in the memory.—WILLIAM B. BRYAN, Public Offices, Nottingham.

[2776].—**Creasing**.—Two rows of tiles or slates placed horizontally under coping of a wall, for example, and projecting about an inch and a half on each side, to throw off the rain water.—W. R. A., Uckfield.

[2776].—**Creasing**.—"Creasing" means ridge-tiles. The word "creasing" is used by Cornish tradesmen at the present time. Crest tiles—tiles to cover the ridge of a roof, upon which they fit on the principle of a saddle, now called corruptly cress tiles and crease tiles. Vide "Glossary of Terms used in Grecian, Roman, Italian, and Gothic Architecture." (Parker, Vol. I, p. 117).—ANGLO-SAXON.

Our Office Table.

PALMER'S ENDOWED SCHOOLS, GRAYS, ESSEX.—The designs of Mr. Thomas Rook Maples, of Queen's Chambers, Chapel-street, Bedford-row, London, W.C., were selected. Thirteen architects competed; the designs of Messrs. Wilson and Wilcox being considered as second in merit.

LECTURES ON ARCHITECTURE AT UNIVERSITY COLLEGE.—The second term of Professor T. Hayter Lewis's lectures at University College will commence on Tuesday next, the 11th inst. The Fine Art lectures will be delivered at 4.30 p.m., and the lectures on construction at 5.35 p.m. Further particulars may be had on application to the Secretary of University College.

DEATH OF A FRENCH PORTRAIT PAINTER.—Gustave Ricard, the most eminent of the French portrait-painters of the day, died in Paris on the 22nd ult., at the early age of 49. Notwithstanding his high reputation as an artist, he led a very secluded life, scarcely ever exhibiting his pictures, and living to the end among a small circle of friends whom he had attracted by the simplicity and amiability of his character. Among the most celebrated of his portraits are those of Madame Sabattier, Lady Granville, Mrs. Blount, Mrs. Johnston, Prince Orloff, Cavaliere Nigra, and M. Troplong.

A NEW PARK FOR EAST LONDON.—The committee of gentlemen appointed at recent meetings of the inhabitants of Stratford and West Ham for the purpose of securing Upton Park for the use of the public have just issued a statement, in which they point out that no district in London has increased more rapidly of late years than West Ham. Not very long ago it was a pleasant well-to-do suburb; it is now fast becoming a large manufacturing town, deserted by almost all its wealthy inhabitants, and already numbers more inhabitants than some whole counties, and has only 8,000 fewer than the City of London—an increase of 60 per cent. within the last ten years. Under these circumstances, Mr. John Gurney has offered the district a park of 80 acres, well-timbered, for £25,000, towards which he guarantees that members of his family will subscribe £10,000. In addition to this, Mr. Gurney expresses himself willing to allow half of the balance to remain on mortgage for five years. If the park be purchased, it is proposed to vest it in trustees.

ARCHITECTURAL NOMENCLATURE.—Mr. J. P. Seddon, in the course of his paper on Grosmont Church, read before the Royal Institute of British Architects, on Monday evening last (and of which an abstract and illustrations appear in the present number of the BUILDING NEWS), called attention to the great want, in practical architecture, of a nomenclature at once correct, precise, and determinate. At present, he said, there is much confusion from the want of such a nomenclature. A practical man looking at a crack in a wall pronounces it to be a "settlement," though in reality it is a fissure, the result of the settlement. Again, architects invariably specify that timber is to be "free from sap," though the objectionable element is not sap, but "sap-wood." Again, the word "foundation," which is of course of very common occurrence, may mean four different things:—(1) the "bottom" on which the footings are laid, (2) the trenches in which the footings are laid, (3) the footings themselves; or (4) the word may be used in a collective sense to include the three things already mentioned—in fact, everything below the ground-level itself.

NEW RAILWAYS IN THE METROPOLIS.—Mr. Bazalgette, C.B., the engineer of the Metropolitan Board of Works, has just presented to them his annual report on Bills in Parliament for works, &c., affecting the metropolis. Of the 27 plans deposited at his office, 16 are for the construction of 15½ miles of railway; six are for tramways, affecting 13 miles of metropolitan thoroughfare

and five are miscellaneous. Four of the railways are for new lines, viz.:—The City and West-end Railway, from South Kensington to Farringdon-road (underground); the East and West Metropolitan Junction (underground) line, from the authorised metropolitan line at Meetinghouse-yard to the North London line at Bow-road; the Brighton, Eastbourne, and London Railway, which would only extend one furlong into the metropolis at Penge; and the Crystal Palace Railway, about three miles in length, from Alleyne's-road, Dulwich, by Beulah-hill-road to the building from which it takes its name. The remaining schemes are principally extensions, and include a short line from Warwick-road, Brompton, to the Broadway, Hammersmith; the widening of the S. John's-wood Railway, and short lines joining the Hampstead Junction and Midland system; a short line by the Midland Company from Aldersgate-street to Milton-street, City. The London Central Railway, who already possess powers to construct a line from the Euston-road to Charing-cross, with a street above, to the cost of which the Metropolitan Board of Works are to contribute £200,000, seek powers to make junctions with the Great Northern and Metropolitan Railways, and to purchase land in the neighbourhood of Leicester-square. Among the tramway schemes are the Columbia Market approach, and several extensions of the North Metropolitan service (chiefly in the City), most of which will be opposed by the Corporation of London.

CHIPS.

The new church of S. Leonard, Newark, was consecrated on Tuesday week. The building will seat 600 persons. One of the chancel transepts is set aside for use as a chapel, and furnished with an additional altar.

A new Post-office is to be erected at Leith, and the plans are in course of preparation.

A meeting of merchants and others was held on Thursday week at Glasgow, to consider the advisability of organising a limited liability company for the erection of an additional exchange. A committee was appointed to make inquiries as to site, plans, &c.

The firm of C. F. Harrison and Co., of Victoria-street, Birmingham, have issued a circular to their creditors, stating that they have filed a petition for arrangement. They say that their assets are sufficient to pay all liabilities in full.

The committee appointed by the Metropolitan Board of Works to negotiate for the purchase of all property necessary to the new approach from Charing-cross to the Embankment reports that the Duke of Northumberland has consented to part with Northumberland House for half a million, and that the adjoining property can be acquired for £25,000. There would be a recoupment of £275,000, reducing the actual cost of the thoroughfare to a quarter of a million.

A meeting of Civil Engineers and Surveyors is to be held on Saturday, Feb. 15, at the Institution of Civil Engineers, for the purpose of forming an Association of Sanitary Engineers.

The Sanitary Committee of the Leeds Town Council has resolved to close 800 cellar dwellings, reported to be totally unfit for human habitation.

Monsieur La Croix, foster-brother of the late Emperor Napoleon, has just died from the effects of a railway accident. He was a distinguished architect, the Elysee Saint Leu, and L'aisle du Vesinet being some of his work.

A few tickets of admission to the Royal Academy Lectures on Architecture still remain in the hands of the Secretary of the Royal Institute of British Architects, for distribution among students recommended by members of the Institute.

Trade News.

TENDERS.

BEESTON GREEN (Bedfordshire).—For alterations, repairs, and additions to a house on Beeston Green. Mr. Lacy W. Ridge, architect.

Camplin.....	2888	0	0
Dabb	865	0	0
Twelvetrees	778	0	0
Harvey	684	0	0
Warr	670	0	0
Coles	619	10	0
Dunham	595	0	0
Proust	575	0	0
Carter	549	0	0

BOW.—For schools to be erected in Olga-street, Bow, for the London School Board. Messrs. Hammack and Lambert, architects. Quantities supplied by Mr. Thomas E. Mundy.

Gibson Brothers	28,302	0	0
Newman and Mann	8,246	0	0
Wood Bros.	8,073	0	0
Linzell and Son	7,993	0	0
Ennor	7,801	0	0
Williams and Son	7,566	0	0
Wicks, Bangs, and Co.	7,531	0	0
High	7,490	0	0
Marland and Son	7,340	0	0
Roberts Brothers	7,225	0	0
Dove Brothers	7,115	0	0
Perry and Co.	6,680	0	0
King and Son	6,028	0	0

BRISTOL.—For carcass of warehouse, Victoria-street Bristol, for Mr. E. H. Symes. Mr. J. Mechelen Rogers, architect. Quantities by Messrs. Strudwick and Meinie.

Wilkins and Son	2,700	0	0
Davis and Son	2,400	0	0
Summers and Ford	2,267	0	0
J. P. Stephens	2,221	0	0
Humphreys	2,208	0	0
Storkey and Veals	2,100	0	0
Howell	2,020	0	0
Approximate Estimate	2,000	0	0

CARNARVONSHIRE.—For the erection of school and residence, for the Llanaelhaearn School Board. Mr. Walter W. Thomas, architect, Liverpool.

Hugh Jones	21,000	0	0
William Jones	650	0	0
Griffith Roberts (accepted)	550	0	0

GREENOCK.—For new schools at Hughes' Fields, Greenwich, for the London School Board. Mr. E. E. Robson, architect. Quantities supplied by Mr. H. T. Northcroft.

W. Higgs	26,543		
J. and H. Coleman	6,389		
J. Perry and Co.	6,275		
Cooke and Green	6,269		
S. J. Jerrard	5,974		
F. Johnson	5,950		
J. Cooper	5,850		

HASTINGS.—For a pair of semi-detached villas. Mr. G. Stooke, architect. Quantities supplied.

Tapper	22,900	0	0
Cousins (accepted)	2,620	0	0

SOUTHWARK.—For new schools in Monnow-road, Fort-road, Southwark. Mr. Rowland Plumb, architect. Quantities supplied by Mr. L. C. Riddett:—

A Sheffield	28,956		
J. Cook	8,750		
Wicks, Bangs, and Co.	8,630		
Marland and Sons	8,500		
Srivener and White	8,312		
B. Wells, junr.	8,150		
Cooke and Green	8,041		
Gammon and Sons	7,999		
S. J. Jerrard	7,987		
W. Shepherd	7,950		
W. Higgs	7,923		
A. Kilby	7,760		

STAVERTON-CUM-BODDINGTON.—For parish schools for 134 children and master's house. Mr. J. T. Darby, architect, Cheltenham.

Hawkins	2,745	0	0
Clarke	625	0	0
Weager	610	0	0
Merideth	598	0	0
Spring	595	11	3
Brown	565	0	0
Morgan (accepted)	532	10	0
Architect's estimate	534	10	0

WALWORTH.—For the erection of S. Mark's Church, East-street, Walworth, Surrey. Messrs. Henry Jarvis and Son, architects.

Adams and Sons	25,740	0	0
Shepherd	5,700	0	0
Myers and Sons	5,675	0	0
Dovns and Co.	5,390	0	0
Dove Brothers	5,345	0	0
Henshaw and Co.	5,320	0	0
Colls and Sons	5,260	0	0
Tarrant	5,148	0	0
Marland and Sons	5,131	0	0
Thompson	4,778	0	0

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—INSTITUTION OF SURVEYORS.—"On the Origin of Parochial Relief." By Mr. E. J. Castle. 8 p.m.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—Discussion on Mr. Thornton's paper, "On the Relative Advantages of the Standard Gauge and of the Metre Gauge for the State Railways of India." 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—Meeting of Class of Construction and Practice; subject: "Plumber, Painter, and Glazier." Visitor for the evening, Mr. John Sulman. 6.30 p.m.—Meeting of Class of Design; subject: "Corn Exchange for Small Town." 8 p.m.

COMPETITIONS OPEN.

HALIFAX, Feb. 18.—For designs for a school at Booth Town. Mr. R. Ostler, School Board Office, Waterhouse-street, Halifax.

THE FROME DISTRICT AGRICULTURAL SOCIETY.—Feb. 20. For adapting a field near Frome for the purposes of a Cheese, Corn, and Cattle Market, and for the erection of suitable buildings. Premiums of £20 and £5 for first and second best designs.—Messrs. Crutwell and Daniell, Solicitors, Frome.

MANCHESTER, March 1.—The Directors of the Manchester Conservative Club require designs for their new premises. Mr. R. E. Johnson, 37, Cross-street, Manchester.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tiler, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

BARROW-IN-FURNESS, Feb. 17.—For the construction of about 2,400 yards of brick sewer, with side entrances, ventilation shafts, &c. C. F. Preston, Town Clerk, Barrow.

BARNESLEY, Feb. 17.—For supplying the boilers and cisterns, and for supplying and fitting the hot and cold water service pipes and other works at the baths, York-Street, Wm. Peacock, Town Clerk, Barnsley.

BICESTER, Feb. 13.—For the erection of magistrates' rooms and a witnesses' waiting-room. Mr. W. Wilkinson, architect, 5, Beaumont-street, Oxford.

BROWNHILLS (near Walsall), Feb. 10.—For the erection of a market-hall, shops, and other buildings adjoining the Railway Station. The Rev. J. J. Singleton, Ogley Hay Vicarage, near Walsall.

DURHAM COUNTY LUNATIC ASYLUM, Feb. 24.—For the following works:—Contract No. 1. For the completion of the new west wing. Contract No. 2. For the erection of an engine and boiler-house. Contract No. 3. For the erection of an enginemans' cottage. John Watson, Clerk to the Visitors, Durham.

FRANKFORT-ON-THÉ-MAINE, Feb. 12.—For the construction of about 846 lineal metres 4ft. 6in. by 3ft.; 975 lineal metres 3ft. 6in. by 2ft. 4in.; 5,396 lineal metres 3ft. by 2ft. brick sewers; and 102 lineal metres 12in. pipe sewer, and other works. Board of Works, Frankfort-on-the-Maine.

GRAYS (Essex), Feb. 12.—For the erection of the new building in connection with Palmer's Endowed Schools. Mr. Thomas Rook Maples, Queen's Chambers, Chapel-street, Bedford-row, W.C.

HULL, Feb. 24.—For the erection of a block of school-buildings for boys, girls, and infants, in Courtney-street, D. Jno. O'Donoghue, Clerk to the Board, Town Hall, Hull.

ILKLEY, Feb. 12.—For the erection of two houses in Rhayddys-road, Ilkley. George Smith, architect, Market-street, Bradford.

KEIGHLEY, Feb. 13.—For making a new survey and finished plans of the district, to a scale of 30ft. to an inch. Henry Alty, C.E., Engineer to the Local Board, Keighley.

KINGTON (Herefordshire), Feb. 22.—For the rebuilding of the north side of the church. Messrs. Bodenham and Temple, architects, Kington.

LEEDS, Feb. 15.—For the erection of a block of eleven warehouses for the Quebec Street Warehouse Company Limited. Thos. Ambler, architect, 9, Park-place, Leeds.

LONDON, Feb. 13.—For the supply of cut wood blocks of elm and beech for the Patent Ligno-Mineral Paving Company, probable quantity about 300,000 blocks. H. F. Stanley, secretary, Offices of the Company, 8, Great Winchester Street Buildings, E.C.

MARCH, Feb. 13.—For the erection of boys', girls', and infants' schools and class-rooms, for the accommodation of 500 children, and residences for the master and mistress. Mumford and Townsend, architects, No. 3, York-row, Wisbech.

MIDDLESBOROUGH, March 3.—For the new Cart Ferry works on the North and South Side of the River Tees. J. T. Belk, Town Clerk, Middlesborough.

NEWCASTLE-ON-TYNE, Feb. 21.—For the erection of the Bell-terrace schools. Alfred Goddard, Clerk to the School Board.

OPENSHAW, Feb. 10.—For draining, flagging, &c. Mr. J. Elliott Holder, Clerk to the Board.

OPENSHAW (Local Board), Feb. 10.—For draining, flagging, &c. Mr. J. Elliott Holder, Clerk to the Board.

OSBOURNEY, Feb. 10.—For the restoration of the parish church. Mr. Kirk, Architect, Sleaford.

ROCHDALE, Feb. 13.—For the erection of a new workhouse at Dearnley, near Rochdale.—John Holgate, Clerk to the Guardians, Acker-street, Rochdale.

SALFORD, Feb. 13.—For the erection of new store rooms at the Union Workhouse. T. H. Bagshaw, Clerk to the Guardians, Union Offices, Eccles New Road, Salford.

S. LAWRENCE NEWLAND (near Malden), Feb. 10.—For additions and alterations to the rectory house. Rev. J. W. Mills, New Hall, Bradwell, near Malden.

STAINLAND (Halifax), Feb. 11.—For the erection of a residence and outbuildings. Messrs. Horsfall, Wardle, and Patchett, architects, George-street, Halifax.

SUTHERLAND AND CAITHNESS RAILWAY, Feb. 14.—For the erection of houses and other buildings at the various stations on the line, also gate-lodges, &c. Mr. M. Paterson, C.E., Georgemas, near Thurso.

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		1,200 Slates.	per square
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BANKRUPTS.

(To Surrender in London.)

Thomas James Pearce, Francis-road, Bermondsey, builder, Feb. 14, at 11.30.

(To Surrender in the Country.)

James Penn and William Russel, Southport, builders, Feb. 17, at Liverpool.—Samuel Wood, Pendleton, Salford, and Manchester, builder and contractor, Feb. 12, at Salford.

SITTING FOR PUBLIC EXAMINATION.

C. Couldwell, Seacombe, plumber, March 11.

DIVIDEND MEETING.

J. V. B. Thompson, Woolwich, engineer, Royal Navy Feb. 21.

DECLARATION OF DIVIDEND.

G. Jones, Oxford, builder, div. 18s. 6d.

SCOTCH SEQUESTRATIONS.

Robert Burbour, Glasgow, plumber, Feb. 10, at 12, at the Faculty Hall, Glasgow.—William Morrison, Leith, engineer, Feb. 7, at 2.

PARTNERSHIPS DISSOLVED.

Cowley and Harland, West Hartlepool and Wakefield, timber merchants.—Lake and Gooday, Rayne, near Braintree, engineers.—J. and R. Purser, Leighton Bussard, plumbers.—William Walmsley and Co., Burnley, painters and paperhangers.—Tangye Brothers and Holman, Laurence Pountney-lane, engineers.—Tangye Brothers, Birmingham and Smethwick, and Tangye Brothers and Bake, Newcastle-on-Tyne, engineers.—Lander and Mellanby, West Hartlepool, saw-mill proprietors and timber merchants.—Glover and Son, Leicester, builders.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

(From the Public Ledger.)

LEAD.		per ton	£22 0 0	£22 5 0
Pig—Foreign	English W.B.	22 15 0	23 5 0	
" "	Lead Co.	23 0 0	0 0 0	
" "	Other brands	22 5 0	22 15 0	
Sheet Milled	" "	23 0 0	23 5 0	
Shot, Patent	" "	24 10 0	25 0 0	
Red or minimum	" "	23 15 0	24 0 0	
White Dry	" "	28 10 0	30 10 0	
" "	ground in oil	0 0 0	0 0 0	
COPPER.		per ton	£94 0 0	£98 0 0
British—Cake & Ingot	" "	96 0 0	100 0 0	
Best selected	" "	96 0 0	105 0 0	
Sheet	" "	100 0 0	110 0 0	
Bottoms	" "	91 10 0	93 10 0	
Australian cake	" "	87 0 0	0 0 0	
Spanish cake	" "	86 10 0	90 0 0	
Chili Bars, cash	" "	93 0 0	99 0 0	
" Refined ingot	" "	0 0 8½	0 0 0	
Yellow metal	per lb.			
TIMBER.		load	£14 10 0	£15 10 0
Teak	" "	3 10 0	5 0 0	
Quebec, red pine	" "	3 5 0	6 0 0	
" "	yellow pine	4 0 0	4 10 0	
" "	pitch pine	6 10 0	7 0 0	
Quebec oak, white	" "	5 0 0	6 0 0	
" "	birch	4 15 0	5 0 0	
" "	elm	4 10 0	5 0 0	
" "	ash	4 10 0	6 10 0	
Dantzic oak	" "	3 10 0	5 0 0	
" "	fir	2 10 0	5 0 0	
" "	undersized	4 0 0	4 5 0	
Riga	" "	2 15 0	3 0 0	
Swedish	" "	4 15 0	6 15 0	
Wainscot, Riga	" "	4 0 0	6 10 0	
Masts, Quebec red pine	" "	4 0 0	6 10 0	
" "	yellow pine	7 0 0	9 0 0	
Oregon	" "	8 10 0	10 0 0	
Lathwood, Dantzic fm.	" "	10 10 0	11 10 0	
" "	St. Petersburg			
Deals per C, 12ft. by 3 by 9in	" "	20 0 0	24 0 0	
Quebec Pine, 1st qual.	" "	14 10 0	16 10 0	
" "	2nd do.	10 0 0	11 0 0	
" "	3rd do.	11 10 0	12 0 0	
Canada Spruce, 1st	" "	8 15 0	9 15 0	
" "	2nd & 3rd	9 0 0	9 15 0	
New Brunswick	" "	14 10 0	15 10 0	
Archangel, yellow	" "	12 10 0	13 10 0	
St. Petersburg yellow	" "	8 10 0	9 10 0	
Finland	" "	0 0 0	0 0 0	
Memel and Dantzic	" "	10 10 0	13 0 0	
Gothenburg, yellow	" "	10 0 0	10 10 0	
" "	white	12 0 0	13 10 0	
Geffe yellow	" "	12 0 0	13 10 0	
Christiania	" "	10 0 0	13 10 0	

Battens, all sorts	7 10 0	8 10 0
Other Norway	8 10 0	9 10 0
Flooring boards per square of 1in., first yellow	0 11 0	0 12 6
First white	0 9 6	0 11 6
Second qualities	0 7 0	0 10 0

IRON.

Pig in Scotland, cash	per ton	£6 13 0	£0 0 0
Welsh Bar, in London	" "	12 0 0	12 10 0
" "	Wales	11 10 0	11 15 0
Staffordshire	" "	13 0 0	14 0 0
Rail, in Wales	" "	11 0 0	11 10 0
Sheets, single in London	" "	17 0 0	18 0 0
Hoops, first quality	" "	14 0 0	15 0 0
Nail Rod	" "	13 0 0	14 0 0
Swedish	" "	17 0 0	18 0 0

OILS, &c.

Seal, pale	per tun.	£39 10 0	£0 0 0
Sperm body	" "	95 0 0	0 0 0
Cod	" "	38 10 0	0 0 0
Whale, South Sea, pale	" "	40 0 0	0 0 0
Olive Gallipoli	" "	46 0 0	46 10 0
Cocanut, Cochin	" "	36 0 0	39 0 0
Palm, fine	" "	38 0 0	0 0 0
Linseed	" "	33 0 0	0 0 0
Rapeseed, English pale	" "	41 0 0	41 10 0
Cottonseed	" "	30 0 0	0 0 0

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THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 14, 1873.

NORTHUMBERLAND HOUSE.

AFTER lengthened negotiations with the advisers of the owner, the Metropolitan Board of Works, as our readers are aware, have decided to purchase Northumberland House, which stands in the way of the proposed new thoroughfare from Trafalgar-square to the Thames Embankment. "His Grace" has been lucky enough to get his own price for his ponderous mansion, namely, £500,000. Additional property will have to be acquired at a cost of £25,000; the Board estimate that they will be recouped to the extent of £200,000, so that the new improvement will cost the public about a quarter of a million. Half a million of money is a very large sum to give for a private residence, even as property prices go in the metropolis, and this transaction has been freely commented upon. One indignant ratepayer, for instance, thus enters his protest:—"I observe (he says) that the owner of Northumberland House has agreed to take £500,000 for his property, and that the Metropolitan Board of Works proposes to give him this sum. It is also stated that the Board 'had called in the services of an experienced valuer.' The result, however, of the labours of this experienced man is not given. Now, Sir, as one of those who will have to pay his share of this £500,000, I wish to know why the purchase of Northumberland House should be made a matter of special agreement, and why the vested rights of a duke in his house should be regarded as more sacred than those of any other individual? If it be decided that public utility requires a street to be made connecting Trafalgar-square with the Embankment, then let the Metropolitan Board of Works promote a Bill in Parliament giving it powers to expropriate along the line of the proposed street, and let owners be forced to sell at the usual 10 per cent. above the absolute value. Many dwellings have been pulled down to make new streets which have been authorised by Act of Parliament; the owners have been paid for them on an exact valuation, and not on their own fancy estimate of their property. A tradesman, when he is 'expropriated,' of course receives an indemnity for injury to his business; but it is pretended that, whilst a commoner loses nothing by a change of his private residence, his Grace of Northumberland is to be indemnified for carrying on the business of a duke in some fresh quarter of the metropolis"! There is a good deal of force in all this, but unfortunately, we fear, the protest comes too late. It must be said that whenever a member of the aristocracy happens to have dealings of this nature with the Board, he always manages somehow to make a remarkably good bargain for himself, if not for the public. The Duke of Buccleuch, it will be remembered, was mightily offended with the Embankment scheme, and Sir Robert Peel and other great personages shared in his objections. They were not easily satisfied in the matter of compensation, and gave the Board considerably more trouble than that corporate body is in the habit of putting up with in the case of individuals who are not blessed with having a handle to their names. And now it requires no end of negotiations, a special agreement, and the round sum we have mentioned, before the claims of the ducal house of Percy can be satisfied. The matter is one that deeply concerns the ratepayers, and we must leave them to deal with it.

There is probably no great private mansion in the metropolis the outside of which is so familiar to Londoners as Northumberland

House. But, standing though it does in the busiest of our thoroughfares, there is no building so completely shut out from public gaze. Of the millions of persons who pass and re-pass it in the course of a year, how many ever caught a glimpse beyond its gloomy portal, or saw any one belonging to the place except the portly porter in livery, who at rare intervals appears at the gate? It has been said that the edifice looks more like a nobleman's mansion than any other in London. Certainly it presents little attraction outwardly as a place of residence. Its grim towering front, full of useless niches, its two dozen odd dirt-begrimed windows, its massive double palisade stout enough to protect a prison, and the dead silence that always seems to surround it, make the house a sort of mystery in stone and lime to Londoners generally. The truth is, such a mansion is out of place here. The pleasant days are long since passed when palaces and personages, political events and holiday festivities, marked the spots now denoted by Essex, Norfolk, Howard, Arundel, Surrey, Cecil, Salisbury, Buckingham, Craven, and Northumberland streets; and this is the last of that noble range of palaces which, with their beautiful gardens, once upon a time stretched from the mainline of road to the shore of the Thames. It may be considered as the solitary link (if we except Buckingham Gate) connecting the past and present records of the Strand. For two centuries the Earls and Dukes of Northumberland have lived here, when in town, in great state; but shops, coal-wharves, markets, railway-stations, and all the other modern encroachments of trade and commerce, render the vicinity unsuitable for aristocratic associations. The house stands upon the site once occupied by the hospital of Saint Mary Rounceval, founded by the Earl of Pembroke in the reign of Henry III. The property passed into the hands of Henry Howard, Earl of Northampton, and son of Surrey, the poet, who, in the reign of James I. (about the year 1600), built upon the foundation a town house, which he named after himself. The architects were Bernard Jansen and Gerard Christmas, the original design consisting of three sides of a quadrangle, the principal apartments being in the upper story, next to the Strand. It appears, however, that even at that early period, "the noise and hurry of so great a thoroughfare," being unpleasant to aristocratic feelings, the Earl commissioned Inigo Jones to erect a fourth side facing the gardens and the river, and commanding a view of the Surrey hills. The Earl dying in 1614, left the property to his nephew Thomas Howard, Earl of Suffolk, when it received the name of Suffolk House, by which name it was known until the marriage, in 1642, of Elizabeth, daughter of the second Earl of Suffolk, with Algernon Percy, tenth Earl of Northumberland, who bought it for £15,000, and called it by the name it now bears. Most of the edifice has been rebuilt, in portions, from time to time. The date 1749 on the façade refers to the work of reparation which commenced in that year, and the letters, A. S., P. N., stand for Algernon Somerset, Princeps Northumbriæ. This nobleman built two wings to the garden front, above 100 feet in length, and faced the sides of the quadrangular court with stone. Indeed, all that is old of the present building is the portal towards the Strand; but even of this there is a good deal that is new; for, about the beginning of the present century, a very general repair of the front was made by the Brothers Adam, who left it pretty much as we find it. The front has no great architectural pretensions, being heavy and dull to a degree, and only a little less ugly than the brick screen which used to hide Burlington House. From its dumpy towers a fine view of the metropolis is obtained. The central gateway is, as everybody knows, surmounted by a lion passant, the crest of the Percies. This figure is generally described as being of stone. We understand, however, that it is of lead, and if so, it will be worth

all the more to the Board of Works. The direction of the animal's tail has long been a matter of dispute—it has even been asserted that it occasionally wags, for the special delectation of country cousins when visiting the metropolis. Be this as it may, rumour hath it that a former duke of that house, being offended with the Prince Regent, and determined to evince his contempt for His Royal Highness, changed the position of the lion, so that his caudal appendage should point towards Carlton House. The vestibule of the interior is 82ft. in length and 14ft. in breadth, and is ornamented with handsome Doric columns. Each end communicates with a staircase leading to the principal apartments facing the gardens and the Thames. The great staircase has a railing of highly wrought brass, superbly gilt. There is a very elegant apartment called the Pompeian room. The state drawing-room in the left wing is 106ft. long, and not to be matched, it is said, in London. It has ten lights to the east, five lower and five upper windows, which throw an equal degree of light over the apartment. The cornice is exquisitely worked, and the general ornamentation is of the most artistic description. Here may be seen a magnificent Sevres vase, presented by Charles X. to the Duke of Northumberland, the representative of Great Britain at that monarch's coronation in 1825. Many of the fireplaces, fenders, and fire-irons are of silver. Besides the chief apartments, there are about 150 rooms, appropriated for the private uses of the family. There is a small but choice collection of pictures; among them the following may be mentioned:—The celebrated Cornaro Family, by Titian. Sir John Evelyn saw it here in 1658. S. Sebastian Bound, on the ground; in the air two angels—by Guercino, with figures as large as life. A small "Adoration of the Shepherds," by Giacomo Bassano. A Fox and a Deer Hunt, two admirable specimens of Franz Snyders. A genuine, but ordinary, "Holy Family," by J. Jordaens. A pretty girl with a candle, before which she holds her hands, by G. Schalken. The "School of Athens," after Raphael, copied by Meugs in 1755, and the best copy ever made of this celebrated picture. "View of Alnwick," in 1750" by Canaletti. A curious full-length portrait of Edward VI. when a boy of six or seven, assigned to Mabuse. A large and fine Ruysdael. Josceline, 11th Earl of Northumberland, by Wissing, and a portrait of Napoleon when First Consul, by T. Phillips, R.A., taken from repeated observations of the Emperor's face. The chief art treasures of the family, however, are at Alnwick Castle. Northumberland House is not rich in historical associations. All we know is that in 1660 General Monk met here the Duke, with the Earl of Manchester and others, to concert measures for effecting the restoration of Charles II. The garden, extending from the mansion to Scotland-yard, is the only rural appendage of that kind in the Strand or its neighbourhood that has survived the encroachments of brick and mortar. It is a considerable piece of ground, but being hemmed in and overlooked on either side by the houses in the adjoining streets and courts, it affords no sort of privacy to its owner; and indeed, for very many years it has been a garden only in name. But it will be invaluable for building purposes.

QUANTITIES.—VI.

CARPENTER.

IN measuring ceiling joists, take the length by the scantling, the same as stated for floor joists, making the deductions for chimney breast, &c. where they occur, and adding for trimmers as described for roof.

ROUGH BOARDING to flats, &c., is measured the length by the breadth, and valued at per square, as shown in the table. It will be necessary to state the thickness and quality of the material, with description, stating how laid, whether the edges of the boards are

"shot," or otherwise. Where any cutting is required, as to splays, irregular walls, &c., take a running dimension of the length, and describe it as "Extra to cutting and waste." Where a gutter is formed in the flat, it is measured at per foot run, and described as "Extra to forming gutter in flat"; also, number the cesspools as extra, as before described to other gutters.

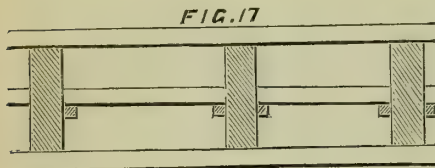
Firings to flats, &c., are measured superficially, taking the area of the flat, as shown in the table.

Rolls for lead are measured as shown in the table, stating the diameter of the roll. Short rolls in gutters are generally numbered.

Boarding, where laid against walls or to ceilings, must be kept separate from that laid flat, more labour being entailed when laid upright or against ceilings, than when laid flat.

Battening to walls is measured superficially, the length by the height. State the thickness of the material and the method of securing to the wall, whether plugged or otherwise, according to the nature of the backings.

To measure sound-boarding, take the length by the width of the space between two joists, and multiply this dimension by the number of such spaces in the room where such sound-boarding is required to go. It will also be necessary to describe the fillets which are included in this one item, and to state whether they are single or double. It is wrong to measure sound-boarding as some surveyors do, viz., by taking the entire area of the room, and making no deduction for the joists, as before stated. Whenever it is done in this way, as it is difficult to get a surveyor to alter his adopted methods of measuring, it should also be stated that the timbers have been measured in. The Fig. 17 illustrates this item.



Weather-boarding is measured similarly to rough boarding, stating whether edges rough, splayed, wrought, or wrought and beaded, &c., the net area of the surface only being taken.

ARRIS GUTTERING is generally measured by the foot superficial, and water-tanks by the foot lineal.

QUARTER PARTITIONS are measured by the foot cube, taking first the lengths of the several timbers and then stating the scantlings. Take the timbers of the largest scantlings first, as the head and sill, including the portions let into walls, then the door-posts and head, the braces, and lastly the quarters, taking care to make the deductions for doorways where they occur. The cubes are then added together, and the sum of the whole is brought into the abstract in one item, and billed as "Fir framed in partitions." Where the partition is trussed, it must be described as "Fir framed in trussed partitions." The student must not forget, as previously stated, to include in both cases the tenons, and care must be taken not to omit any ironwork in connection with the partitions, as bolts, &c., which should be taken out at same time, and afterwards billed with the Smith.

OAK TEMPLATES are generally numbered, stating the dimensions each way.

OAK CURBS are also measured by the foot cube; take the length by the scantling and add for the laps.

In measuring Bracketing to cornices, &c., take the length by the girth of the moulding, making a superficial dimension, and specify the thickness of the deal used, and how secured to the wall. To obtain the proper length, it will be necessary to make a deduction on the length of each wall of the width of the projec-

tion of the bracket, which will give the average; or the better way would be to deduct four times the width of the projection from the collected lengths of the walls of a rectangular room. For a sketch of ordinary bracketing, see Fig. 18 in last number, page 116 ante. If to circular ceiling, state so, and do not allow double, as some surveyors do, and call it all "straight."

Cradling for entablatures is taken in a similar manner—according to the thickness of the material.

All angle brackets are taken with the others, and afterwards billed again as extra only to angle brackets.

Angle Staves are measured by the foot lineal, taking the net length.

CENTERING—to vaults, groins, &c. Take the length by the girth or circumference of the underside of the arch, which will give a superficial dimension. This is brought into the square of 100 feet, as stated in the table, and is valued as such for use and waste. It is customary to measure centering to all vaults, although many of them may be of the same size, and the centering of one does for some of the others, in which the additional time in removing it for the other arches might be made an "extra" of.

Centerings to trimmer arches are measured the length by the girth.

The centres to windows it is advisable also to measure by the foot super., taking the girth by the width of reveal, and stating the nature of the curve, whether semicircular, pointed, &c.

Turning pieces to flat arches are taken at per foot run, stating the width of reveal, and including struts.

No centering is taken to the arches over fireplaces where chimney-bars are provided (they not being necessary). Where there is no chimney-bar they must of course be provided.

There is a difference of opinion as to the measurement of centering to arches of windows, relieving arches, &c., some preferring to take them at per number, and average the openings, keeping the different widths of soffit separate; so having one item for the 4½ in., another for the 9 in., and so on—but, of course, keeping at the same time the different arches separate, thus, the semicircular from the Gothic, Pointed, &c.; but I think it better to follow the course I have laid down, and measure all by the foot superficial.

All labours, on whatever class of work in connection with the carpenter, should invariably be measured at the same time as the material; otherwise it will be almost impossible to prevent inaccuracies occurring, and it will save considerable amount of time. The labour on carpenters' work is generally confined to planing, splays, chamfers, rebates, &c., the sawing of timbers being of course always understood to be included in the price. Planing fir is measured by the foot superficial, also the labour to splays when over 6 in. wide. Chamfering is measured by the foot run, and the stops numbered according to the description, whether straight, splayed, moulded, &c., although this is more within the province of the joiner than the carpenter. Rebates, beading, &c., is also measured by the lineal foot.

It may, perhaps, be as well to observe, in concluding the Carpenter, that circular timbers are generally measured at per foot run, stating the scantlings, and if any labour is executed on the same, it is as well to include it in the item, and not keep it separate from the material, as stated for straight work, as the labour being circular, it is better kept with the material, the builder being better able to form an estimate of its cost when knowing what it is for. Otherwise it would have to be abstracted separately, and described as to circular work. All additional lengths for scarfing, &c., must be added as before. It will be also necessary to state the radius. An example of a circular-rib to a Gothic roof will be found in the table annexed. Number the framed and

mitred angles where they occur, and also the intersections, stating sizes in each case as shown. When the curve is other than circular, it must be so stated.

TABLE V.

This Table has a double use; it shows the order of taking this Trade, and the method of measurement:—

Fir in plates, lintels, and wood bricks	At per foot cube,
Do. in ground joists and sleepers	"
Do. in girders	"
Do. do. sawn, reversed, and bolted	"
Do. fitted and bolted to iron flitches	"
Do. framed in roofs	"
Do. do. in floors	"
Do. do. in quarter partitions	"
Do. do. in trusses	"
Oak in templates	"
Do. in curbs	"
Centering to vaults and arches	At per square of 100ft. super.
Do. to trimmers	At per foot super.
Do. to segmental arches	"
Do. to semicircular arches	"
Do. to Gothic pointed arch	"
Do. do. with splayed soffits	"
¾ in. battening, 2½ in. wide, for countless slating	At per square of 100ft. super.
Do. rough eaves board	At per foot super.
Do. do. boarding jointed for slates	At per square of 100ft. super.
Do. do. boarding edges, shot, and firings for flat	"
Do. do. valley boards	At per foot super.
Do. do. sound boarding, with single fillets	At per square of 100ft. super.
Do. do. do. do. with double fillets	"
Labour planing to fir	"
Inch rough boarding	"
Do. do. bracketing for soffit	At per foot super
Do. do. gutter boards and bearers	"
Do. do. weather-boarding, with splayed edges	At per square of 100ft. super.
Do. wrought do.	"
Do. do. one side and V-jointed battened boarding plugged to walls	"
Inch deal matched and beaded boarding to ceiling	At per square of 100ft.
Do. deal wrought and ledge trap door	At per foot super.
1½ do. do. and splayed linings dovetailed at angles	"
Splayed cutting and waste to ¾ in. boarding	At per foot run.
Tilting pieces	"
Springing piece to trimmer	"
Labour to Rebates	"
Do. do. Chamfer	"
Turning pieces to arches 4½ soffit	"
Stout rough fillets nailed to girders	"
2 deal rounded roll for lead	"
Herringbone strutting	"
1½ in. by 9 in. cut and stopped chamfered barge board	"
10 in. by 4 in. circular wrought ribs to ceiling screwed up in two thicknesses, framed and chamfered on 2 edges	"

	At per number.
Fir cleats to purlins	"
Rebated drips in gutter	"
Extra to dovetailed	"
cesspools in gutter	"
Oak templates 2ft. by	"
9in. by 6in.	"
Mitred intersections	"
of circular ribs, 10	"
in. by 4in.	"
Framed and mitred	"
angles to 6in. ribs.	"
Fixing screw bolts to	"
flitches—extra to	"
Do. to principals.	"
Do. straps with 2 bolt	"
each	"
Do. king heads to	"
trusses	"
Do. shoes to feet of	"
principals	"

I have thought it easier to keep this trade separate from the Joiner, although in a small job this is not always done. Next week I propose beginning the JOINER.

B.F.

NOTES ON STONEMWORK.—V.

MILLSTONE GRIT.

THE Yoredale Grit is found in several parts of the North-Midland counties, as at Bakewell Edge, in Derbyshire. It is a very handsome stone, and of it are built Bakewell Church, the Crescent at Buxton, and the front of Chatsworth House. Above these beds in geological order is the Millstone Grit, which is found in many parts of Derbyshire, Yorkshire, and Lancashire, being thrown off on either side of the great anticlinal axis of the Pennine chain of hills, or, as it is sometimes called, the back-bone of England, running in a generally north and south direction. The Millstone Grit consists mainly of thick-bedded quartzose sandstone, with layers of shale, and, in general, yields a stone which is hard, durable, and of a greyish or light brown colour, which is caused by the presence of one or another of the oxides of iron; nearly all sandstones contain these oxides. The Millstone Grit is massive, and of uniform composition for a considerable depth. It is especially suitable for engineering works, such as the piers and abutments of bridges, docks, foundations of engines and machinery, &c. From Bramley Fall, near Leeds, very large quantities have been procured. This is a coarse-grained stone, weighing about 150lb. per cubic foot. Experiments made on one-inch cubes showed a crushing weight of 13,632lb., according to Gwilt's "Encyclopædia of Architecture"; but this must be considered to be much stronger than the average, as, indeed, was the specific gravity of the specimens tested in this case, viz., 2506, which is a density which gives more than 156lb. per cubic foot. This crushing weight approaches nearly to that of Cornish granite, which is 14,302lb. on a cube of one inch; it is nearly three-fourths of that of Peterhead granite, which is 18,636lb. on the one inch cube, and rather more than half that of Aberdeen blue granite, which is 24,556lb.

In other places the stone is of finer grain, and more suitable for architectural works. In a paper read before the Literary and Philosophical Society of Manchester, by Mr. Binney, on the building-stones there used, it was said that as the Millstone Grit, as well as the beds of sandstone above it in the Lower Coal Measures, have most probably been formed of the debris of granite or granitoid rocks, there are found in them the proportions of silica, alumina, potash, iron, lime, and magnesia generally met with in those rocks. As a general rule, the more silica the rock is composed of, the better building stone it is. Iron or manganese in the state of protoxide, or sulphuret of iron, as well as clay, all damage the stone. The stones composed of silica cemented with silicates of soda, potash, lime, magnesia, or alumina, are all durable; but when clay or salts of iron form the cement,

the acids in the atmosphere have a very damaging effect on the building-stones containing them. The Millstone Grit formation consists of three chief members: the lower and upper grit, and the rough rock, or Highmoor stone, but in the Geological Survey this latter is included with the upper Millstone Grit, although beds of flagstones intervene in the neighbourhood of Rochdale. To begin with the lower beds, they are found at Roccross and Rhodes Wood, Tintwistle and the lower part of Pendle-hill, but they are hard to work, and therefore have not been so much used as other sorts; but it is, no doubt, one of the strongest and most durable stones of the series. In the lower parts of it are some beds of fine-grained sandstone, freer to work than the upper beds. An excellent bed of this stone is found at Bailey, near Ribchester. The upper millstone of Holcome, Bank-lane, Todmorden, Saddleworth, and Tintwistle, is a hard and durable stone, chiefly composed of silica. It is much harder to work than the rough rock, or summit stone, and stands the weather better. The rough rock is of a coarser grain than the stones above mentioned. It is composed of grains and rounded pebbles of translucent quartz, cemented together with partly decomposed felspar and a little iron and manganese in the state of oxide. It is soft when first quarried, and works pretty freely, hardening when exposed to the air. As a building-stone it is preferred, owing to its working much easier than the two millstones. Parbold, Horwich, Holcome Hill, Blackstone Edge, and Werneth Low, were said to be good examples of this stone. A stone much used for building in Manchester and the neighbourhood is the Halliwell, Woodhead-hill, or Lomax Wood rock, lying immediately under the best coal of New Mills. A fine sharp-grained siliceous grit is found sometimes above the Gannister coal, as at Ending Common, near Rochdale.

Stone from the Millstone Grit beds is largely used in the towns and villages of the North of England, as well as at Manchester, at Bolton, Blackburn, Haslingden, Burnley, Sipton, Bradford, Sheffield, and Leeds. "The stone is admirably adapted for resisting the smoky atmosphere of these large manufacturing towns, as very little lime enters into its composition."—(Hull.)

Immediately over the Millstone Grit there occurs, in Lancashire, Derbyshire, and Yorkshire, a series of strata of great thickness in the aggregate, known as the Lower Coal Measures, or Gannister beds, which produce excellent flagstones, generally micaceous, evenly bedded, and parted by bands of shale. These are largely worked in some parts of the country, as at Whiston (near St. Helens), Orrell, Billinge, Upholland, Catlow, Holy Fold, and at Bradshaw and Shawforth (near Rochdale), the beds of which lie under the rough rock and above the upper Millstone Grit; also at Oldham, Kerridge, and Shrigley (near Macclesfield), and at Wingfield Manor, in Derbyshire. These flag beds yield the stone generally used for parpoint work. Parpoint is the name commonly given in Yorkshire and Lancashire to a particular kind of walling, in which all the stones are "throughs," that is, that the depth of bed of all the stones is of the full thickness of the wall; and parpoint walling, therefore, is never of great thickness. But it would seem that "parpoint" is a corruption of another word, originally from Norman-French. In Parker's "Glossary of Architecture" the same kind of work is described as "Perpent-stone, Perpendicular, Perpyn.—A large stone reaching through a wall so as to appear on both sides of it; the same as what is now called a bonder, bondstone, or through, except that these are often used in rough walling, while the term perpent-stone appears to have been applied to squared stones, or ashlar; bonders, also, do not always reach through the wall. In Gloucestershire, ashlar thick enough to reach entirely through a wall is called parping ashlar. In Yorkshire, such

a stone would be called a through stone." The Glossary quotes the following from Cotgrave:—"Perpins,—perpenders or perpent stones; stones just as thick as a wall, and shewing their smoothed end on either side thereof," and from "Higin's Nomenclature"—"A stone that goeth through the wal, and is seen on both sides thereof; a perpendor or perpent stone."

The sandstones from the Lower Coal Measures in the neighbourhood of Halifax and Huddersfield, and generally known by the name of Yorkshire stone, are much used in Manchester and elsewhere, owing to their good colour and free working qualities. Many buildings in which these stones have been used show symptoms of decay, especially in the places where long pieces of stone have been required, and in moulding and ornamental work. In some cases, the sulphuric acid in the atmosphere has acted on the clay in these stones, and an impure sulphate of alumina is formed, which is washed out of the stone by rain, and then the grains of silica soon crumble away. The under-side of the projections of copings and string-courses often show evidence of decay, which seem to arise from the moisture percolating the stone and finding its way to the lower parts, which, owing to their being shaded from the sun, are nearly always wet, and are thus prepared for the action of frost. The sandstone of which the cathedral at Manchester was built (but it has now been rebuilt of better stone) was procured, said Mr. Binney, in the paper before mentioned, from Smedley and Collyhurst, suburbs of Manchester, two rocks belonging to the upper part of the middle coal-field. These stones contain a large amount of clay and peroxide of iron. Further down in the middle coal-field, sandstones are found which contain less iron in a state of peroxide, and smaller proportions of clay, and yet these stones are not suitable for outside work, as they contain protoxide of iron, and sometimes sulphuret of iron, which are scarcely to be seen in the white sandstone when first quarried; but on exposure to the atmosphere, the iron becomes further oxidised, and the stone "bleeds" and becomes discoloured, as well as decomposed. As a rule, the middle coal-field does not yield a building-stone fit for outside work in towns with a smoky atmosphere; and the stone found in the upper part of the coal measures is still less fit for such work.

A valuable report was made by the Commission appointed to examine all the kinds of stone in the country, with the view to the choice of the best for the new House of Parliament. This report is now out of print, and the few copies that can be obtained are charged at about ten shillings each, the original price being but eighteen pence. In it the Commissioners report of the sandstones they examined that that from Craigleith, near Edinburgh, is of a whitish grey colour, and weighs 145lb. 14oz. per cubic foot; Duffield Bank, Derbyshire, light brown, with dark brown and purplish tints, weighing 132lb. 14oz. per cubic foot; it contains grains of quartz of moderate size, and decomposed felspar, with an argillo-siliceous cement, iron spots, and occasionally plates of mica. The quarry joints are from 3 to 30 feet apart, and the beds have a slight dip. Of this stone the following structures are built, viz., S. Mary's Bridge, the Mechanics' Lecture Hall, and Bishop Ryder's Church, in Derby; Duffield Bridge, the Grammar School in Birmingham, and others; at Kenton, in Northumberland, is found a light-brown ferruginous sandstone, weighing 145lb. 1oz. per cubic foot; at Heddon, in the same county, a sandstone of a light-brown ochre colour, weighing 130lb. 11oz.; at Park Spring, near Leeds, a light ferruginous brown stone, weighing 151lb. 1oz. Several analyses of Millstone Grit, from various sources, show it to contain about 96 per cent. of silica, 1 of carbonate of lime, and 2 of iron alumina. It weighs on an average about 140lb. per cubic

foot, and contains about 0.5 per cent. of its weight of water, but is capable of absorbing about 4 per cent., or 8 times as much as it contains in its ordinary state. It will bear a weight of about 6,000lb. per square inch before crushing, but it is cracked with about half that weight. If we take the factor of safety to be 8, the safe load would be about 400lb. per square inch. The qualities of the various sandstones examined by the Commission before-mentioned were as follow.

Name of Quarry.	Craigleith.	Darley Dale (Sharcliffe).	Heddon.	Kenton.
Silica	98.30	96.40	95.10	93.10
Carbonate of Lime.....	1.10	0.36	0.80	2.00
Iron Alumina	0.60	1.30	2.30	4.40
Water and Loss	—	1.94	1.80	0.50

The specific gravity of each of these kinds of stone was found to be as follows :—

Of dry masses.....	2.232	2.628	2.229	2.247
Of particles	2.646	2.993	2.643	2.625

The weight of water absorbed, per centum, when saturated after the air had been extracted from the pores of the stone, so far as that could be done under the receiver of an air pump, was as follows :—

	0.143	0.121	0.156	0.143
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The disintegration, by Brard's process, for eight days, was as follows :—

Quantity of matter disintegrated, in grains	0.6	10.1	7.9
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This is a method adopted by M. Brard to discover in a short time the relative resistance offered by different kinds of stone to the action of damp and frost, and therefore to determine their durability with reference to exposure. It consists in boiling small cubes of the stones to be tested in a saturated solution of Glauber's salts (sulphate of soda), and then suspending them for several days in the open air. As they dry they become covered with an efflorescence of crystals, which must be successively washed off until the efflorescence ceases. If the stone resists the decomposing action of damp and frost, the salt does not force out any portions of the stone with it; on the other hand, if it yields to this action, small fragments will be perceived to separate themselves, and the cube will gradually lose its angles and sharp edges. The amount of this disintegration affords, according to the author of the process, a criterion of what would be produced in course of time by the action of the weather; but according to other authorities the expansion of water under frost, and the almost inappreciable expansion of Glauber salt when crystallising, are so very different things, that the one cannot by any means be taken as a test of the effects of the other.—(Page.) As, however, the Commissioners submitted many kinds of stone to this process, a few of which are given above, it may be useful to state the following abstract of the method recommended to be employed, as given by Professor Ansted.

1. Several specimens should be selected from the questionable parts of a block of stone to be tried, taking, for instance, those which present differences of colour, grain, or general appearance.

2. These fragments should be cut into two-inch cubes, with sharp edges, and each marked carefully, so that the part of the block from which they came may be referred to.

3. There must next be prepared a saturated solution of sulphate of soda, the solution being made with cold water, and a quantity of the salt left for an hour or two at the bottom, after as much has been taken up as the water will at first absorb. (It will be found that a quart of water will absorb more

than a pound of this salt at ordinary temperatures.) The saturated solution is then to be boiled, and the cubes prepared are to be plunged into the vessel in which the solution is boiling violently, care being taken that each one of the cubes is completely submerged. The boiling is then to be kept up, and the stones retained in the boiling liquid for half an hour exactly. If a longer period elapse, the effects produced exceed those of ordinary atmospheric action and frost.

4. When the boiling is completed, each specimen is to be withdrawn successively, and suspended from a string, taking care that it touches nothing else, and is completely isolated. Beneath each there is also to be placed a vessel full of a quantity of the solution in which it has been boiled, care being taken that it contains no fragments of the stone detached during the boiling.

5. If the weather is not too wet or too cold, it will be found that the surface of the stones, four-and-twenty hours after they have been suspended, is covered with small white acicular crystals of salt. When these appear, the cubes are to be plunged into the vessel below them, to get rid of the efflorescences; and this is to be done repeatedly, as often as crystals of salt are thrown out during the experiment.

6. If the stone resist the decomposing action of damp and frost, the salt does not force out any portions of the stone with it, and one finds neither grains nor laminae, nor other fragments of the stone in the vessel. If, on the other hand, the stone yield to this action, small fragments will be perceived to separate themselves, detached even from the first appearance of the salt, and the cube will soon lose its angles and sharp edges. The portions thus detached are preserved at the bottom of the vessel over which the cube is suspended, and their weight may be determined at the completion of the experiment.

7. The period of duration of the experiment, as recommended by M. Brard, should be four days, and at the end of that time the particles detached should be carefully weighed. The result is an index of the amount of disintegration suffered by the stone, and may be compared with similar results from other stones.

EDINBURGH.

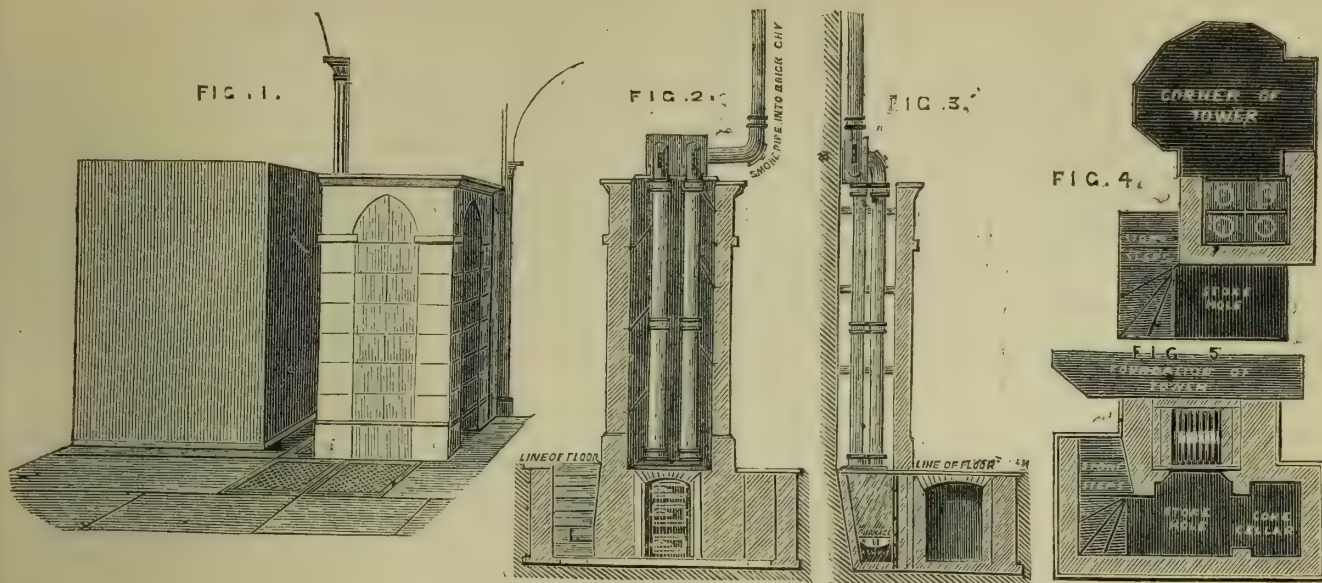
(FROM OUR OWN CORRESPONDENT.)

WHEN the Cathedral shall have been built, and the labours of our Improvement Trust completed, future generations will probably say that more has been done within the last few years for the beauty and amenity of Edinburgh than had been done since the New Town was built. Improvement schemes are not, however, always and in every way happy in results. We are losing the old landmarks, and many buildings of great historic interest and civic dignity have been swept away. The labours of the Trust, in the way of demolition, have made a sad exposure of the nakedness of our University on its northern front. The genius of Mr. Adam has been checkmated in this instance, and much affronted by taking him upon his rear. The building in question bulks more largely to the eye than any other edifice within the City, and the growth of the latter has unfortunately shut it up by narrow thoroughfares. To see the beauty of its design whole streets would need to be removed. The spectator finds himself involuntarily in the position of the artist who has come too near his subject, and finds the lines of his drawing taking ungainly curvature or indicating preposterous dimensions. The University labours also under the additional disadvantage (for a Classic building) of being built upon a steep acclivity. The height of elevation on the northern, is very much greater than that on the southern, side. The architect has met this difficulty by giving a separate design for every front. Three of these are elaborately decorated, but the fourth

(i.e., the northern) is bare as economy could make it. With exception of four very flat projecting surfaces, the two innermost crowned with pediments, and one large window in each of the four projections, this elevation has nothing to commend it but its bulk. The architecture throughout is of that solid but commonplace kind which has brought the aspect of the New Town into disrepute. Excepting the projection at Adam-square, the wall is all but naked of design, and is, besides, a blank on which the shadows can never fall. The windows alluded to are noticeable only as samples of the experimental design of the day, and not happy in their application of Classical details. It is evident that the architect never suspected that his northern front would be submitted to the criticism of spectators in such a broad thoroughfare as Chambers-street (80ft.) will be. North College-street was a narrow lane, in a chronic state of disrepair, which was telling disastrously on the College wall. People were glad to hurry through it, but with impressions of the towering altitude of the edifice, it was easy to believe in a magnificence they could never see. The glimpse of the long perspective of the whole obtained at Adam-square, on the eastern extremity, strengthened the illusion, and it was under these conditions that the architect spared the labour and expense of costly decoration and design. Had it been the principal front, the shade of Adam might have been satisfied, and a scheme for opening this up was mooted when the rebuilding of the Infirmary was first considered; but this has been abandoned, with the selection of another site for that Institution. A question at present engaging the keen interest of the public is how to make the best of the opening up of this, the northern, front. The best and easiest way would doubtless be to lay out all the ground in garden. This, however, would be no cheap amenity, and since Chambers-street must be built, the question now is, To build or not to build on Adam-square, or rather the small corner of it left after the thoroughfare is made? The Trust has recently decided, by a small majority, to do so. The question has its financial and legal aspects, but esthetically it is difficult to see what difference this little corner, if left unoccupied, could make as to commanding a better prospect for the College—a handsome junction of Chambers-street with the South-bridge would lend the building a charm by hiding part of its ungainly altitude, and thus better fulfil the conditions under which the design was originally made. These considerations, however, may all be set aside by legal difficulties, as some parties affirm that before the decision of the Trust can be effective this civic coach must be drawn through an Act of Parliament, which protects Adam-square from stone and lime.

Even 80ft., however, is far too little of distance to lend enchantment to the design of such a lofty front. There is urgent need for carrying out upon it some of the decoration profusely lavished on the other sides. Government, which has placed the College under great disadvantages by erecting beside it a building so small as the Industrial Museum, might do something. The contrast of the two thrusts itself upon the eye, and if any one is disposed to find allegory in a nursery tale, the juxtaposition will remind him of Beauty and the Beast—on its northern side our University is a princely building in disguise, and its interior quadrangle, by Playfair, is like a cave of the same fairy tale.

The timber work of the roof of the central part of the Industrial Museum is nearly completed. This Crystal Palace of the arts and sciences will be a very telling feature in the architecture of the city. The Venetian grouping of the windows, their light Byzantine arches and pillars of red sandstone, will subdue any glaring effect of superfluity of glass, whilst its freedom from slavish adherence to the ordinary details of the Classic style, gives it the charm of novelty. It is too much,



THE POLMAISE SYSTEM OF HEATING CHURCHES.

THE Rev. J. M. Taylor, in the *English Mechanic* of Nov. 8, 1872, described at some length the Polmaise system of heating churches; and in the last number of that journal gives the subjoined illustration of the apparatus. The four heating tubes communicate with a smoke-box, the 7in. tube acting as a chimney communicating with that box, which the artist has very properly represented as resting by claws on the top of the hot-air shaft. One only of the openings into the bottom of the hot-air shaft is visible, the other being opposite to it, but out of sight. Close to this opening, and let into the floor, may be a cast-iron flat tank to hold water, an open grating over it being flush with the pavement of the floor. The warmth of the floor so near the stove will cause this water to give off vapour, which will moisten the air as it is carried into the shaft by the current.

Explanation of Diagram:—Fig 1, elevation of hot-air shaft; Fig. 2, front section; Fig. 3, end section; Fig. 4, ground plan; Fig. 5, basement plan. The scale is about 8ft. to the inch.

THE HIGH PRICE OF TIMBER.

THE high and increasing price of timber arises from causes already recently alluded to in THE BUILDING NEWS, and recently the advance in cost will bear comparison with that of coals. There is very little room for bargaining at present. The foreign houses say in effect, and very often literally: "These are our prices, and you may take or leave the goods. But if you leave them, the odds are that we shall ask still more when you are compelled to purchase." It is, therefore a matter of importance that the building interest should be kept advised from time to time of the state of the market, as in these times the lapse of a few days makes all the difference in calculating the cost of a contract. It is certain that a further rise will take place in the price of Swedish goods, as the shippers are very firm, and some hardly care to name a price at present; and the same applies to Russian wood. Quebec yellow pine also shows a great advance, and it may be here remarked that so many cargoes have been lost by the dangerous system of deck loads as to positively influence the market. The importer cannot be to blame, for no one would prefer to receive twenty or thirty standards of deals in a discoloured and dirty condition, as deck loads are received in; and it will be remembered, by those who have known the trade for twenty or thirty years, that when a high duty was imposed on foreign wood, it was usual to petition the Board of Customs for a drawback on such loads, which was almost always granted. It is remarkable also that the United States compete with us for Canadian deals, and this is owing to the reckless destruction of the forests in that country. Square timber of all kinds is going out of fashion, except hard woods, and Quebec oak has advanced £1 a load. The returns of stocks at the public docks on the 1st of February are as follows:—1,637,000 pieces foreign deal, 960,000 battens; 1,625,000 boards; 45,700 loads of timber. Of

Colonial yellow pine, 1,217,000 pieces; Spruce, 430,000; Pine timber, 7,700 loads; and East Indian teak, 5,700 loads.

Freights from Memel have ruled at 16s. per load, and Dantzie quotations are 15s to 15s. 6d.

The following are the prices asked and readily obtained for timber and deals, all the quotations for deals and battens being at per Petersburg standard:—

	£	s.	d.		£	s.	d.
Archangel best yellow	14	10	0	to	15	10	0
Ditto second yellow	10	10	0	"	12	0	0
Australian Ironbark, per ton	7	10	0	"	9	0	0
British Guiana Greenheart, ditto	7	0	0	"	8	10	0
Christiania best yellow and white	10	0	0	"	13	10	0
Dantzie crown deck deals, per 40ft. 3in.	1	5	0	"	1	9	0
Ditto brack	0	17	0	"	1	0	0
Dantzie & Memel crown timber, per load	5	0	0	"	6	0	0
Ditto, best middling	4	0	0	"	5	10	0
Ditto good middling and second	3	15	0	"	5	0	0
Ditto common middling	3	10	0	"	4	15	0
Ditto undersized	3	0	0	"	3	5	0
Ditto small, short, and irregular	2	15	0				
Dantzie & Stettin crown oak	5	10	0	"	6	0	0
Ditto brack and unsquared	5	0	0	"	6	0	0
Finland best quality deals	12	0	0	"	13	0	0
Ditto battens	10	0	0	"	11	0	0
Ditto handsawn	9	0	0	"	10	0	0
Ditto ditto battens	8	10	0				
Flooring boards per square of lin. :—							
First yellow	0	12	6	"	0	13	6
White	0	10	6	"	0	12	0
Second qualities	0	9	0	"	0	11	0
Matched boards, 5in. to 7in.	0	8	6	"	0	10	6
Norway deals	9	15	0	"	10	15	0
Ditto battens, all sorts	7	10	0	"	9	5	0
Petersburg best yellow.	12	10	0	"	13	15	0
Quebec best floated yellow pine	20	0	0	"	21	10	0
Ditto best bright	22	0	0	"	24	10	0
Ditto second floated	14	15	0	"	16	5	0
Ditto second bright	15	10	0	"	16	15	0
Ditto third floated	10	5	0	"	10	15	0
Ditto third bright	10	10	0	"	11	10	0
Ditto first white spruce	11	15	0	"	12	0	0
Ditto second	9	10	0	"	10	10	0
Ditto third	9	0	0	"	10	0	0
Prince Edward's Island and Lowerport spruce.	9	0	0	"	9	5	0
Spruce battens	9	0	0	"	0	0	0
Quebec red pine for building purposes, per load.	3	10	0	"	4	0	0
Ditto large yellow pine	4	10	0	"	5	5	0
Ditto Waney Board yellow pine	4	0	0	"	6	0	0
Ditto small.	3	5	0	"	4	0	0

perhaps, to expect that any public edifice here should escape the inevitable in the form of ornamental vases and the balustrade, and we have them here of no novel pattern. The main entrance is by three lofty archways, but this part sadly lacks projection. Amid the multitude of arches, great and small, around them, they are hardly distinguishable at a little distance. The scroll keystones on the arches are not only out of keeping with the style, but give no sufficient emphasis to the doorways, and should be chiselled off. It may, however, be in contemplation to add something in the way of a porch and staircase.

The Watt Institution is the only other building in progress in this street, and it is not nearly finished. The statue has now been placed over the porch, and looks infinitely better than of old. The exterior of the building is light and graceful in design, and the porch makes an excellent stand for the statue.

Owing to the state of the market for labour and materials, the builders of the city have urged the necessity for a revision of the method of taking out the quantities of mason-work. The same revision, I believe, is at present going on in Glasgow, but the results have not transpired. There is no very uniform standard of proceeding in the matter, and no written authority existing of any value. England has not a few works upon the subject—some of them very full, such as Reid and Garbett. The papers publishing in the BUILDING NEWS will no doubt be the more valuable as the latest exposition of the subject. All these works, however, seem to ignore the fact that walls are sometimes built of stone: and it would be of advantage, or at least, interesting, to your Scotch subscribers to know the English method of measuring the rubble. There seems to be no reason why a uniform method of measurement should not prevail, and that in reference to all the Building Trades. The best ought to prevail, and architects and contractors would thus know the value of the scheduled quantities in any district of the country.

By mistake of the printer, the roof of the Drill Hall here was said to be designed by Mr. Bond, when it should be Mr. R. H. Bow, C. E.

At Rome, in the Villa Casali, just outside the gate of S. Sebastian, on the old Appian Way, an ancient sepulchre has been recently discovered. It contains three sepulchral chambers, in which have been found four sarcophagi of white marble, sculptured with fine bas-reliefs. These represent: On the first, the Muses, one of whom, crowned with flowers, is supposed to be the portrait of the lady whose remains were found within; on the second, Bacchus and Ariadne; on the third, a hunting scene; on the fourth, the door of a tomb. All are in perfect preservation.

Pensacola pitch-pine timber	4 0 0	"	4 10 0
Quebec oak	7 0 0	"	8 0 0
Ditto rock elm	4 15 0	"	6 0 0
Ditto ash	4 10 0	"	5 0 0
Ditto large birch	5 0 0	"	6 5 0
St. John's birch	4 5 0	"	5 0 0
Ditto small average	3 15 0	"	4 10 0
Riga fir timber	4 0 0	"	4 10 0
Red pine masts	4 10 0	"	6 0 0
Swedish mixed deals	13 0 0	"	15 0 0
Ditto thirds	11 10 0	"	12 10 0
Ditto fourths	10 0 0	"	11 0 0
St. John's white spruce	9 5 0	"	10 0 0
Stettin fir timber, per load	3 0 0	"	3 10 0
Swedish ditto	2 12 6	"	2 15 0
Swedish balks	2 10 0	"	2 15 0
Wyburg best yellow	10 10 0	"	11 10 0
Memel crown oak, per load	5 10 0	"	7 10 0
Ditto brack	5 5 0	"	
United States pitch-pine planks	15 10 0	"	16 10 0
Teak (Indian)	14 10 0	"	15 10 0
Mahogany, per superficial foot:—			
Honduras, cargo average	0 0 7½	"	0 0 8½
St. Domingo ditto	0 0 8	"	0 1 0
Tabasco ditto	0 0 8½	"	0 0 9
Mexican ditto	0 0 7½	"	0 0 8½
Cuba ditto	0 0 8	"	0 1 0
Cuba cedar	0 0 6½	"	0 0 7½
Honduras	0 0 6½	"	0 0 7
Pencil	0 0 2	"	0 0 4½
Rio rosewood, per ton	15 0 0	"	25 0 0
Bahia	13 0 0	"	18 0 0
Lathwood, Petersburg, per fathom, 216ft.:—			
Petersburg	11 0 0	"	12 10 0
Riga, &c.	8 10 0	"	10 0 0
Wainscot logs, per 18ft. cube:—			
Riga crown, English and Dutch	5 5 0	"	6 15 0
Ditto brack	4 10 0	"	4 15 0
Memel and Dantzic crown	4 0 0	"	4 10 0
Ditto brack	3 10 0	"	3 15 0
Ditto crown staves, per mille of pipe	240 0 0	"	250 0 0
Ditto brack	225 0 0	"	235 0 0
Canadian standard pipe:—			
Punchon, per 1,200 pieces	33 10 0	"	35 0 0
Bosnia single barrel, per 1,200 pieces	34 0 0	"	35 0 0
United States pipe:—			
Hoghead, heavy and extra	45 0 0	"	60 0 0
Ditto slight	30 0 0	"	32 10 0

The present price of fancy woods will be maintained, or more probably increased. Walnut may be excepted, as it does not find a ready sale, owing to the market being overstocked. The present rates are, for Italian, 4½d. to 5d. per superficial foot; Black Sea, 4d. to 5d.; and Canadian, 4½d. to 4½d. All descriptions of satin-wood are readily sold on arrival, for the stock at the docks is held by dealers. S. Domingo commands 1s. to 1s. 3d. per foot superficial; Bahama, £6. 10s. to £7. 10s. per ton; and East India, £7 to £8. All kinds of lignum vitæ go off well; S. Domingo is quoted at £5 to £10 per ton; Cuba cocus wood at £5 to £6. 10s.; and large sized timber is exhausted. Ceylon ebony, £10 to £15; Turkey boxwood, £5 to £16.

In the face of these prices it is evident, as has been before argued in these pages, that mercantile enterprise will soon find fresh fields for its development. In an article on Queensland timber it was pointed out last year that matters were rapidly tending to this, and there can be no doubt but that Queensland hard wood and other woods deserve the attention of importers. A small importation at first may be safely suggested. It would test the market and enable the trade to pronounce an opinion. It is all a matter of price, for if that is within bounds, a judicious selection from the samples shown at the Exhibition of 1872 would probably result in opening up a market. But such a selection would have to be very carefully made, and by one of considerable experience in the wants of this country.

A new church is to be erected at Walmer, the old chancel being retained as a mortuary chapel for the graveyard.

DR. HARDWICKE ON MODEL DWELLINGS FOR WORKING PEOPLE IN TOWNS.

A MEETING was held by the National Health Society on Thursday, 6th February, at 1, Adam-street, Adelphi, Mr. F. Pennington in the chair, at which Dr. Hardwicke, Medical Officer of Health for Paddington, read a paper on "Model Dwellings for the Working Classes in Large Towns."

Dr. Hardwicke emphatically denounced the evils attendant upon the letting out of property utterly unfit for human habitation, and characterized the transaction as a speculation in which life and health were at stake. He believed that no better means could be devised for destroying health and producing pauperism on a large scale. The demolition of such houses is loudly called for, in all parts of the country as well as in London. Dr. Hardwicke's remarks on the unfair legal facilities for distressing for rent, and on the consequences of this, met with support. He observed that it was not fair to tradesmen who supplied the various necessities of life that a preference should be given to one class of individuals, viz., the landlords, whose prior and immediate claim upon bed-furniture, cooking utensils, and other means of securing warmth in this climate was the means of simply jeopardising the lives and health of many innocent persons, thereby creating burdens upon the poor-rates, and making wider than ever the discreditable extreme between rich and poor in our vaunted state of civilisation. After speaking of the model buildings in London, such as those built by the Corporation of London, and the Waterlow buildings, which he said were rather costly, although, perhaps, the best types at present in existence in London, and expressing some doubts of their adaptation to the wants of the artisan class generally, he proceeded to give a description of a set of block-buildings, which he thought embraced more of those benefits sought for and required by working people, to make a pleasant and attractive home. The Doctor has not much faith in men becoming better citizens by owning suburban freehold cottage property. He says cottage property in the hands of small owners cannot be kept in sanitary condition without constant and irksome sanitary supervision, and he gives good reasons why this is so. The kind of building he recommends is on the block system, capable of accommodating fifty to one hundred families, in sets of room of various rents, some looking on the street and some inward on to a covered court paved with asphalt. The familistère of M. Godin, at Guise, he takes to be a model, having visited and carefully examined it in all its details. He proposes that in, or closely adjoining the block building, there should be a common room and kitchen below; with these a smoking and club-room should be provided. There should be a washing and ironing-room; washing and drying should only be done away from the living-room; it is, he observes, a real sanitary nuisance, when conducted in the room where the family have to eat, drink and sleep. An infant and other school is also proposed in a suitable part of the building. The upper story is devoted chiefly to workshops, which are well lighted from above, and able to be let at a low rent, varying according to the size: in this range of the building are dormitories, or single bedrooms for males and females separate on each side. They are to be kept clean by the women who have charge of the stair corridors and water-closets. Plans and sections of such a building as proposed by Mr. Hardwicke were exhibited. These were designed by Mr. Seddon, who had endeavoured to embody all the ideas suggested in the sketch exhibited, and appears to have succeeded in adapting the apartments to a class of persons likely to appreciate comfort, cleanliness, and other conveniences.

Dr. Liddle, of Whitechapel, Mr. Banister Fletcher, Dr. Shrimpton, Mr. Baldwin Latham, Mr. Patterson, Mr. Seddon, and other gentlemen took part in the discussion which followed, and which turned upon what are the best methods of providing comfortable and healthy homes, and whether it is desirable that the State or municipalities should assist in improving the dwellings of the poor, and if so, in what way. Regarding the proposed block-building, a doubt was expressed as to the ventilation, with the glass covering over the court-yard; one gentleman alleged that there would be an obstruction to light and ventilation; but it was fully explained by Dr. Hardwicke, and corroborated by Mr. Baldwin Latham, that proper ventilation could be readily

effected, and that the closed area was cooler in summer and warmer in winter than an open court. The lecturer said that the air entered from below, and made its exit from the roof, which was the proper principle of ventilation, and that this had been well tried and approved in M. Godin's familistères.

The meeting concluded with a vote of thanks to the lecturer and the chairman.

MUSEUM OF FINE ARTS AT BOSTON.

THE Americans are now building in Boston one of the largest structures ever dedicated to the arts. A museum for works of art which, when completed, will cover an area of nearly two acres, is in progress, from designs originally made by Messrs. Sturgis and Brigham, of Boston. The designs have undergone some changes under the superintendence of Mr. J. K. Colling, who has made all the working drawings for the details of the ornamental façades. These are now in progress at the Terra Cotta Works, Stamford. The style of the building is Mediæval; the ground floor is of granite; the first and second floors and the whole of the exterior of the upper portion of the work is to be of red brick and terra-cotta. The plain red brickwork will be formed of the Boston bricks, which are much smaller than English bricks, being not quite eight inches long by two and a quarter inches in height. The portions now in progress at Stamford consist of the principal front and two return ends and back front to an open court. In the centre is a large portico of two arches, adorned with sculptured ornaments and statues. The windows are deeply recessed, and divided by enriched columns, which, with their capitals and bases, are nearly 13 feet in height. From the columns spring pointed arches, and the soffits of all the voussours of the arches are fully enriched, as are the key stones and springers of the arches; and the tympani of the arches are also sculptured. Between the arches of the first floor there are, in niches in red terra-cotta, life-size portrait heads of eminent sculptors, painters, architects, and engravers, also of some of the great patrons of art, including Prince Albert, Cosmo di Medicis, Pericles, &c. The second floor windows will be adorned with enriched columns, arches, and panels, with portrait heads in the tympani. There are gables on front and wings, which will also be enriched with sculpture, and panels for bassi-relievi, illustrating ancient and modern art, 6 feet by 19 feet. The façades now in progress at Stamford equal in length about 320 feet. Except the brickwork, the whole construction of the exterior above the granite ground floor is of terra-cotta of warm buff colour and of red. The shafts of the columns are red; the bases, capitals, arches, and string-courses are buff; some of the large plain surfaces are decorated with panels of deeper work in red. Among other works now in progress at the Stamford Terra Cotta Company's premises are details in red terra-cotta for a large Tudor building for Mr. Wells, M.P., of Holmewood, and some large brown vases in brownish grey terra-cotta for Mr. Finch, of Burley-on-the-Hill, besides numerous small objects of fine art.

Lord Dudley has offered to defray the cost of paving the nave of Worcester Cathedral with black and white marble. The cost will be between £4,000 and £5,000.

MUNICIPAL BUILDINGS FOR BIRMINGHAM.—On Tuesday, at a meeting of the Birmingham Town Council, the subject of the proposed municipal buildings for the town was discussed. The Estates and Buildings Committee recommended that the architect of the design and plan to which the Council awarded the first prize of 200 guineas (Mr. T. Thomason, of Birmingham) should be instructed to prepare the necessary drawings and specifications for carrying out so much of the plan as referred to the corporate buildings, and that tenders be obtained for carrying out the work. It was stated that the estimated cost of the buildings was £85,000, and that it could be paid without any increase in the present burdens of the ratepayers, as the present heavy payments on account of the loans in respect to the Lunatic Asylum and prior were lapsing. The present buildings were strongly condemned; and, after two amendments for delaying the work had been defeated, a resolution in accordance with the report of the Committee was passed by a large majority.

Civil Engineering.

THE NEW WAVERLEY BRIDGE AT EDINBURGH.—On the 6th inst. the new Waverley Bridge, built at a cost of over £20,000 by the North British Railway Company, to connect Cockburn-street with Princes-street, and form an improved access to the New Waverley Passenger Station, was opened for public traffic. The bridge is constructed of iron, on the lattice girder principle, with a mean length of 303 feet, and a breadth of 73 feet 6 inches, and was designed by Mr. Bell, chief engineer of the North British Railway Company. It is carried on seven main girders, six feet deep, and raised twenty-six feet three inches above the level of the rails below:—The length of these girders is as follows:—The eastmost 319 feet 9 inches; second, 314 feet 1 inch; third, 308 feet 5 inches; fourth, 302 feet 9 inches; fifth, 297 feet 1 inch; sixth, 291 feet 5 inches; and seventh (westmost) 285 feet 9 inches. The spans of the bridge are of varying width to suit the exigencies of the railway, which at this point spreads out like a fan—the lines to the south being appropriated for goods traffic, and those to the north for passenger trains. The main girders are supported on three rows of cast-iron columns—the northern row having six, and the centre and southern rows seven columns each. These pillars, which rest on stone foundations sunk to a considerable depth, are octagonal in shape, and have capitals of simple design. Being on the skew, the spans present the following measurements:—On the west side, from abutment to pillar, 96 feet, then 96 feet from pillar to pillar, and lastly from pillar to abutment 84 feet; on the east side, 57 feet 3 inches from abutment to pillar, 67 feet 3 inches from pillar to pillar, 96 feet from pillar to pillar, and 96 feet from pillar to abutment. It will thus be seen that the bridge is longer on the west than on the east side. The masonry of the abutments is eleven feet thick, and sunk twelve feet below the surface. The upper works of the bridge are constructed with top and bottom flanges. Both flanges are eighteen inches broad, and consist of two plates, three-quarters of an inch thick, connected by two angle-irons at the web plate. The lattice bars are three feet apart, and are made of channel iron; and besides being riveted at top and bottom, are riveted at the centre back to back. The cross-girders, corresponding to rafters in a house, are three feet apart, and riveted to the top web of the main girders. They are covered with Mallet's patent buckle plates, each of which is stamped out in the centre with a rise of about three inches, and riveted all round the sides. The buckle plates are connected with rows of T iron, which have the effect of stiffening the floor. The structure is stiffened laterally by cross girders, nine feet apart, resting on the bottom flange of the main girders, and riveted to them. Again the bridge is further stiffened in the two outer spans by angle iron diagonal bearings, fixed on the top of the lower cross girders. A layer of asphalt is laid over the floor-plates, and upon this a foot of concrete, which supports the granite causeway. The width between the main girders is 10 feet 6 inches, so that the total breadth of the bridge is 73 feet 6 inches. The roadway is 48 feet 6 inches wide; while the east footpath is 12 feet, and the west footpath 10 feet broad, giving a total width between the parapets of 70 feet 6 inches. The parapets, which are bolted on the main girders, are divided into panels of open iron-work six feet wide, separated by pilasters of rounded caps. Handsome octagonal pillars divide the bays of the bridge—each pillar being surmounted by an octagonal cap, on which is fixed an ornamental lamp with three-branch lights.

THE BROOKLYN SUSPENSION BRIDGE.—The East River Bridge, which will eventually connect Brooklyn with New York, is steadily progressing towards completion. It will really be more than a bridge—a suspended highway connecting the two cities. Of this entire highway, which is 5,989 feet long, 3,455 feet are suspended in three main openings, and these constitute what may be called the bridge proper. The central span will cross the river in one single span of 1,595 feet 6 inches from centre to centre of tower. From each tower towards the land side, half spans will be supported by the land cables, 930 feet long each, measuring from the centre of tower to face of Anchor Wall. From the Anchor Wall, on the New York side, a distance of 1,562

feet to the City Hall, and from the Brooklyn Anchor Wall to the Brooklyn terminus, a distance of 971 feet. These distances, known as approaches, will be supported by iron girders and trusses, and will rest at intervals upon small piers of masonry or iron columns located within the blocks of buildings, which will be occupied. There will be one uniform grade of 3 feet 3 inches per 100 feet from the New York terminus to the centre of the bridge, and the same from the Brooklyn Anchorage. The roadway will pass the towers at an elevation of 119 feet, and in the centre of the main span the elevation in the clear of the lower chord of the bridge will be 135 feet above mean high water, or 140 feet above low water. The superstructure will consist of an iron framing 85 feet in width from out to out, suspended from four main cables by wire rope suspenders attached to iron floor beams, which are placed seven feet apart. The flooring of the bridge is to be divided into five grand spaces by six lines of iron trusses, of which the two centre lines will have a depth of 12 feet and the others of 8 feet. The outer spaces of the bridge have a width in the clear between the trussposts of 18 feet, and accommodate each two lines of tramways for ordinary vehicle travel, as well as for street cars drawn by horses. The next two spaces are 13 feet 2 inches wide, each provided with rails for the running of the trains above described. The bridge is supported by four main cables—two outer ones, and two near the middle of the flooring. They will be 16 inches in diameter, composed of galvanised, tempered cast-steel wire, having a strength of 160,000lb. per square inch of section. The cables are aided by a system of 104 stays in each quarter. They together will uphold the superstructure of the main span, the aggregate weight of which, inclusive of cables, will be 5,000 tons. The two towers form the principal features of the work. At the water-line the New York tower has a length in the direction of the river of 141 feet, and a width of 59 feet. On top of the timber foundation their dimensions are respectively 157 feet and 77 feet, while the base of the foundation measures 172 feet by 102 feet. From the base of the foundation to the top of the balustrade will be 354 feet. The quantity of masonry in the New York tower, from the timber to the summit, is 44,000 yards, giving a weight of about 93,000 tons on top of the timber foundation, superstructure included. The anchorages contain each 33,000 yards of masonry. No rock being available, it is necessary to provide artificial foundations, extending to the water-level with an excavation of 20 feet; that in Brooklyn consisting of a timber platform; and that in New York of piles. The anchorage forms a mass of stone, 129 feet by 119 feet at the base, and 117 by 104 at the top. The height is 89 feet above the river. The four anchor plates are located in the base of the masonry. They consist of castings, oval in outline, with radial arms, having a dimension of 19 feet by 17 feet and depth of 3 feet, weighing 25 tons each. The arrangement of the anchor walls is such as to have two large spaces in each, 80 feet long by 20 feet wide, and divided into six storeys, serving for warehouses above, and for an underground railway passage in the lower storey.

THE OBELISK OF ALEXANDRIA, AND ITS TRANSPORTATION TO ENGLAND.

MR. J. L. HADDAN, the Director of Public Works at Aleppo, in a letter to the *Engineer*, offers a new suggestion as to the best means of effecting the long-delayed transportation of the Alexandrian Obelisk to England. He recommends the building up round the obelisk itself a solid or partially solid wooden casing, so as to transform the square obelisk into a long cylinder, which can thus be easily rolled down to the sea on ladder-shaped baulks of timber. Seeing that the larger the cylinder the easier the traction, its diameter would purposely be made so considerable that the timber thus applied will likewise serve the purpose of floating the whole structure after it is rolled into the sea. Once on the briny element, it will be towed to Whitehall without further trouble, and can be hoisted intact, packing and all, on to the Embankment, either by the risings of several tides or by a few rams. Once on terra firma, as before, it will be transported to its site by rolling. The weight of the obelisk being about 284 tons, about 320 tons of wood would be required to float it, if the casing were solid throughout, which, how-

ever, is not strictly necessary. Taking into consideration the weight of the bolts, bands, &c., the diameter of the cylinder would be about 20ft., while its length would be 72ft., or 6ft. in excess of the obelisk itself purposely added at the thicker end of the monolith, so as to insure horizontal flotation. The timber casing can easily be applied to the granite shaft by scraping out the sand little by little from under it. The 3in. planks of which the casing would be constructed would not be applied longitudinally, but in discs bolted together, after the manner of calender rolls on a large scale. Mr. Haddan has not very carefully estimated the cost, but he thinks that by these simple means the transport of Pharaoh's Needle to London would not cost more than one-third that of the plan previously proposed, while the risk would be considerably lessened.

THE DUTCH STOVE.

THE enormous and unprecedented advance in the price of coals which has recently taken place will render the cost of fuel a very serious item to persons with small incomes, and will also seriously affect manufacturing interests. Coals are becoming "black diamonds" indeed; but their present costliness will not be without very great compensation if it induces a less extravagant consumption. All who are competent to speak upon the subject are unanimous in declaring that there is great wastefulness in the use of coal for generating steam; while as to domestic fire-places, it is well-known that they consume twice or thrice as much coal as is necessary, and that in most of them the heat goes up the chimney. The present high price of coals will prove a "blessing in disguise" if it leads to more persistent and sustained efforts being made to secure something like complete combustion, and, as a consequence, to the effecting of greater economy. Sir William Armstrong recounted in the *Times* the other day how, at the Elswick Works, 25 tons of coal have recently been made to do the work which has hitherto required the consumption of 60 tons; this shows that manufacturers are beginning to feel the importance of the subject. As to domestic fireplaces, "A Lieutenant-Colonel of Royal Engineers" writes as follows respecting the Dutch stove:—The stove, as I have seen it used in Holland, combines the advantages of the close stove and the open fireplace. It is simply an iron stove open in front. The Dutch, who are a very economical people living in a cold climate, use nothing else; and I have known a room kept perfectly warm by one of them with a few lumps of turf cut off the neighbouring bog. The stoves, if bronzed, would be very ornamental in appearance, are very cheap, and are set under the mantelpiece, like our English fireplace, but instead of being situated in the recess of a thick wall, stand a few inches into the room, and diffuse their heat in every direction. In my opinion, they are more ornamental than the black sooty openings of our English fireplaces, and there can be no comparison in the cost of the fuel consumed by them. In addition to the saving in the quantity of fuel, a large saving is also made in quality, as an inferior coal or coke makes as good fuel for them as the best screened Wallsend coal.

THE CONTRACTS FOR THE NEW TOWNHALL, MANCHESTER.—At the recent meetings of the Manchester City Council considerable discussion has taken place with reference to the contracts of the New Townhall. There is in the council a strong party who desire that some part of the work should fall into the hands of local builders. The subject again came up at a meeting of the council on Wednesday, the 5th inst., when, on the adoption of a fresh report by the sub-committee being proposed, an amendment, "That the remainder of the contract on the New Townhall should be let by competition," was put and carried by 34 against 25, after a protracted discussion. The entire cost of the building will be close on £1,000,000.

THE LONDON AND COUNTY BANKING COMPANY.—The annual general meeting of this successful corporation was held on the 6th inst. The customary half-yearly dividend of 6 per cent. was declared, together with a bonus of 4 per cent., making, with the dividend and bonus paid in June last, a total return of 20 per cent. for the year 1872.

The salary of Mr. Hewson, the Borough Surveyor of Rochdale, has been increased from £250 to £400 per annum.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SIR GILBERT SCOTT'S DESIGN FOR EDINBURGH CATHEDRAL.

We are enabled to give this week a double-page perspective view of Sir Gilbert Scott's design for this Cathedral, with the two Western Towers, which have been added at the request of the Trustees since the award was made, and about which a considerable amount of correspondence has taken place. We also give a perspective view of the Interior, as designed by Sir Gilbert Scott. The week before last we gave a double-page view of the North Elevation, and last week we gave Two Bays of the Nave, Two Bays of the Choir, and Ground-plan. With the aid of these seven illustrations, our readers can form a pretty correct conception of this noble design.

MR. ROSS'S DESIGN FOR EDINBURGH CATHEDRAL.

Having given in a preceding number (see BUILDING NEWS, Jan. 24) a double-page view of the South Elevation of this design, we give this week the West Front, which was so particularly alluded to by Mr. E. W. Godwin and G. F. Roper in our last impression. It now seems that this design was made in London before it was submitted to Mr. Ross, at Inverness, and then, it appears, copied line for line by its author, in Mr. Ross's office, and under Mr. Ross's "immediate superintendence."

MR. BURGESS'S DESIGN FOR EDINBURGH CATHEDRAL.

We are further enabled to give this week the West Elevation of Mr. Wm. Burgess's rich design for the same Cathedral. As we intend to give next week other illustrations, including a double-page transverse section of this design, we will postpone any further observations till then.

WILLESDEN CHURCH: NORTH-EAST VIEW.

Our other photo-lithographic illustration this week represents Willesden Church, which has recently been restored by Mr. Edward J. Tarver, architect. For ample information about this church, its history and restoration, see our report of proceedings of the Architectural Association in this week's BUILDING NEWS. We repeat what we stated last week, that we shall be glad, when opportunity permits, to illustrate, as well as report, suitable papers read before our Architectural Societies.

A TIMBER ROOF OF 100FT. SPAN.

(From our Own Correspondent.)

A TIMBER roof of the widest span upon record in this kingdom has been erected, and tested, at Oldham, by Messrs. McTear and Co., the well-known felt manufacturers of Belfast, London, and Manchester. It is constructed upon the bow-and-string lattice-girder principle, and consists of 18 girders, of 100ft. clear span between the walls. The test to which it has been subjected affords data of great practical value that have not, hitherto, been supplied or ascertained. The roof has been erected over the drill shed of the 31st Lancashire Rifles—a building just completed under the superintendence of Messrs. Blackburn, Son, and Page, engineers, of Oldham. The area covered is 100ft. wide, and 160ft. long, in the clear. The site of the building is upon one of the highest levels of the hill-crest upon which the town of Oldham is built; and, consequently, the roof is exposed to the highest pressure of gales of wind, and to the most extreme falls of snow. During the progress of the work, nine of the girders, raised into position and temporarily secured by guide-lines, were blown down. This accident proved the sound construction of the girders, not one of them being materially damaged by falling from a height of 15ft.; and led to a severe practical test being applied before the girders were re-hoisted.

The girders, as before stated, are constructed

on the lattice bow-and-string principle. The strings are 104ft. in length; the depth of the girders in the centre is 10½ft.; the radius of the bow is 123ft.; the camber of the strings is 10½in. in the centre. The timber in the bows and strings is American yellow pine; the other is spruce fir. The whole of the work is spiked and nailed; without tie-rods, bolts, shoes, iron flitches, straps, or iron adjuncts of any kind beyond spikes and nails. The strings are each formed with two flitches, of 10in. by 1½in., one flitch being formed with two lengths and the other with three lengths of scantling, spliced, or plain scarfed together. The two flitches are set at a distance of 2½in. apart, to receive the lattice work. The intermediate spaces in the strings between the lattice work are packed with filling-in pieces of the same thickness as the lattice, placed with the grain reversed to that of the lattice work, and securely nailed to the lattice and flitches. By this means the strings are rendered compact and solid. The lattice work is formed with scantlings of 4in. by 1½in. The lattices are set out from the bow of the girder, as a basis, at right angles with each other, and at a distance of 2½in. apart. In the strings they are secured in their double thickness, occupying the 2½in. of space between the two flitches; in the bows of the girders they are secured flush with each other in a space of 1½in. Each lattice apex passes through the bow, and is notched to receive and clip the purlins. The bows are formed with two flitches of 3½in. by 1½in., bent to the required arc, and held in position by being nailed to web-pieces at each foot, about 5ft. long and 12in. deep, and to the lattice-work throughout, without any other stays or fastenings. The purlins are formed with two flitches of 3in. by ¾ths of an inch each, nailed together from end to end of the building, and notched to the girders. They are placed at a distance of 21½in. apart. There are no rafters. The purlins are covered with a sheeting of ½in. boarding. Upon the boarding Messrs. McTear & Co.'s roofing-felt is laid, and finished with a coating of impervious roof-varnish.

The walls upon which the roof stands are about 15ft. high, built in 14in. brick-work, with stone dressings. Under each girder the walls are increased to 2ft. in thickness, by internal piers. In appearance the roof internally fulfils the demands required for such a building. It is open to the sheeting. The timbers are all left from the saw. The camber line of the eighteen girders is pretty uniform throughout, and generally the soffits of the strings are straight for sawn work. Notwithstanding the slowness of the scantlings and the extreme width of the span, there are no indications of insecurity or weakness: and Messrs. McTear & Co., in all probability, will not be called upon for any outlay under a guarantee which they have given for the stability of the work for ten years.

The testing of the work was conducted by one of the engineers, Mr. Page, and Mr. Nicholl, the Manchester representative of Messrs. McTear & Co. It was watched with great interest by Colonel Lees and other officers of the corps, and the result has been accepted as satisfactory.

Two of the girders were taken for testing, and placed about 8ft. apart, their ends resting upon footings with a clear space of 100ft. between. One girder was entirely new, the other was one that had fallen and sustained damage in the accident before referred to. Being with some difficulty steadied in position to receive this test fairly, they were evenly loaded with sawn timber, from end to end, with the following results. At starting, the camber of the strings varied in the two girders. In the damaged one, before testing, the camber in the centre rose 10½in. above the horizontal line from bearing to bearing. At 20ft. from the bearing on the left hand, it rose 4½in.; at 20ft. from the bearing on the right hand, it rose 4½in. With an evenly-distributed load of 4½ tons over the entire length of the two girders, the string of this one was deflected 2.2in. in the centre; 1.8in. at 20ft. from the left-hand, and 1.9in. at 20ft. from the right-hand bearing. With a similarly distributed load of 10 tons, the deflection was 4.6in. in the centre, and 3.5 and 4.0in. respectively at the two points before mentioned. When the weight was entirely removed, the camber of the string in the centre stood at 8½in., showing a loss of 2½in. after sustaining a weight equal to 5 tons, assuming that the weight of 10 tons was equally borne by the two girders.

In the other girder, the original camber was 12½in. in the centre; 5½in. at 20ft. from the left-

hand, and 5½in. at the same distance from the right-hand bearing. Under the weight of 4½ tons, sustained in conjunction with the other girder, the deflection of this string in the centre was 2.2in.; and at the other two points 1.7in. Under its share of the full weight of 10 tons, the centre was deflected 4.7in.; and at the 20ft. distances, 3.9in. and 3.5 respectively. After the weight was removed, this string went back to 10½in. in the centre, showing a loss of camber, after sustaining a weight of 5 tons, of 1½in. in 100ft.

Each of the girders, weighing about 15cwt., was constructed within the building, and hoisted with a collar from the centre into its position. They displayed no signs of weakness in being hoisted. The wall-plates are held down by wrought-iron wall-hooks, built perpendicularly into about 3ft. of brickwork.

The cost of a roof of these extreme dimensions would at the present time, in consequence of the higher prices of labour and materials, be about £3. 10s. per square of 100 superficial feet. The contract for this roof was made before the rise in prices, and was taken for about £3 per square complete, exclusive of the cost of testing. The cost of testing, amounting to a considerable sum, has been defrayed by Messrs. McTear & Co., to whom, with the engineers, the public are indebted for the publication of this contribution of data in the scientific practice of cheap roof-building.

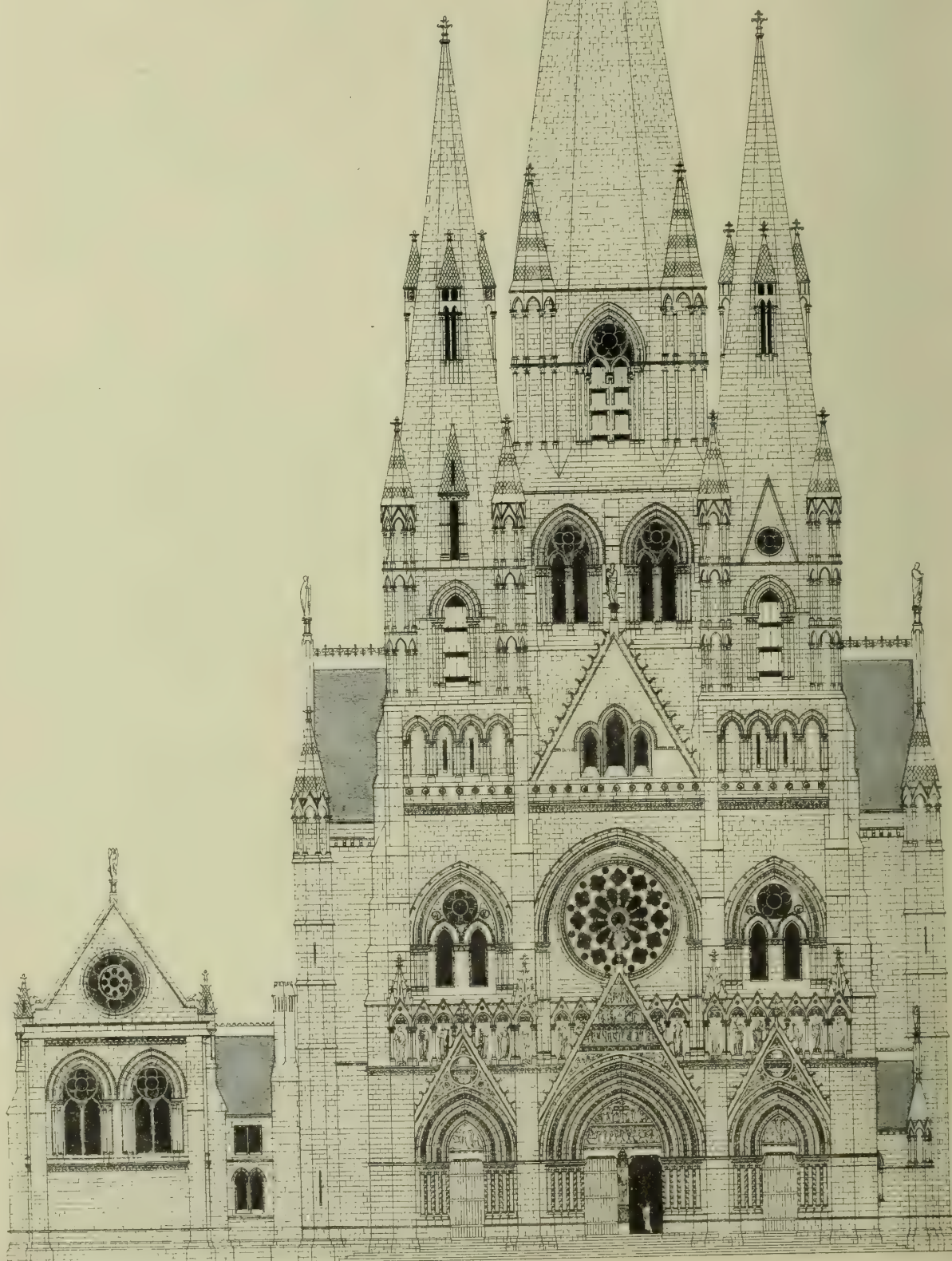
OPEN ROOFS AND SMOOTH CEILINGS.

IN our impression of the 3rd ult. (p. 21), we reprinted some remarks by Mr. Samuel Sharpe on this subject. In reply thereto, Mr. Joseph Boulton, of Liverpool, writes:—"As an architect, permit me to suggest to Mr. Sharpe that the difficulty to which he refers is less the result of open roofs than of the increased altitude of the inclosed space in a church which usually accompanies an open roof; but it is by no means a necessary adjunct. If in any building he pleases, with an open roof, a flat ceiling be substituted at the highest part of the roof, the difficulty of hearing, I have no doubt, will be greatly increased. The deduction, then, is that in an auditorium, the greatest height should be proportioned to the length and width. The form of roof or ceiling has, doubtless, to be considered, but I am not aware that flat sounding-boards immediately above the preacher were ever of much advantage. But unless the speaker has something to say, and says it as if he had, he will never make himself heard. Such a speaker as the Premier will reach the ear of thousands, whether it be in the open area of the Liverpool Exchange, or in the Philharmonic Hall of the same town; whilst he who is indolent, or speaks merely in a perfunctory manner, will not be heard at the distance of a few yards in a small apartment."

In reply to these remarks by Mr. Boulton, Mr. Sharpe writes:—"If my letter implied that a smooth ceiling was all that was wanted to make a building good for purposes of speaking and hearing, I readily stand corrected by Mr. Joseph Boulton. I am aware that it is a very difficult subject. The transept, the columns to divide off the side aisles (all thought so necessary in our would-be cathedrals), no doubt add to the difficulty. But, without pretending to much knowledge of the subject, an unprofessional person may safely contrast the music-hall, in which every syllable is heard distinctly, and some of our unfortunate chapels, in which the hearing is very difficult. For practical purposes, the science of acoustics is so far understood that if a congregation intending to build directs the architect to let the acoustic properties of the chapel be of the first importance, he will, no doubt, produce a building in which an ordinary voice could be heard by the congregation. . . . To correct a building after it has been built is not such an easy matter. I only know of one case in which it has been attempted, namely, in the House of Commons. There the Gothic fret-work and handsome pendants have been ruthlessly covered up by a flat ceiling, in order to enable our legislators to hear one another; and the incongruity between the old work and the new remains a monument of the architect's neglect of acoustics in a room which, like a Unitarian chapel, was built for one single purpose, namely, to hear what is spoken."

Signor Dupré, the sculptor, has finished the monument to be erected in memory of Savonarola, in the convent of San Marco, in Florence. Savonarola is represented in the act of preaching to the people.

DESIGN FOR
CATHEDRAL CHURCH
OF
ST MARY, EDINBURGH,
WEST ELEVATION,
BY ALEX^R ROSS, ARCHT



Scale: 0 10 20 30 40 50 60 70 80 90 100 Feet

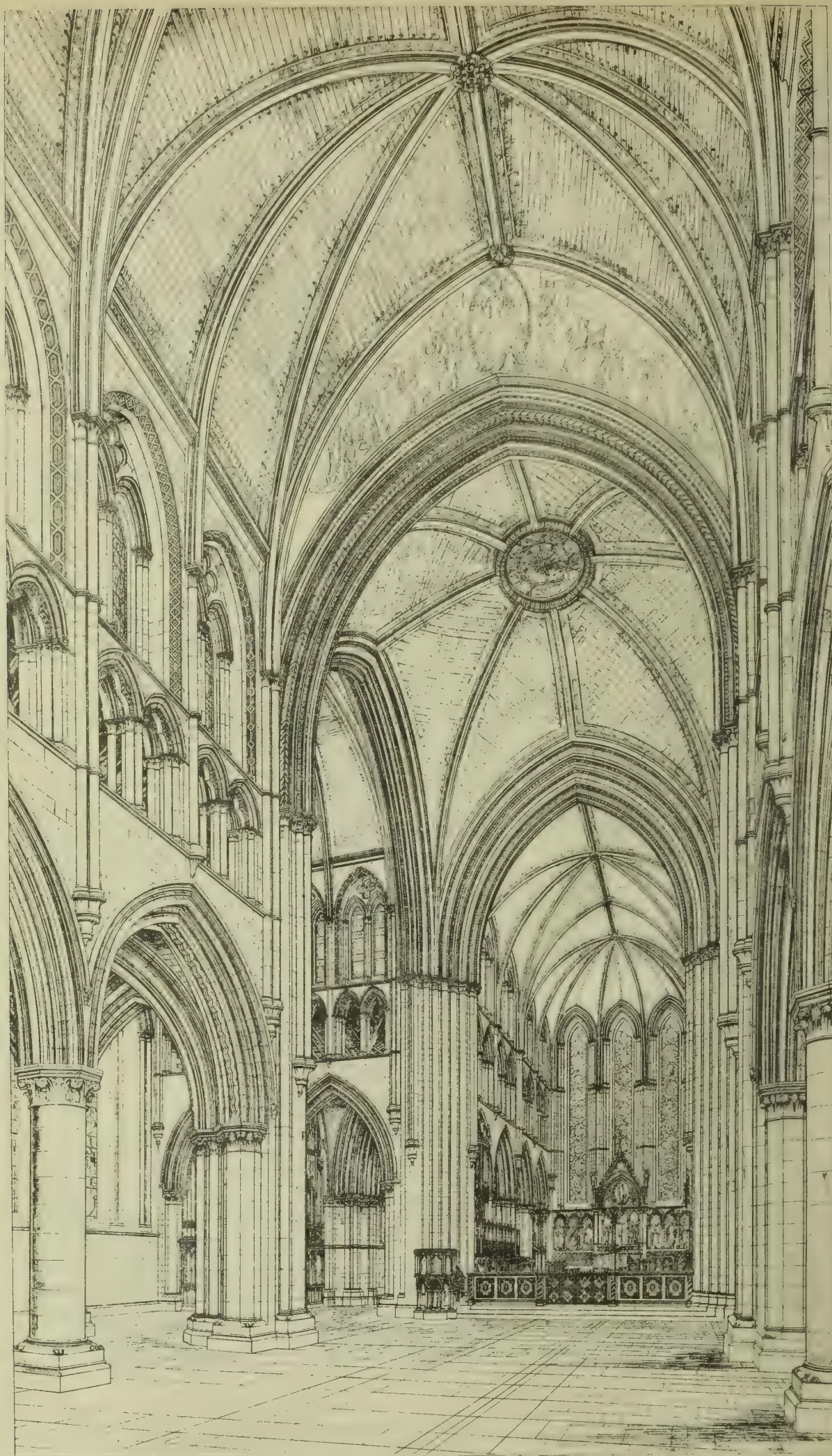
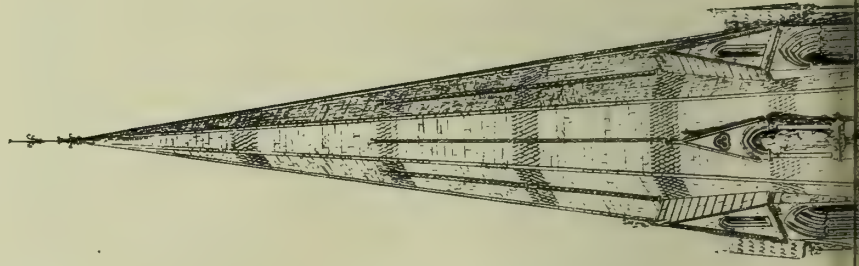
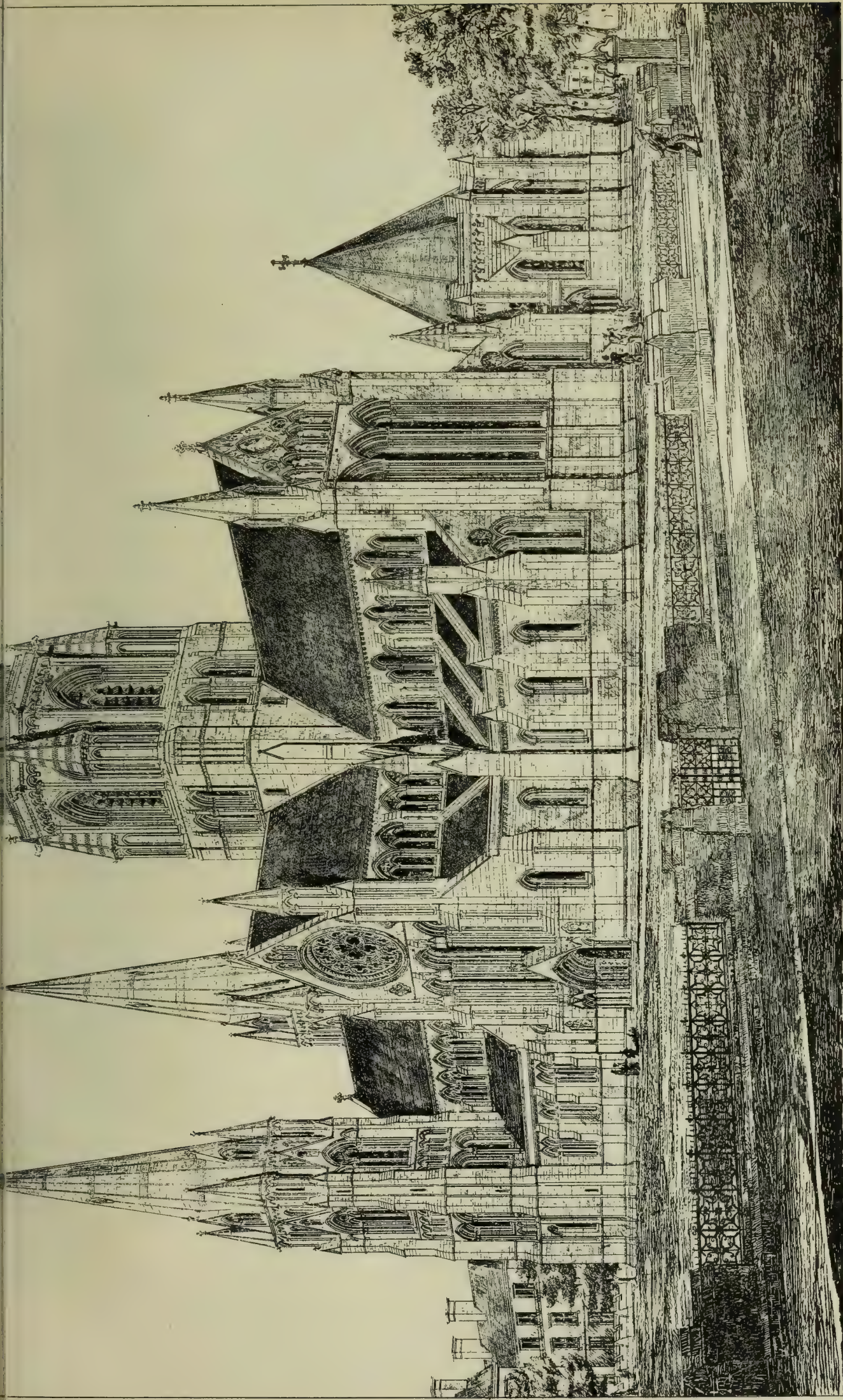


Photo-lithographed & Printed by W. & A. G. Scott, Edinburgh.

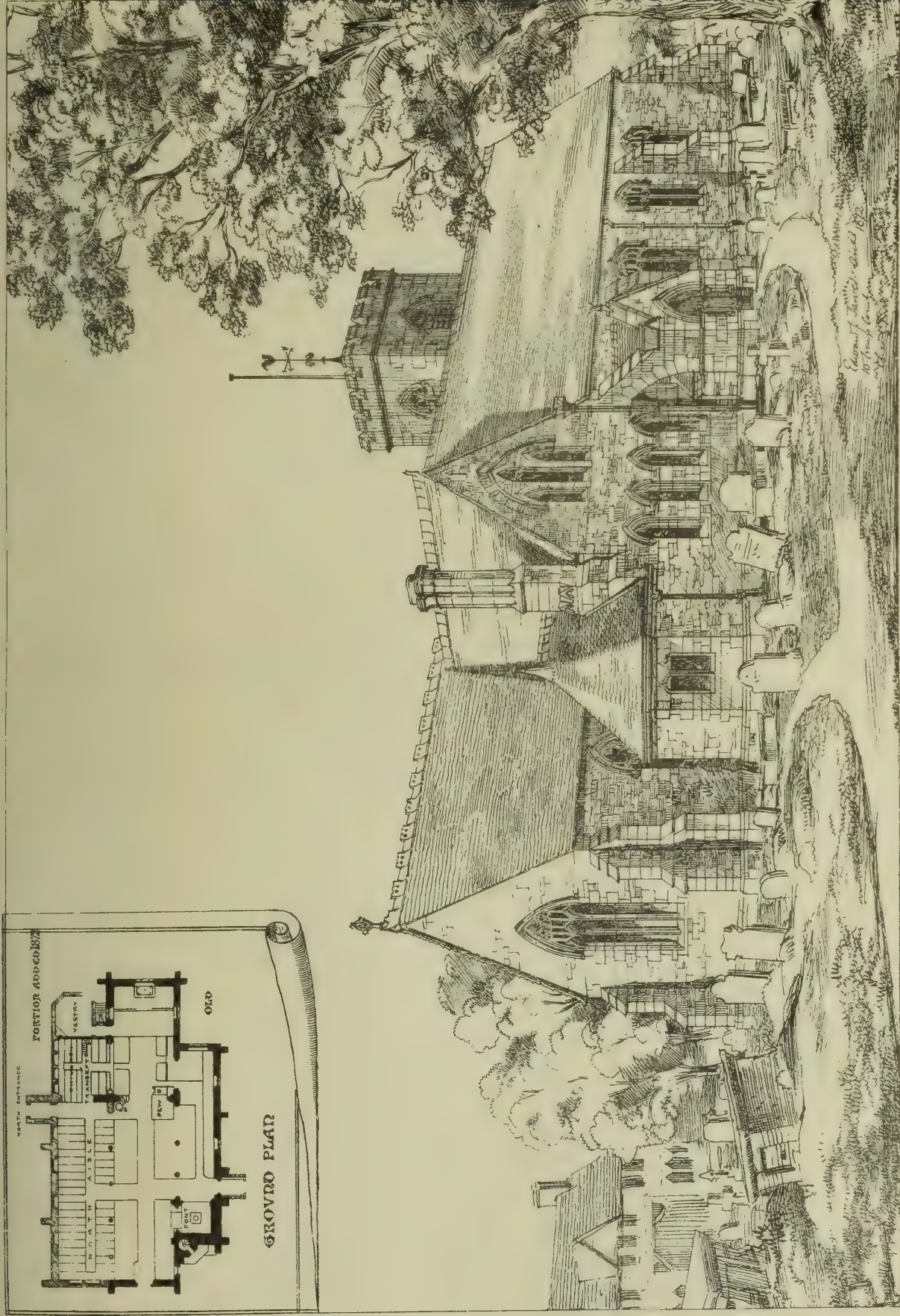
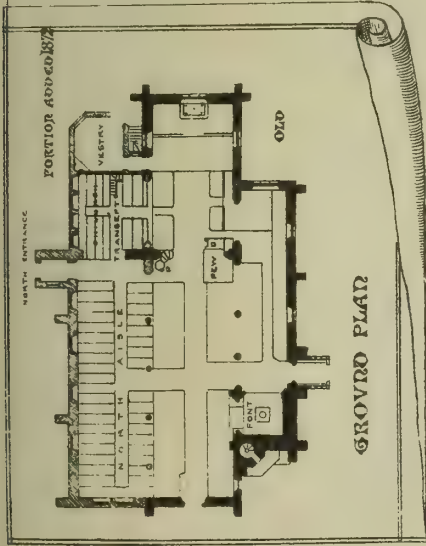
SELECTED DESIGN FOR S. MARY'S, EDINBURGH.—SIR GILBERT SCOTT, R.A. ARCHT



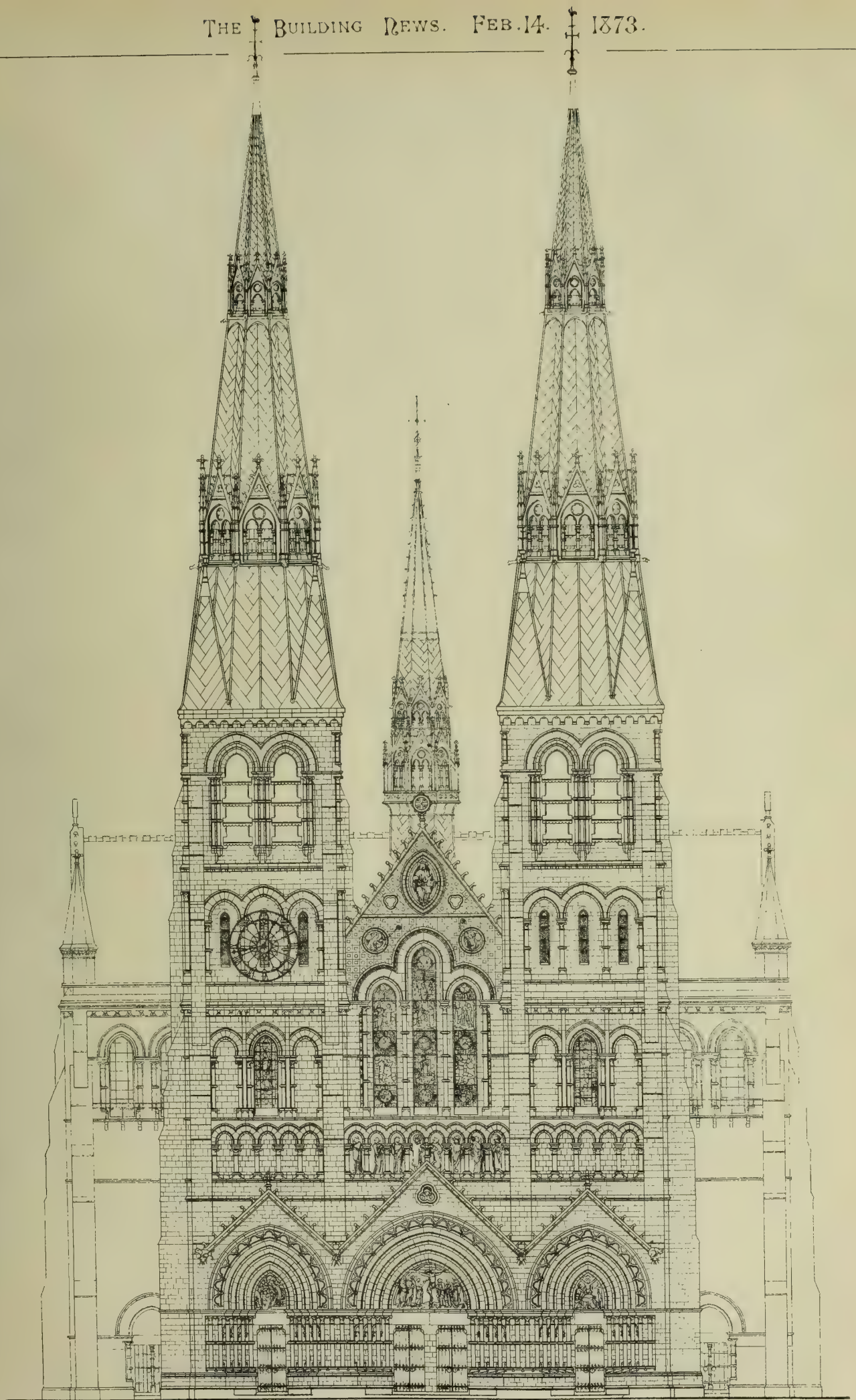


CATHEDRAL CHURCH OF ST. MARY, EDINBURGH.

SELECTED DESIGN - SIR GILBERT SCOTT, R.A. ARCHT.



Willesden · Grovno · View from the North East.



WEST ELEVATION

DESIGN FOR THE CATHEDRAL CHURCH OF ST. MARY, EDINBURGH.
WILLIAM BURGESS, ARCHT.

Photo Lithographed & Printed by James Alcorn, 51 Gray's Inn Road, W.C.

A THOUGHT ON COMPETITIONS—OLD AND NEW.

IT would be very difficult indeed to fix on any subject connected with Fine Art more worthy of attention, especially at the present moment, than that of Competitions. Indeed we might affirm, without much fear of contradiction, that it is the subject of all others most worthy of a first regard; for, without competition in art, whether in painting, sculpture, or architecture, the practice of art must become a simple monopoly, confining itself to a few well-known and very busy men—of those indeed who are alone able to command by their social position the art market. No man can surely wish for any such thing as a complete artistic monopoly, any more than a monopoly of other things useful or pleasing to the world. And there is another thing to be thought of in this matter of Competition, which is not a little unfortunate—that of a certain degree of suspicion under which "Competition," as a mere idea, lies. It would be a little difficult, perhaps, to explain this to a foreigner; but here, in professional circles, at least, there is a normal objection in the abstract to Competition. A professional man, in proportion as he is removed from the general circle of competitions in art, is above, or is supposed to be above, the common run of professional existence. This prejudice is not a little unhappy in itself, and artistically destructive; for it places a man on a sort of eminence for the doing of nothing, and makes a positive of a simple negation. It is akin to that wonderful notion in academy life which places a man on a pedestal who "never exhibits," or who has ceased to exhibit. One who does exhibit is, to a certain extent, visible, and the world knows what he can, and what he cannot do; but one who does not exhibit at the annual exhibition, nobody sees him, and he becomes capable of any mighty work you will, for nobody surely can prove him incapable of it. It is not a little, unfortunate, therefore, that Competition should not be allowed a fair field and no favour, for if ever an idea was worthy of it, art competition is! Need we, therefore, ask a little hearing for a few words about it, and how it is done, and how it *ought* to be done, especially in full view of the late Scotch Cathedral competition—the last, and perhaps the most momentous of all competitions?

In the first place, as we take it, Competition is not a thing to be run away from, or a "temptation" to be stedfastly resisted, as some seem to think, but is a practice to be in all possible fair ways encouraged and helped forward; and the problem is not how to do away with it, but how to manage it well and fairly; to get the best possible result for your time and your means; to get the best art out of the best men the country can produce. It has been done, and it can be done again. If in past days men were to be found who could compete honourably and fairly, and with the best of good and noble results, then must it be possible to do so nowadays, if but the same system of doing the work be adopted. Let us, by way of example, take two or three instances of competitions out of past art history, before modern art "improvement" set in to do so much by *machine* processes.

Michael Angelo and Leonardo de Vinci were very great painters, and it well might puzzle the lovers of art, in their day, to decide which to choose of the two men to do any certain work. Both had powers peculiar to their separate individualities of mind and hands. When a great work of wall decoration or painting had to be done, a "competition" was almost a necessity. On opposite wall surfaces it was that M. Angelo and Leonardo set to work, quite in a public way, to work out, each artist, his wonderful idea, the one in the great picture, or drawing, of the "Battle on the Arno," and the other the "Battle of the Standard." It might well puzzle any one to choose between them. Both are, unfortunately, lost to the world; but en-

gravings remain to show what the compositions were like, and to give us an idea—a feeble one, doubtless—of what the great works were which covered the bare fresco wall surfaces. Both were the work, be it observed, of the artists themselves—their own hands' as well as heads' work, the imprint of their artistic capacities and giant powers. This was a competition, and it remained for the world to determine which was the most worthy. It was a great trial of artistic power and skill. Has the art world yet decided which of the two it would most dearly like to see? This was, perhaps, the greatest of competitions, by the greatest of competitors, the world being the judges.

Another competition was that of the famous one between Raphael and Sebastian del Piombo. Raphael's picture was the "Transfiguration," by some thought to be the greatest of all pictures; the other was the great picture of the "Raising of Lazarus," now in our National Gallery. It is a pity that, with all the picture-copying that is going on, there is no adequately capable copy of the "Transfiguration" to be seen in London. It might afford an idea of one of the terms of a competition, and, by the side of the Sebastian picture, might be a check on modern competitors for artistic work, the world being the judges. Here there was a second competition. But now for a little architecture.

It would be not a little curious and instructive could we but know of, and see exactly how some one of our great cathedrals, or even churches, were brought into being: Westminster Abbey, for example. Who can imagine? The east end, the "sanctuary," was certainly first built. Was there a competition, as at Edinburgh, and if so, who competed? and how many, and who selected the men to compete? and were there *drawings*—tinted drawings on parchment—made? and if so, to what scale, and how many of them? Could any man, whether architect, or hired servant, or "clerk," make a perspective out of the geometrical drawings, or even out of his head? Why, it is absolutely impossible for any man living, however much he may know of Gothic architecture and antiquity, to divine how the east end of Westminster Abbey, as it now stands, came first into existence, or how it was begun to be built. We have a notion about it, but may be wrong; so we will let the industrious and curious reader puzzle over it a little. But of one thing we are quite sure and certain—viz., this, that the man who did get the work to do, whether by competition or no, was a right good one, and those who gave him the work to do *knew their man*, and the sort of work they themselves wanted. No Gothic man will doubt this. What a curious thing the first *plan* must have been, and the "section," and the outer "elevations!" and one cannot help asking, What sort of chance would the old architect of the east end of Westminster Abbey have had, had he sent in—say through a kindly medium—those very drawings to Edinburgh? What would have been said about them? But they were real and *bona fide* drawings, with a meaning and a practical purpose, and when carried out in execution what have they not produced? In these days of "competitions" we see a future building through a fine set of drawings; in old days they must have seen the drawings—rough enough—through the building, as, indeed, we are now obliged to try so hard to do. Competition, then, in our modern sense of the word, could hardly have been possible, or, if possible, the *men* must have competed in some visible and practical way. Indeed, like M. Angelo and Leonardo at a picture, or like Raphael and Sebastian at their work, the old rough and stone-dust covered architects of the works must have competed in *building*. It was in stone, wood, and metal, that the old workmen competed, and not on *paper*. If this be impossible nowadays, then is there a great problem still to

be solved. It is art and architecture in actual material that the world wants; drawings disappear, but the buildings remain, and it is the buildings that the world looks at, and not the drawings, which seem always to indicate what they are and what we try to make them. The real keys to the understanding of the Edinburgh drawings lie, may be, in London; for it is in actual completed *buildings*, already in use, that we can best see the merits of each "competitor."

Thus the real fact is, that competitions, at least architectural ones, as nowadays managed, are purely modern affairs, as much so as railways and electric telegraphs. It is altogether a new thing, unknown in old art days, to picture a building on paper and then to pass judgment on the mere "designer," or thinker out of it, after it has passed through the heads and hands of other, and perhaps inferior, artists. No such thing was ever dreamed of till now. In the older days of the world a man must have begun life as an artist and working architect by the actual production of a building, as a clerk or architect of the works. He must have commenced by the building, under his daily and immediate direction, and perhaps actual *manual help* in the work, some church, or house, or barn it may have been, and then from such experience and proof of competency, he passed to the work of some larger building, as a cathedral. It was not so much the men who competed, as the buildings. Which town had the most reason to boast of its cathedral—Lincoln or Ely, York or Peterborough, Westminster or Salisbury? Each had its speciality. But times are changed, and it is for the modern man to find out, if possible, how best to do its architectural and artistic work. The marvels of the old cathedrals were produced, not by a system of "art-manufacture," or, in other words, by the putting a vast number of buildings, of all sorts and sizes and degrees of cost, into the hands of one man, under the preposterous idea that he can work them adequately *all* out, but who must, in reality and in practice, confide all the real hand and art work in them to *subordinates*, without responsibility, profit, or credit. Such a man can do little else than *travel about* from one building to another, and so do little more than glance at each one of them! And futher, to draw a lesson, if possible, from this last competition, may we not say that a new system of architectural production must needs come into use before we can expect, under any circumstances of architectural *style*, an art-architecture, parallel with true painting, to spring forth into existence. A man must be judged in architecture, as in painting, not by what he can do by dint of travelling about from one place to another, leaving the real work all the time to irresponsible subordinates, but by the impress he is capable of making on the dead materials which Nature provides for use and artistic expression. No wonder all modern towns are empty of truly expressive architecture. What is there to produce it? In the old Gothic cities, each house was, as it were, a separate artistic erection—an architectural painting in stone, wood, and metal, the thought and hand work, as far as could be, of one artist; and the whole result of a number of such works made up a Gothic street, such as those yet to be seen—but so fast disappearing before modern improvements—in French and German towns. Rouen and Ulm, Münster and Nuremberg, and hosts of others contain such. Each house and street, or collection of individual art thoughts, is a picture. It is in this way that the real future of architecture must lie—not in manufacture, but in art; not through *superintendence*, but work: stone, and wood, and metal painting! There would then be work for the humbler men, with or without competition, each one getting credit for the work he does, however small it might be. All this, it is true, is in the *future* of art—a great era, truly; distant it may be, but not the less sure and certain

to come. It is not a new thought; it is but the renewal with a fresh life of the great spirit of the past, of which we see now but a few scattered fragments in museums and ruins.
C. B. A.

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association on Friday evening last, the President, Mr. J. Douglass Mathews, in the chair, the following gentlemen were elected members: Messrs. A. E. Thompson, J. Nurse, R. W. Gibson, T. J. Fyfe, R. Francis, A. Robinson, R. H. Snape, S. M. Fisher, W. Nixon, and E. P. Williams. A vote of thanks to Messrs. Parris and Aldwinckle, the architects of the New Lambeth Workhouse, for their kindness in allowing the members to visit those buildings on the 1st inst., and for so kindly entertaining them on the occasion, was accorded by acclamation.

It was announced that the next visit would be paid to-morrow (Saturday), to the new Home and Colonial Offices, Downing-street, now in course of erection under the superintendence of Sir Gilbert Scott.

It was further announced that a new class had been established for the study of colour decoration, under the superintendence of Mr. Quilter.

The PRESIDENT said that according to the syllabus of papers to be read before the Association during the present session, Mr. R. Herbert Carpenter was to have read a paper, but was unable to do so, owing to, among other circumstances, the death of that gentleman's esteemed friend and partner, Mr. Slater. To supply the deficiency, Mr. E. J. Tarver had consented to read a paper on "the Restoration of Willesden Church," but before Mr. Tarver read his paper, he was glad to be able to call upon Mr. Wood, a local antiquary, to read a paper on the history of the Church at Willesden.

Mr. Wood then read an interesting paper

ON THE HISTORY OF WILLESDEN CHURCH.

MR. WOOD said that during the works which had recently been completed at Willesden Church by Mr. Tarver, discoveries had been made which carried back the origin of the church 150 years further than was previously supposed. It was now beyond doubt that the church at Willesden dated from the reign of the Conqueror, or the beginning of that of his successor. There was, however, no mention of the church in Domesday, but this was easily accounted for from the fact that the living of Willesden was never more than a vicarage, and at the time Domesday was compiled the church was nothing more than an oratory or cell, with nothing to depend upon except what the Dean and Chapter of St. Paul's chose to endow it with. Of the little Norman oratory or chapel (which was probably built on the verge of a dense wood or forest, the whole of the district at the time being almost one continuous forest, infested by all kinds of wild beasts) which occupied the same site as the present church, but two window-heads, and the drum and cap of a small window-shaft had been found built up in the north wall of the nave. The Norman oratory was probably built on the same model as the neighbouring church of Kingsbury—a plain, oblong structure, without aisles, and pierced by narrow Norman windows, and containing a great many Roman tiles in the structure of its walls. Kingsbury Church had been ruthlessly dealt with, however; its windows had been replaced with fifteenth-century ones, and afterwards by wooden frames with square panes; it has lately, Mr. Wood believed, been "restored," and the walls covered with an elegant bed-room paper (!) but it had never been added to since it was first built. The font in Willesden Church afforded good evidence of there having formerly been a Norman edifice on the site. The font was square, with a central stem, and four clustered columns. It was sometimes said that the font had been brought from Kingsbury, but the description which Stukeley and others gave of the font at Kingsbury did not support the assertion. The font at the latter place, which was very different in appearance, had long since been destroyed. Towards the end of the twelfth century, a new church was planned, to meet the wants of the parish, although no doubt partly in emulation of the church then recently erected in the neighbouring parish of Kilburn by the Abbot of Westminster. All that now remained of this second church were the pillars of the nave, constituting two of the bays

between the nave and south aisle, still standing, and those between the nave and the north aisle, found built up into the wall which formed, till lately, the plain blank north wall of the nave. Though not exactly alike, these had a close resemblance to the pillars in the crypt under Becket's crown, at Canterbury, and were probably designed a little later than the period when that structure was erected (1174). Mr. Wood said that the likeness was so close that the builder of Willesden Church might have studied under the architect of Canterbury. In 1181 there would appear to have been neither vicar nor church, but about 1200 there seems to have been a new vicar appointed, and that by 1249 the new church had been erected. The church probably took twenty, if not forty, years in building; as, although so near London, the roads at that time must have been almost impassable, except for a few dry weeks in each year, the soil being a most tenacious clay, and all the materials having to be brought to the site. The new church was built on the site of the old one, and the remains of the latter "built in" or incorporated with the new edifice. Mr. Wood expressed his conviction that the north aisle of the new church was in reality the old Norman nave, which while it contained the blessed image of our Lady was sanctified to the people of the parish, and too sacred to be destroyed. He believed that a new nave, south aisle, and chancel were added to the old church, which was left as a north aisle. The shrine of the Virgin at Willesden attracted hosts of pilgrims from London, who no doubt brought with them the plagues with which the village was several times severely scourged. The place was also on the high road from London to St. Albans, and the shrine of the Virgin at Willesden was greatly enriched by the offerings, prompted by either the fear or the gratitude, of pilgrims to or from St. Albans, and who would have to pass through the dangerous forests referred to. During the first two hundred years after its erection, however, the church seems to have suffered great neglect, as was attested by the following document found in the old muniment room at St. Paul's, and which Mr. Wood said he had translated as literally as he could:—"To the Noble and Rev. Lords, the Dean and Chapter of St. Pauls,—Your humble and devoted parishioners of Willesden relate with great grief that, after various visits from the Commissary-General, it has been proved that the chancel is in a state of ruin from the roof (*co-operatura*) through the walls and windows, to the foundations themselves, and so weak in consequence of age and long neglect, that the said chancel is ready to fall (*in terram ruere incipit*), and that the walls and windows are so broken and cracked (*franguntur et rumpuntur*) that it requires but the strength of a boy to tumble down the stones of the structure, and that through these cracks in the wall, and the fractures in the windows being so large, wide, and abundant (*tam magna, longa, et amplas*), robbers had obtained entrance and taken away the precious goods, thus spoiling the church, and that since the last robbery the parishioners have been daily expecting others. And that further, on account of the rains, strong winds, and horrible tempests entering through the cracks and fissures, neither can Mass be celebrated at the high altar, nor can the holy offices be performed; and what is worse, the owls, the crows, and the jackdaws, and other birds flying in by night and by day, defile all the altar and other places in the church with feathers and dung, to hear of and to see which is absurd, and very much to be lamented, not only on account of the loss and prejudice caused to your parishioners, but because it is a scandal to those who ought to have amended these acts." The date of this plain-spoken document was, according to the writing—for it was neither dated nor signed, being probably presented in person—of about the time of Richard II. Soon after this period, a new chancel, new south aisle, and the tower must have been built, while the Transition nave and north aisle were left untouched. Mr. Wood having spoken at some length of the reputed miraculous image of the Virgin which existed at the church, and of the destruction of the image and that portion of the church in which it was contained at the time of the Reformation, proceeded to speak of the history of the church since the time of the Reformation, in which there was nothing remarkable until, in 1851, Mr. Little was called in to restore and lengthen the church. What Mr. Little had done for the church would be stated by Mr. Tarver. In conclusion, Mr. Wood said that Mr. Tarver's enlargement of the church had given

entire satisfaction to the parishioners and the Committee.

Mr. E. J. TARVER next read his paper

ON THE RESTORATION AND ENLARGEMENT OF WILLESDEN CHURCH.

AFTER a few introductory observations, Mr. Tarver said that he had selected Willesden Church, firstly because it was so near London that any of the members who wanted an object for a walk would be able to see the interesting old church; and secondly, because Mr. Wood had kindly consented to read a paper on the history of the church, a subject which that gentleman had studied in connection with his researches into the history of the parish. Mr. Wood had given an account of the church up to the year 1852. Mr. Tarver said that, thanks to the drawings presented to the Royal Institute of British Architects by the widow of the late Mr. Little, he was enabled to explain the works carried out at the church by that architect. Having done this, he would describe what had been done by himself for the enlargement of the church. He would first proceed to describe the church as he believed it existed in May, 1852, when Mr. Little was employed to repair and enlarge it. There was a chancel 36ft. by 20ft., with a south aisle or chapel 11ft. wide, and extending to within 21ft. of the east chancel wall, and with a modern vestry on the north side. There was a nave 47ft. by 20ft., with a south aisle 11ft. wide opening into it by an arcade of three arches—a fourth arch opening into the tower at the south-west angle; and there was a wooden south porch. The chancel had an east window, with the arch and jambs of Early Perpendicular style, but filled with wooden tracery and mullions, and filled up some 4ft. or 5ft. above the sill for the accommodation of a wooden altar-piece, classical in style. There were also two north windows and one south window (two-light) Early Perpendicular in style, and a small south door of the same date. The vestry door, Mr. Tarver thought, was modern. The two arches opening respectively into the nave and south chapel were apparently of much later date than the windows, the former being four-centered and crippled in form, and the latter a pointed segment. The roof was hidden by a plaster ceiling, and held together by three (probably modern) ties. There were two steps up to the sacarium, and a returned altar-rail. The south chancel aisle or chapel had an east window of three lights, and a south window of two lights, each with a very flat segmental head and Late Perpendicular tracery. There was an arch opening into the south aisle of nave, and the roof was of flat pitch, probably modern, and ceiled at the plate. Behind the chancel arch pier stood the font, which Mr. Tarver said was the most ancient object in the church. The nave had two north windows, built into a brick-faced wall, and a west window—all of them fitted with wooden mullions and tracery. The west door was blocked up. This had on the exterior an arched head under a square dripstone, with cusped spandrels. The arcade consisted of one narrow arch and two wider ones, Early English in style, with a rood-loft entrance pierced through the eastern respond. The roof consisted of rafters, with collars and braces, supported by tie-beams. The south aisle had one window, with wooden mullions and transoms, the roof being a continuation of that over the south chancel aisle. The seats throughout were irregular square pews, including one large one immediately under the rood-loft entrance. The tower, opening by two acutely-pointed arches into the nave and aisles, was Perpendicular in style, and had a small south door, apparently modern. The south porch was of no interest itself, but contained a fine traceried door of Decorated style. What Mr. Little did was to repair and restore the windows throughout, taking the two-light window in the south chancel aisle as his general type where wooden tracery had been used. For the east window of chancel and west window of nave he adopted two varieties of Perpendicular tracery for three-light windows; for the rest, he carried out a restoration of such tracery as he found. He re-opened the western door, and placed a lobby within it. He built a new south porch of wood upon a stone plinth, and re-used the fine old Decorated door. He closed the external south door of the tower and the internal or belfry door, and substituted for the latter an external door with a picturesque arrangement of steps; he also closed the south chancel door. He removed the arch separating the nave and chancel aisles, after (Mr. Tarver

thought) pleading for its restoration. He removed the eastern respond containing the roof-loft entrance, probably considering it an obstruction to sight and sound, and added the space thus gained to the easternmost arch of the nave arcade. He repaired the walls in various places, and built a dry area around them. He raised the pitch of the south-aisle roof and put a boarded ceiling underneath it, and he materially strengthened the nave roof by running a pole-plate along it, thus connecting the tie-beams with the rafters, inter-ties, and collar pieces. He also increased the size of the church by adding 15ft. at the west end of nave, this extension containing a children's gallery, in which the organ was also placed, but subsequently removed to the tower. Finally, he re-seated the Church throughout (with the exception of the Neason House faculty pew—an institution which was rigidly maintained to the present day, and which was of itself worth a journey to see any Sunday at morning service). Mr. Little might have done other works which Mr. Tarver had been unable to ascertain, as the drawings presented to the Institute by Mrs. Little were not accompanied by a specification. Those drawings had served as a guide to him (Mr. Tarver) in the works he had to carry out, and he hoped the example set by the widow of Mr. Little of presenting to the Institute drawings connected with public buildings, would be followed in other instances. The first professional services that Mr. Tarver was called upon to render were in connection with the sacristy, and consisted in designing a reredos and pavement given by private individuals. The reredos erected by Mr. Little was a very inexpensive one, and had no particular pretensions to richness. The sill of the east window was very low, and the Vicar (the Rev. Mr. Wharton) suggested that an open-traceried reredos might be made sufficiently high to attain proper proportions and at the same time admit of the east window being seen through it. Mr. Tarver thought his design would show that this treatment admitted of an effective arrangement of floral decorations in the shape of wreaths twined in and out of the tracery, and of a background of rich flowers to throw up the light-coloured stonework. In the pavement he had adopted a combination of mosaic and tiles. Some time after these works had been completed, the Vicar told Mr. Tarver that it would be necessary to increase the accommodation of the church, and instructed him to prepare plans showing in what way this could be done. In due course a Committee was formed, and Mr. Tarver's plans were accepted. His instructions were to obtain about 200 additional sittings on the ground floor, and, with one or two allowed exceptions, to avoid interfering with graves dating within the last fifty years. After making a careful plan of every grave that was visible on the surface of the ground, he found that a north aisle to the nave of 17ft. internal width, and a somewhat narrower adjunct to the chancel, could be built without touching any of the graves in question. In excavating the trenches, however, the workmen did come across a few unexpected recent graves, but this only proved that their whereabouts was unknown. The contract for the new works was entered into in March, 1872, between William Shearburn, of Dorking, builder, and the treasurers on the part of the Committee. Mr. Tarver said that the drawings exhibited indicated what had been done, but he would take the chief clauses of the specification in their order for the purpose of explaining the works. The first thing to be done was to take down portions of the church where necessary for carrying out the new works. This led to some most interesting discoveries; for the north wall, on being taken down, was found to contain not only a large number of wrought and moulded stones of various dates, but the bases of three columns in their original positions, thus making it evident that the work in hand was to be, after all, merely the restoring a lost limb of the church. Those columns and arches corresponded in every detail with the Early English arcade on the south side. There were three columns, supporting four arches, answering to three Early English arches and the tower arch opposite, thus proving that the Early English church extended as far as the west wall of the tower, and perhaps there was an Early English tower. The caps of the two responds, east and west, were also found; and Mr. Tarver said he could thus have reproduced, without any difficulty, an exact copy of the original arcade, and have crowed over the "restoration," as such things were called. But would this have been right in principle? He held a very strong

opinion that it would not. What he could and did do was this:—There was a number of stones, quite sound, sufficient to re-use as one of the columns, and there was one perfect base (but no cap); these he rebuilt, with a new cap, similar to the other new ones, and cut an inscription stating that they were the remains of a former arcade, and had been discovered and rebuilt in 1872. Several moulded stones of the Decorated and Perpendicular periods were also found, and the jambs and head, *in situ*, of a two-light window in the north chancel wall. This, Mr. Tarver thought, had corresponded with the other Perpendicular two-light windows, and its position would not have left room for a north chancel aisle of the same length as the south chancel aisle. Still, there might have been a short chancel aisle on the north side. There was also discovered a small piscina, with a narrow shelf over it, in the north chancel wall. The earliest discovered stones were, however, the most exciting "finds" of all. These were, as stated by Mr. Wood, two semi-circular window heads, each cut out of a solid stone, and a capital of the same date—probably Early Norman. These were carefully preserved in the vestry. Mr. Tarver next referred to the shoring of the nave roof during the removal of the wall, and gave credit to the contractor for the manner in which he had effected this without producing the ghost of a crack in the plaster ceiling which follows the internal line of the nave roof. Mr. Tarver had provided for a system of braces to hold the feet of the rafters in their places, but Mr. Little's pole-plate with its iron chairs to the beams prevented the necessity of these. As to the interference with the seats, the contractor simply moved them all bodily 18in. away from the wall, and erected his boarding. In the excavator's work, Mr. Tarver had provided for carrying all footings down 12ft. below the ground, and in one place (the north porch) this calculation was under the mark, for it was necessary to go down 14ft. 6in., on account of some extra deep graves; but the general average depth proved to be less than 12 feet. Dorking lime was used for the concrete, and no settlements have as yet been observed in the work. The walls were carried up in stock bricks faced with Kentish rag, with Box Ground for the dressings, quoins, &c., while for the internal stonework Corsham Down was used. In mentioning the carving, Mr. Tarver said he had wished to make all the corbels historical (as suggested by Mr. Sulman in his paper on the Churches of North Hants, read before the Association on the 24th ult., and reported in the BUILDING NEWS for February 1st inst.) by introducing portraits of various dignitaries and ministers connected with the Church, viz., the Queen, the Archbishop of Canterbury, the Bishop of London, the Archdeacon of Middlesex, the Dean of St. Pauls, the Vicar, and the two curates or the churchwardens, but the money would not allow of portraits, so he contented himself with giving to the four dripstone heads outside the west wall certain insignia as a substitute for an attempt at likenesses. The Queen was represented by wearing a crown over a widow's cap; the Archbishop having the pall fastened on with crosslets fitchy; the Bishop of London, by the crossed daggers, and the Vicar by a Maltese cross, in token of the chaplaincy which he holds to the Knights of St. John of Malta and Jerusalem. The next item of importance referred to the chancel steps. These were taken up and reset 3ft. westward (with due regard to placing the ledger stones so that their inscriptions could be read). This enabled the south chancel window sill to be used for sedilia, and gave much more space for the Communion-service. The roof covering was of blue Staffordshire tiles, to match those used by Mr. Little, with cresting, finial, and tile cross by Cooper, of Maidenhead. There was nothing particular to mention under the head of "Carpenter and Joiner." The roofs were boarded under the rafters, so as to facilitate the warming of the church. For the latter purpose an estimate was submitted by Messrs. Bacon for hot-water apparatus, but as in the case of the portraits, the funds available would not admit of hot-water apparatus, and hot air was resorted to, the apparatus being provided by Messrs. Haden. The organ was removed from the tower, where it had been hidden, to a loft in the transept; this allowed of seats being placed underneath it. The total number of new sittings was 312. On the other hand, 26 were lost in the nave and chancel, and the whole of those in the west gallery; but as these consisted of mere steps without backs or bookboards, their loss should hardly be counted. Omitting them, therefore, the nett gain was 287

sittings, at a cost of about £8 per sitting. The space in the tower vacated by the organ was turned to account as a baptistery, where the font might now be seen to much better advantage than when tucked away behind the south pier of the chancel arch. The clock-weights in their deal case presented some difficulty, but Mr. Tarver surmounted it by removing the case, revealing the weights, and painting and gilding them, while to prevent any chance of accident through the breaking of a chain, he has provided a high wrought-iron fender, made by Leaver of Maidenhead, to inclose the space immediately beneath the weights. The pulpit was refixed on the north side, a correct position, but hardly so well adapted for commanding a view of the congregation as the south side; here, however, the "Faculty pew" was lord of the position. The glazing was in varied quarry patterns, executed by Pepper, and five of the windows were provided with sliding casements, also provided by Pepper, and possessing the advantage of being easily opened by side pulleys. In conclusion, Mr. Tarver said he thought some apology was due by him for bringing before the Association this account of a small contract, but he hoped that the historical associations of the church and the fact of its being so near town, and yet bearing the character of being an out-of-the-way country church, might have lent some interest to the subject.

A brief discussion ensued, in which Mr. Lacy W. Ridge, the Rev. Mr. Wharton (Vicar of Willesden), Mr. Riddett, and the President took part; and, a vote of thanks having been accorded to Messrs. Wood and Tarver for their interesting papers, the proceedings terminated.

BUILDING NEWS CHURCH-PLANNING COMPETITION.

IN our notice of this competition a fortnight since, we omitted to state that the prizes would be the same as those for the School-Planning Competition, namely £10. 10s., for the best plan; £5. 5s. for the second best; and £3. 3s. for the third best. Each set of drawings to be on one sheet of double elephant, and capable of reduction for a double-page BUILDING NEWS illustration. A double-page illustration measures 15in. by 11in. For the sake of easy transmission, the drawings should be sent in unframed and unstretched. Designs to be sent in under mottoes.

PARLIAMENTARY NOTES.

THE NEW COURTS OF JUSTICE.—Mr. Gregory on Monday asked the First Commissioner of Works what was the cause of delay in the construction of the New Courts of Justice, and when the building was to be commenced.—Mr. Ayrton replied that at the beginning of last session he stated that the sketch of the plans of the designs had been approved of by the Treasury, and that they had been referred to the architect, that he might be prepared to supply the necessary plans and drawings. He was then to prepare them within six months, but much more time than had been anticipated was required, and though the architect worked very diligently to fulfil his engagements, it had been found impossible to do so. It was also found necessary that the surveyors should "take out the quantities" for the purpose of the tender. That work had been of great magnitude, and required much more time than had been anticipated, but he hoped that the surveyors would be in a position to fix the time for the issue of the contracts on the 25th of March, and if the tenders were satisfactory the work would be speedily proceeded with.

SANITARY LEGISLATION.—Sir C. Adderley asked the First Lord of the Treasury whether the entire omission in her Majesty's Speech of any reference to the completion of recent sanitary legislation by a consolidation of the numerous existing Acts giving power to the authorities now constituted, implied that the Government do not intend to introduce any measure this session for effecting such consolidation.—Mr. Gladstone intimated that it was not the intention of the Government to take any immediate steps for the promotion of sanitary legislation.

NEW MINT BUILDING SITE.—Mr. Ayrton obtained leave to bring in a Bill for the removal of the Royal Mint to a new site.

THE CITY AND WEST-END RAILWAY.

MR. ISAACS, the surveyor of the Holborn district, has presented to the Holborn Board of Works a report on the City and West-end Railway. He states that the line is designed to start from the South Kensington Station of the Metropolitan Railway, to be carried under the Brompton-road, Knightsbridge, Hyde Park-corner, and Piccadilly, to Regent's-circus, where a large station is to be formed, which, in addition to receiving the local traffic, is to serve as a West-end terminus for some of the principal railways in the kingdom. Leaving Regent's-circus, the railway would take the line of Leicester-square, and pass through Lincoln's-inn-fields, emerging into Holborn opposite Brownlow-street, thence along the centre of Holborn until nearly opposite Ely-court, where it cuts diagonally across Hatton-garden, Ely-place, Field-lane, and Farringdon-road, and terminates by a junction with the Metropolitan Railway, about 76yds. north of the northern end of the west platform of the Farringdon-street station. In connection with the railway it is proposed to make five new streets, one only of which may be considered as affecting the interests of the Holborn district—viz., the widening of the existing line of Newman's-row and Great Turnstile from Lincoln's-inn-field's to High Holborn, on the west side of each respectively. He points out that the company seek power to underpin any building which might be affected by their operations, but which they do not want to take. There was no doubt, having regard to the nature of the soil, should the line be sanctioned by Parliament, that there would have to be an open cutting along Holborn prior to the tunnel being formed. This would reproduce the inconveniences that occurred in the Marylebone-road during the construction of the Metropolitan Railway by cutting off access to the shops without any liability to make compensation.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

LEICESTERSHIRE ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The annual meeting of this society was held at Leicester on the 27th ult. The report was read, and the statement of expenditure showed a balance in hand of £62. 5s. Mr. J. P. Clarke was elected a member of the Society. A number of interesting objects were exhibited; among others, Mr. Stephens, the Borough Surveyor, exhibited a drawing of a fragment of Roman pavement found in excavating for a cellar on the south side of Silver-street, in that town, at a depth of 3ft. below the surface of the street pavement. The pattern was composed of interlacing circles within a square border, all of black, red, and white tessera.

BIRMINGHAM AND MIDLAND INSTITUTE.—The annual meeting of the members of the Archaeological Section of the Birmingham and Midland Institute was held on Wednesday fortnight. From the report it appeared that the number of members had increased during the year from 206 to 235. Mr. J. T. Bunce read a short paper upon the old town registers recently discovered in the demolition of S. Martin's Church. Mr. J. R. Holliday then read a paper, illustrated by plans and diagrams, with reference to recent discoveries in S. Martin's Church. He said there was no record of the existence of any church in Birmingham in Domesday Book, but the discovery of two portions of a Norman arch tended to show that the first portion of S. Martin's Church was built in the twelfth century. By the end of the thirteenth century the church appeared to have consisted of a nave, with north and south aisles, chancel, tower, and a crypt under the south aisle. A weather moulding on the tower showed that the floor of the thirteenth century church must have been several feet lower than the present one. In the fourteenth century the church appeared to have been extended, and the north aisle rebuilt. In the fifteenth century further alterations were made, the principal being the raising of the nave arcades and the placing of a flat roof over the clerestory windows. Two of the beams of the flat roof and some of the brackets had been discovered. This woodwork was painted, and one of the beams appeared to have been against the wall over the chancel arch. The painting upon it was part of a picture of the Last Judgment, and was similar in character to paintings in other churches of the same period. Mr. Holliday concluded by calling attention to two

drawings of frescoes on the chancel wall, which, as he showed, illustrated incidents in the history of S. Martin.

LIVERPOOL ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The sixth meeting of this session was held on Wednesday week, when a paper was read by Mr. Huggins on "the Revival of Art in Liverpool." The Council are arranging to hold a soirée, in April next, commemorating the twenty-fifth anniversary of the Society. Mr. Edmund Sharpe has kindly promised to be present, and lecture upon the Cathedrals and Monasteries of England, views of which will be exhibited by the aid of the lime-light. As considerable time will be devoted to conversation and the inspection of models, paintings, books, &c., members and friends are requested to assist by contributing objects of interest to the evening's proceedings, and to communicate thereon with the hon. secretary as early as possible.

EXETER DIOCESAN ARCHITECTURAL SOCIETY.—The quarterly meeting of this Society was held on the 23rd ult. Mr. Edward Domville and the Rev. G. Watson were elected members of the Society, and the best thanks of the meeting were given to the Rev. H. T. Ellacombe for presenting the supplement to his valuable work on the Church Bells of Devon, and to the Architectural Society of Oxford, and the Middlesex Archaeological Society for the presentation of their "Transactions." Mr. J. Hayward, on behalf of the Treasurer, read his report for the previous year, which showed a balance in favour of the Society of £103. 12s. 4d., but stated that this sum would be nearly all absorbed by payment of outstanding accounts. A correspondence between the Society and Sir Gilbert Scott on the work of restoration in progress on Exeter Cathedral was read, followed by a paper by the Rev. Prebendary Barnes on "The Proportions observed by Mr. Huggall in rebuilding the Church of S. Mary, near Torquay." The Rev. H. T. Ellacombe next read some further particulars relating to the bells of the Cathedral which had recently been discovered among the records, many of which were very interesting. The thanks of the meeting were given him, and, a similar compliment having been paid to the chairman, the meeting terminated.

BELFAST ARCHITECTURAL ASSOCIATION.—A meeting of the Belfast Architectural Association was held on Monday evening, 3rd Feb. Robert Young, Esq., occupied the chair, and there was a large attendance of members. Mr. Robert Watt, B.E., F.R.G.S., read a paper on Architectural Education. In the course of his paper the reader referred to the great want that existed for a thorough systematic training for Architectural students, especially before entering an office. He suggested that, as a step in the direction of supplying this want, Architecture should be recognised as well as engineering in the Queen's Colleges, and advocated the appointment of a lecturer on Architecture at each College. Architecture is almost the only profession which does not get some assistance in the education of its junior members from the State. The Government in this country rather ignored the profession, and gave their work usually to their own Engineers, except when some work of more than ordinary difficulty is required, which even the commanding officer cannot attempt. He recommended that the Belfast Architectural Association, until something better can be substituted, should take up this work in Belfast, and as a commencement, open classes for instruction in the science and history of Architecture, and offer prizes to the younger members for drawings. The Association has already a Class of Design, meeting fortnightly, and which is largely attended.

SOMERSET ARCHÆOLOGICAL SOCIETY.—A meeting of this Society was held recently at Taunton. The Rev. J. S. Gale, of Kingston, read a paper, entitled "An attempt to distinguish the old Brislington ware." The ware, he said, was now realising almost fabulous prices at frequent auctions in Bristol and elsewhere, on the faith that it was genuine local manufacture, but very little of it was even of British make; and his theory for its estimation as Brislington ware was that a tradition existed that a copper lustrous delf of similar material had been made in that place—so similar that it was impossible, perhaps, to distinguish it. His view was that when the West of England was the seat of the woollen trade, Spanish vessels laden with wool brought into the Somersetshire ports this ware, which had been made by the Moors while in Spain, and which in the ceramic art served as a model for the Italian majolica.

BOOKS RECEIVED.

Engineering Notes, by Frank Robertson, F.R.A.S. (London: E. & F. N. Spon), is intended to supply an exhaustive digest of all the subjects necessary for an engineer in practice. The form of arrangement is a good one, and the great recommendation of the book to those who wish to use it will be that, instead of mere general formulae only to be developed by those well versed in the higher mathematics, as far as possible actual dimensions and scantlings are given, thus affording reliable standpoints to be adopted or improved on.—*Our Seamen: an Appeal*, by Samuel Plimsoll, M.P. (London: Virtue & Co.), is a most praiseworthy attempt to inquire into and find some remedy for the great loss of life ever taking place on our coasts. Mr. Plimsoll has spared neither pains nor expense in his work, which is very well produced, and illustrated by the heliotype process. He shows that there are annually hundreds of lives lost by shipwrecks from two causes which are easily preventible. One of these is the neglect by the law to take the same care of sailors as of the rest of the people; and the other the carelessness or deliberate wrong-doing of shipowners who send vessels to sea in such a condition that they can hardly hope to reach their destination safely. He compares, at some length, the precautions taken by the law to insure the safe condition of structures erected on land with the absence or lax enforcement of such regulations so far as vessels are concerned. Any one at all familiar with houses built to sell is tolerably acquainted with some of the dishonest evasions which characterise our commercial morality of the present day; but there are few, we imagine, who will not feel surprised and indignant at some of Mr. Plimsoll's revelations of the manner in which many vessels are built. The illustration following page 36, which gives an example of the use of "devils," or sham bolts, in shipbuilding, will for ever prevent surprise in any mind at the ever-recurring losses of vessels supposed to be seaworthy. We do earnestly hope that Mr. Plimsoll, who has laboured, and is still labouring, to bring about a better state of things, will obtain a hearty response to his appeal. His immediate endeavour is to obtain a Royal Commission to inquire into the whole matter, and he declares that, if in the ensuing session he fails to do this, he will resign his seat, "and as God may help him with such fellow-workers as he may find, go from town to town to tell the story of the sailor's wrongs."—The fourth issue of *The Australian Handbook and Almanac for 1873* (London: Gordon & Gotch) reaches us in a considerably enlarged and improved form. It has already become well known.—*The City of London Directory for 1873* (London: W. H. & L. Collingridge) has now been published three times in as many years. As in the preceding issues, the work is well done, many features—some very valuable ones—are introduced, not to be found in any other directory; and we only regret, as we have done before, that the limited area which it embraces must to a great extent interfere with its general usefulness.—*Elementary Lessons in Applied Mechanics*, by Robert Stowell Brown, LL.D. (London: Cassell, Petter, and Galpin), is one of Cassell's "Technical Manuals." It is intended for those who, having some knowledge of elementary mathematics and mechanics, desire to gain information as to their practical application.—*A Catalogue of Ecclesiastical Metal Work* is issued by Messrs. Brawn and Downing, 64, Clement-street, Birmingham. They promise at an early date an addenda, which shall contain a few examples of the Renaissance style.—*Land Sales in England, Wales, and Ireland, from 1815 to 1842*, is a list republished from the *Manchester City News*, compiled from statistics furnished by Mr. George Robins, the well-known auctioneer. The list comprises about six hundred sales, representing the disposal of more than 700,000 acres, the total amount received for the same being over £11,000,000.

At a meeting of the Kensington Vestry, on the 4th inst., it was proposed to adopt the Baths and Washhouses Act in the parish, the expense of the necessary buildings being estimated at £25,000. An amendment that it was "inexpedient at the present time to adopt the Act" was carried by 24 to 19.

Competitors for the Coachmakers' Company's prizes may be reminded that the drawings must be sent in on or before March 30, to enable the adjudicators to make their award before May 1, in order that the drawings may be exhibited in the forthcoming International Exhibition.

Building Intelligence.

CHURCHES AND CHAPELS.

MIDDLETON-IN-THE-WOLDS.—The ancient parish church of Middleton-in-the-Wolds, Yorkshire, has been reopened, after restoration at a cost of £2,600. The tower, west front, north wall of nave, and the south porch, have been entirely rebuilt, and the chancel arch widened and heightened. The architect was Mr. J. M. Teale, of Doncaster, and the contractor, Mr. Robert Slater, of York. The building is of Pickering stone, with Ancaster stone dressings, and the interior has been faced with chalk. The church consists of chancel, nave, north and south aisles, and tower at the west end; the nave is divided from the aisles by four bays, the pointed arches of which spring from Norman pillars. In the chancel is a fine early specimen of the sedilia, besides which is a piscina, and on the opposite side an ambury.

SEATON.—A new reredos has just been erected in Seaton Church, Devonshire, from a design by Mr. R. Medley Fulford, architect, of the Close, Exeter. The reredos is built principally of Beer-stone. The re-table, which projects about 6in. from the face of the work immediately over the holy table, is of richly-veined polished Devonshire marble. The reredos proper consists of three compartments, the central one being the highest and largest, though each is surmounted and terminated by an embattled and carved cornice. A large cross stands detached from the middle panel, which is enriched by carved diaper-work, and upon the arched head above is carved a representation of the Fruitful Vine. In sunk panels, on either side of the central compartment, are sculptured angels in the attitude of adoration, each of them swinging a censur. The capitals, cornices, splay, finials, &c., are all effectively carved, the carved and sculptured work having been executed by Mr. Harry Hems, of Exeter. The entire height of the whole is 7ft. 9in., and this measurement is just the extreme width of the structure without the wings, which are kept subordinate to all the rest; they extend the full width of the chancel, and are plain ashlar, of Beer stone, surmounted by cornice in keeping with the cornice of the reredos proper.

SILCHESTER.—The church of S. Peter, Silchester, was reopened on Candlemas Day, after restoration. The walls, constructed of rubble and flint, hitherto concealed by painted deal wood-work, have been repaired, plastered, and coloured. The roof, which was hidden from sight by a false ceiling of lath and plaster, has been opened out. The work has been executed by Messrs. Ham, of Bramley. The old brick flooring has been replaced by pavement of encaustic tiling, by Messrs. Minton, & Co., of Stoke-upon-Trent. The sanctuary curtains of blue, red and gold, were manufactured from the pattern of an ancient cope.

WORCESTER CATHEDRAL.—The restoration of Worcester Cathedral is now drawing near to a completion, and the Restoration Committee require the remaining work to be done by Whitsuntide. The designs are by Sir Gilbert Scott, and Mr. E. A. Perkins, of Worcester, is the local architect. The principal recent work has been the completion of the choir flooring, the erection of the grilles behind the stalls, the repairs to the tombs of King John and Prince Arthur, the erection of the screen between the choir and nave, the flooring of the nave, and the lighting. The work required to be done to the tomb of King John and the mortuary chapel of Prince Arthur, elder brother of Henry VIII.—a curious and elaborate piece of Perpendicular architecture—was small. This chapel is of white Painswick stone, the whole of which has been scraped, and some slight repairs have been done to two or three broken pinnacles; but the defaced figures have not been restored. The tomb of King John has been scraped, and it is intended to recrown him. Traces of paintings on the outside of the tomb had been found, but no attempt has been made to restore them. The choir flooring of marble has now been completed, though this has been somewhat delayed owing to a change made in the design after part of it had been laid. The old stone pulpit on the north side of the choir has been pulled down, the lower portion rebuilt of more elaborate design, and the old upper portion will be replaced upon it. Some light metal-work, in harmony with the grille work in the choir, has

been added to the reredos. Messrs. Farmer and Brindley, of Lambeth, have had the execution of all the ornamental wood-work. The bishop's throne of carved oak is not yet erected in its place; nor are the proposed carved oak canopies, which are to be placed over the stalls of the Dean, the sub-Dean, and Canons, altogether eight in number, at the west end of the choir. A good portion of the carved wood-work of the screen between the choir and nave is erected. Considerable progress has been made in the flooring of the nave. All the old white stone floor (which was much broken) has been removed and broken up to aid in making concrete, which has now been laid nearly over the whole area of the nave. The new floor to be laid on the concrete is of blue slate and white (Hopton Wood) stone of great hardness. The stones are cut square, and will be laid in patterns. Messrs. Wood and Sons, of Worcester, have the execution of this part of the work.

BUILDINGS.

CHORLEY.—The new workhouse at Chorley, which has been erected from the designs of Mr. Bradshaw, architect, of Bolton, is now completed. The building has been completed at rather less than the contract price. Mr. Pickup's tender was for £16,796, the actual cost having been £16,788.12s.

SOUTHPORT.—A new Winter Palace is about to be erected at Southport. The building, with the exception of the conservatory, will be substantially built of brick, with stone dressings; the roofs will have cut green slates, mingled with purple; the stairs will be carried up in outside towers, with slate turrets, which will give variety and picturesqueness to the outline. The space outside the building will be laid out with terraces, promenades, shrubberies, winding walks, croquet lawns, summerhouses, fountains, &c. Contracts for the works have been entered into for sums amounting in the whole to a little under £30,000. The buildings have been designed and the grounds laid out by Messrs. Maxwell and Tuke, Bury.

SCHOOLS.

LONDON.—At the weekly meeting of the London School Board, on Wednesday, the works committee recommended the acceptance of a tender from Mr. A. Killby, of Salmon-lane, Limehouse, amounting to £7,760, for the erection of a school to provide accommodation for 1,167 children, in Minnow-road, Southwark; of a tender from Mr. W. Wigmore, of Bradfield House, Fulham, amounting to £7,495, for the erection of a school to provide accommodation for 1,102 children, in Wornington-road, Chelsea; of a tender from Mr. W. Higgs, of Crown Works, South Lambeth-road, amounting to £6,430, for the erection of a school to provide accommodation for 1,084 children, on the site in New-road, Wandsworth; and a tender from Mr. J. Cooper, of Camberwell-road, amounting to £5,850, for the erection of a school to provide accommodation for 766 children, on the site in Hughes's-fields, Deptford. The recommendations of the committee were agreed to.

ROMAN LATCH KEYS.—At the meeting of the Archaeological Institute on Friday last, Mr. Fortnum exhibited a series of bronze rings with keys fitted to them, and read a short but very interesting paper on their use. He was followed by Mr. Soden Smith, who also exhibited several examples, and there can be no doubt that these bronze rings were worn so as to insure the greatest security. It is possible that the freedman who acted as treasurer in a great house was the wearer. A statement by Mr. Freeman followed; after which there was a short discussion on Anglo-Saxon architecture, in which Sir Gilbert Scott and Mr. Ferrey took part. A series of drawings of the remains of the *ecclesiola* at Bradford-on-Avon by Mr. Irvine, were on the walls, and it was regretted that no adequate description of them was offered.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—At a meeting of this Society on Friday evening last, Mr. Edward Perrett read a paper "On Various Kinds of Condensing Apparatus for Steam Engines," which was illustrated by well-prepared diagrams. A discussion followed, in which Messrs. Black, Haughton, Brewster, Butler, Kingsford, and Britten took part.

New National Schools at Wood Top, Burnley, were opened on Saturday last. Mr. Waddington was the architect.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—W. J. B.—W. E.—An Architectural Cook.—J. M.—J. H. B.—F. F. F.—J. F. M.—W. C. H.—H. A.—An American Subscriber.—W. H.—F. H. K.—J. S.—R. M.—T. W. B.—Rev. W. H. T.—J. P. S.—T. S.—J. L.—P. and W.—E. W. G.—W. and W.—W. and S.—J. H. T.—S. W. P. V.—New York Subscriber.—Llanely.—J. B.—Colourist.—E. B.—J. N.—Antiquarian.—J. C.

R. F. T., Ambleside.—You say, "I am now eighteen years of age, and have been in an office eighteen months, and feel dissatisfied with the work I get, therefore with the proficiency I have arrived at. What amount and what kind of drawing ought I to look for, with anything else you would advise me upon?" Judging from the character of your communication, we should say you are entitled to very little remuneration, and that unless you improve, you are not likely to arrive at superlative proficiency. How is it possible for a stranger who knows nothing of your antecedents or abilities, or the quantity or quality of the work you are capable of performing, to tell you what you are fairly entitled to claim for your labours?

COMPETITOR.—We should be glad to insert any fair criticism on the selected design of the BUILDING NEWS School-Planning Competition, but your remarks smack rather too strongly of disappointment and chagrin to be of use.

F. A. and J. A. B.—See our notice of BUILDING NEWS Church-Planning Competition this week.

G. SKIPPER asks whether "non-professionals are allowed to enter the BUILDING NEWS architectural competitions?" Certainly, and carry off all the prizes if they can.

BUILDING NEWS SCHOOL COMPETITION.—We misspelt the name of the author of the design as given last week. It should have been Fred. Simpson, not Sampson. We beg Mr. Simpson's pardon.

"ENTREGLE."—We have handed your letter to the referees of the School-Planning Competition. We will not, however, insert any letters reflecting in any way on the integrity of the referees. Your observation about "tampering with the conditions" imply as much, and your letter is, therefore, inadmissible. The referees are not infallible, but they are honourable and high-minded men, and they performed their work conscientiously.

Correspondence.

THE EDINBURGH CATHEDRAL COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—It must be a comfort to your readers, as it certainly is to me, that at last we have got at the "unimpeachable evidence" which you have assured your readers for weeks past you have had in your possession, but which you have been so reluctant to divulge. It now concentrates on Mr. Roper. His is the only name you have condescended upon in the whole discussion, and it is therefore entirely with Mr. Roper I have to deal.

The merits of the case may be illustrated in a very different form from that which you suggest, viz., by what took place subsequent to the appearance of your first article on the subject of the Designs for the Edinburgh Cathedral.

That article amazed me. You will remember that immediately on its appearance, I wrote an indignant repudiation of its contents, so far as they applied to me. The letter appeared, but in the paper of the following week, and in the same issue, were published a continuation of the first article.

I wrote you again, but a private letter, received from you induced me to withdraw my letter, thinking a satisfactory explanation would appear in the BUILDING NEWS. The explanation that did appear was the reverse of satisfactory. Meantime I received a letter from Mr. Roper, dated 15th January, 1873. He says:—

"I admire Mr. Street's design excessively, but for a cathedral I still hold to yours, and am certain it will keep the position it has taken. In the BUILDING NEWS of last week, mention is made of your having had assistance from London. Now all the architects I am connected with know who is meant, and of course the conclusion they wish to come to is obvious. I therefore wish distinctly to state that I have not, by word of mouth, given any grounds for connecting myself with this work, that I am aware of. You will, I am sure, excuse my mentioning this, as it is likely to do me some injury in connection with my works for others. I have not thought it necessary to trouble you about this before, although I have known certain men had been busying themselves in the matter. I know, therefore, pretty well in what quarters it originated. The jealousy of the profession, you must remember, is very great in London."

In reply I wrote Mr. Roper as follows:—

"January 19, 1873.

"As you may imagine, I was very much annoyed, at the tone of the article, and wrote immediately to the Editor. He inserted my letter, but continued his remarks more offensively than before. I have, as you see, simply denied the truth of their statement, but probably I may go further; meantime, I am rather inclined to stand on my defence. I should be sorry that you suffer in any way, but it seems to me you have only to state the facts, viz., that you were employed by me, and that you assisted me, in the same manner and in the same sense as you are accustomed to assist the leading London architects. I shall take care that you are no way let into trouble, and fortunately, I am in a position to defend myself, and give due credit to my assistants."

This is the last letter I wrote to Mr. Roper. In answer to it he wrote me as follows:—

"January 21st.

"I was glad to get your letter; indeed I have been long expecting to hear from you, respecting the statements afloat about the Edinburgh design, and was sorry you did not take me into your confidence, previous to writing your letter to the BUILDING NEWS.

"I wish myself, as you can well imagine, to have nothing to do with the matter publicly, and I am in hopes nothing further will be said. However, in case there should, I had better advise you as to what I know. I happened to be working on a set of drawings for E. W. Godwin when I made the first sketches of the Cathedral, and I think I told you I showed them him. My belief is, that had you said that a young London architect, Mr. Geo. Freeth Roper, assisted you in the design, but that the whole drawings were worked out at your private residence, and, under your immediate superintendence, nothing further could or would have been said. Your total denial of my assistance seems to have raised their 'bile.'

"If I am obliged to speak, you can rest assured I shall not say anything but in your favour. Your having been so near success seems to have bred ill-feeling. I hope all will end well. Had I, however, anticipated this, I should have been more careful at the start.

"You will, I am sure excuse the correction I am about to make. I am not an assistant or draughtsman, according to the general sense of those words, although I devote the greater portion of my time to other architects' work. I still claim my position as an architect, and have done so for four years."

This was the first intimation I had that the sketch made in London from my instructions had been shown to any one, and also the first intimation that Mr. Roper professed himself other than a draughtsman.

Whoever was entitled to the credit of the sketch, the exhibition was clearly a breach of confidence. On receipt of the letter, I telegraphed to Mr. Roper as follows:—

"Your name is printed in connection with mine. Write frankly to the BUILDING NEWS that the design you showed in London was prepared after seeing my sketches and receiving my instructions. That you were engaged by me as a draughtsman only, and worked for me in the same sense in which you had been accustomed to work on the plans of other architects. This you are bound in honour to do, and if not done without equivocation in the BUILDING NEWS of this week, I shall state my case, and quote from your letters. My action depends on your reply by telegraph. Reply paid. Copy of letter to BUILDING NEWS to be posted to me on Tuesday."

The telegram received in answer was vague, but a letter followed, in which Mr. Roper says:—

"January 20, 1873.

"I received your telegram, but it was rather unintelligible. I really think I can serve your purpose better by remaining silent. I am in every way satisfied with the way you have treated me, and therefore have no grievance or anything to do with the discussion unless I am called upon to speak. I still must insist on keeping my position as an architect, and not an ordinary draughtsman or assistant, and I must ask you to bear this in mind. I also decline to mention how I am connected with other architects. They have nothing whatever to do with the discussion. Besides, this would be damaging

yourself, considering I design the whole of some of their works.

"While writing this it has come to my knowledge that Mr. Burbidge has entered the field, and of course, I can only conclude, by your instructions, since he is very precise in placing my position as a draughtsman. I need only say that I am greatly annoyed at this letter, and if it is allowed to appear, the only thing I can possibly do is, to state exactly my position in every respect, what I did, and what I did not do, in the design. The best advice I can give to you is that you at once acknowledge in some way my help, and stop Burbidge's letter, for I can assure you my answer to it won't benefit you.

"I am placed in a very painful position, and one difficult to manage, without, in some way, keeping to the truth; and from the many inquiries I am personally having made, I can assure you it is anything but a pleasant position. I look to you to clear the whole matter from further discussion. My answer to Burbidge's letter cannot but be damaging to you, and his letter does no good. In great haste, for I am dreadfully busy on a large competition, to be sent in on Friday. What letter do you intend to quote?"

NOTE.—I cannot impress upon you too much the importance, in your own interests, of withdrawing Mr. Burbidge's letter. My answer will be anything but what you like. I have not seen nor do I intend to make reference to it."

It is not in reply to my urgent appeal to speak the truth, that Mr. Roper penned the letter in your issue of Saturday, but in response to pressure, of the strength of which I am no judge. I made no further appeal to him on the subject.

For the terms of my letter to yourself, I make reference to your columns. It explained how I had applied to Mr. Burbidge to procure me a draughtsman who was willing to come to Inverness to work on my plans; how Mr. Burbidge did so; how, there and then, when money terms were arranged, I took him freely into my confidence, and unfolded to him my ideas, which for months before had been developing themselves in my mind, and revealing themselves on paper at home, and in my note-book while travelling abroad.

My instructions to Mr. Roper were most precise and definite, and quite sufficient for any draughtsman to work from. In especial, I impressed on him the resolution I had definitely come to, to adopt the Early French style. I showed him views of certain buildings, and sketched and explained the points on which I meant to deviate from them, and how far to follow them; and my reason for asking him to prepare a sketch embodying these ideas before he came to Inverness was, as I stated to him, that I should be very busy with other work on my return home, in consequence of my long absence. Mr. Burbidge has corroborated this, at least as much of it as he was privy to. For the rest you have the kind letter of the Primus of Scotland. You had also another letter, from an intimate friend of mine who was cognisant of what I had been doing from the beginning, but which you did not deem it expedient to publish.

These three letters were written without my cognisance, and entirely on the motion of the writers themselves, and they were entitled to speak to facts, and they all signed their letters.

I have no wish to refuse to Mr. Roper the credit to which he is entitled. I found him a most apt and able assistant; but the charge you made against me was not that I had able assistants, but that the design was made for me by another. This charge I again most emphatically deny.

Before I went abroad, or had seen or heard of Mr. Roper, I had settled on the main features of my design. I had then drawn the ground-plan exactly as it was exhibited, and had sketched a building differing only from that which was exhibited in that I substituted the Early French for English Gothic, and I had resolved on doing this during my travels in France, and intimated my intentions to my travelling companion before I met Mr. Roper.

During the progress of the work I studied and carefully arranged every detail before it was introduced, and frequently erased and had redone parts of the plans in order to have my instructions and ideas properly carried out. This my regular draughtsman saw, and will corroborate if necessary.

It is in some sense a satisfaction to me that the question lies between Mr. Roper and myself. To one of us at least the credit of the design is due, and it seems to be settled on good authority that it was second only to Sir G. G. Scott's.

Mr. Roper and I met by the merest accident, and in answer to an inquiry for a draughtsman. Who he is is probably better known to you and some of your correspondents than to me. I have hitherto borne the character of a man of honour. I was selected by those who knew me to build a small cathedral here, and I was chosen by the

trustees of Miss Walker to compete with the best architects of the day for the Edinburgh Cathedral, and my statements have been vouched for by men of the highest character, and can further be corroborated by my regular assistants, who were engaged on the designs from the beginning, and are entitled to their fair share of credit along with Mr. Roper. Why, therefore, Mr. Roper's statement in contradiction to mine should be considered unimpeachable I cannot see, and I refuse to admit that it is so, or that the only answer to his statement is to produce my sketches.—I am, Sir, &c.,

ALEXANDER ROSS.

[We beg to ask, Why was the above lengthy letter written? What does it prove? For months past, ever since September last, according to the Bishop of Moray (see BUILDING NEWS, Jan. 27th), a rumour has prevailed that Mr. Ross was not the author of a certain design. We merely reiterated the rumour, and Mr. Ross without hesitation indignantly denied it. He furthermore stated that he, and he alone, was the author. His words were explicit and emphatic. A correspondence ensued, in which he was as explicitly contradicted by Mr. E. W. Godwin and Mr. G. F. Roper. We hold in our hands other letters which substantiate the accuracy of the statements of these gentlemen. There being a collision of testimony, Mr. Ross is invited, in the interest of truth, by E. W. Godwin, by an Edinburgh architect who has claims to speak with authority, and by ourselves, to submit his original sketches to an independent and disinterested referee. He fails to do so. He is asked for bread, and he gives a stone. Instead of sketches, original or otherwise, he gives us long extracts from letters, which throw no light on the matter. Like an out-flanked general, he beats a retreat behind a cloud of smoke and loud thumping of drums. The original sketches are now the best, and, in fact, the only, instruments to bring into court; and if Mr. Ross will not produce them in his own vindication, and after so many solicitations, people will naturally think he cannot. Indefinite extracts and shadowy insinuations avail nothing. Once more, therefore, we beg to suggest that the original sketches should be submitted to an impartial umpire. When we first mooted the matter, we had no idea that Mr. Ross was under obligation to Mr. G. F. Roper. It was two or three weeks after the appearance of the articles which offended Mr. Ross that we heard of Mr. Roper's connection with the work. We did not particularly allude to Mr. Roper when we spoke last week of "unimpeachable evidence;" and we beg to inform Mr. Ross, and all others interested, that Mr. Roper did not volunteer his evidence last week. It was only given in obedience to urgent entreaty on our part.—Ed.]

COUNTERFEIT AUTHORSHIP IN ARCHITECTURAL DESIGN.

SIR,—The Edinburgh Cathedral competition both in the character of the designs submitted and also in the disputed authorship of a design which the BUILDING NEWS has fearlessly exposed illustrates in a rather remarkable manner, and very opportunely, the remarks I have recently ventured to express in this journal under the heading of "Custom and Invention in Art." The opinion there pronounced that our system of architectural education and practice is radically in fault, inasmuch as it subverts the very basis of the art, and puts uppermost the adventitious and non-essential—the mere mechanical vehicle of expression, "draughtsmanship," is strongly exemplified in the letters of your correspondents, and the admissions contained in Mr. Godwin's contribution. Mr. Godwin, indeed, exposes a far too prevalent practice in the profession, and one which requires only a partial experience to verify. It is too true that "architects" are to be found who exercise their calling by deputy or by substitute and that there are miserable, or, more charitably speaking, unfortunate members of the same calling who, for mere mercenary considerations, degrade themselves and encourage this disreputable bartering in art. What would be said of the members of any other liberal profession who trafficked on the brains of others? So contemptible a practice can hardly be conceived, degrading alike to both parties of such a trade.

But the rottenness of the system which encourages such a traffic is to be found in the degradation art has suffered by the substitution of "draughtsmanship" for design. So long as architecture is held to be a mere convention-

fashion, swayed by a few capricious individuals, the members of the profession will find it to their advantage to procure the aid of draughtsmen well "posted" in the latest style, and make their pecuniary gain compensate for the credit and honour of their work. I know instances, indeed, where provincial architects have been compelled to obtain such aid before their plans could pass church building societies, or some crotchety individual on the committee.

There are others again in the profession who are afraid to compete publicly, simply because they know their inability to produce "effective drawings." Many of them are well-read and intelligent, and often more able inventors than their more gifted brothers of the pencil, yet they stand back, or are obliged to have recourse to "manufacturers" of designs. They find "clever drawing" and the typical style of the day the *sine qua non* of success, and so they either fall back on a practice they can honestly work in, or are perhaps forced to borrow their plumes. I appeal to my readers for the truth of this.

There is another class, however, who are "architects" only by name, and who persistently do their work by substitute, for the reason that they find it pay best, or that they cannot do it themselves. This class the "manufacturing designer" or "draughtsman" encourages, and it is to the discredit of the profession that such a large class of brain-buyers exists.

The remedy for this great evil is in the hands of the practical and educated in the profession. Let them spurn with contempt the employment of a set of men who are at best the slavish copyists of certain leaders, and let it be a violation of professional honour and practice to engage in a trade where the honour and profits are so unjustly wrested away.—I am, Sir, &c.,

G. HUSKISSON GUILLAUME.

ARCHITECTURAL PERSPECTIVE.

SIR,—Two questions on Mr. J. L. Robinson's paper in your last issue—First, it is of the utmost importance that diagrams in illustration of scientific papers should be accurate. Who is to blame for Fig. 8? Second, I do not think the process employed for putting arches in perspective, as shown in Fig. 12, is a good working process. Would not the application of the diagonal be likely to be not only more accurate, but more expeditious?—I am, Sir, &c.,

Feb. 6.

E. W. GODWIN.

SUPPLYING "QUANTITIES."

SIR,—I desire to express my admiration for your recent article on "The System of Supplying Quantities." So much nonsense has been talked about architects who receive money from builders for quantities, thereby laying themselves under an obligation to the builders, that one might think it was never, or very rarely, done without the architect violating his duties. If so, clients are very badly off here—for it is the practice, both in Bradford and in Leeds, as well as in the surrounding neighbourhood, where a vast amount of building is constantly in progress. I am not aware that our buildings have any ill-reputation for soundness—so that, if any harm is done, it is not to the buildings, but to the clients' pockets. But, I believe there is no harm done even there, for the system works well, and there are scarcely any complaints—and clients continue to build. It is very generally known to the laity of these parts that the quantities are supplied by the architect, and that the latter is paid by the builder.

In my own practice, I have supplied quantities for from £100 to £150,000 worth of work—partly for other architects, and partly for my own works. In the latter case, I never found any disposition on the part of the builder to claim favour or affection on the score of his having paid me money which would be repaid to him again, if it had not been paid to him before he paid me. On the contrary, I have found in these (not oversensitive) men a kind of acknowledgment of obligation for this very reason, that I did supply the quantities. I am ready at all times to give explanations as to the details of measurements as taken, and always desirous of doing "the fair thing" on either hand—and if anything be wrong, I take care to make it right as soon as convenient. To my mind, the quantities, being strict and definite (that is, being *quantities*) form a kind of protection for both parties when taken by the architect, as he has the opportunity, when measuring off, to check errors on either side.

There is a deplorable tendency amongst architects to escape the practical parts of the profession. Some of them don't measure off; some like to have advice in construction; many don't understand inspecting works, and are glad to relegate that task to a Clerk of Works; and this shirking of quantities is another phase of the same fact. It is not too much to say that my best learning has been derived from the practice of measuring off quantities. But the upper branches of the profession soar much above such things, and are like a certain sect of philosophers whose ethereal ideas nearly carried them away into the realms of eternal night, but they were tied down or weighted (with 6 lb. best milled lead, perhaps). Nothing less than "the figure" is good enough for these gentlemen to draw. But they should hear what common-place clients say of them. Well, they employ Brown, the joiner; and if you observe to them that Brown is no architect, they will reply with sublime content, that he is no architect, but he is "a practical man." It is quite unnecessary to insist that the public seldom want much ornament, and still more rarely do they want "the figure," but they do want the virtues of the "practical man" in every case. The combination of practice with art makes the architect; the want of either makes something else—a charlatan, an artist, or what not.

Your article very ably disposes of a point which has frequently been raised to my great astonishment, namely, that quantities are often too detailed. This can hardly be, unless the detail be fanciful, unpractical. But architects who use much and various detail should never object to having it given fully to the builder if he is to be called upon to carry it out. The concealment of detail looks much like fraud; but if the builder be referred to the drawings for minor details, then the quantities are incomplete to just that extent.

As the opinion of your readers is welcomed by you, allow me to express my sense of the bountiful cheapness of your work as you now issue it; doubtless, if the character of the illustrations be maintained, you will keep the lead of the professional papers.

F. B. P.

Bradford, 5th Feb.

VICARIOUS ACT.

SIR,—We are much indebted to you for the way in which you have discussed the question as to the authorship of the competition drawings for the Edinburgh Cathedral, attributed to Mr. Ross. It seems to me that Mr. Roper was really upon that occasion a consulting architect upon the vital question of design, and that he was certainly entitled to something more than mere payment for his time as a draughtsman. The tendency of the time seems to be towards a greater division of labour in every branch of industry, and the recent "disturbance in the architectural atmosphere" points to the desirability of recognising the existence of consulting art-architects who have especially devoted their time to the study of drawing and design.

There are many excellent men whose reputation and position are beyond dispute, who receive the confidence of the public, but have devoted little of their time to the *art* of architecture, knowing how true it is that to encourage the poetry or sentiment of their profession to any extent is to endanger those sterner qualities of discipline and business habits, the exercise of which will alone gain them the suffrages of the public, who, generally speaking, have very hazy notions about design, and look upon it as secondary to comfort and stability.

But we are gradually learning that the *art* of architecture is an important part, and that we must have our labour and materials directed and applied in proper form, which can only be accomplished by the union of the artist with the practical man. If the opposite qualities of science and art are happily blended in one individual—the "passionate intellect" with the cool man of business—so much the better; but until the rising of the architectural phoenix, it is not better to get art wherever it can be found, and to frankly acknowledge it? Anywhere, rather than go on without it. Does it detract from the dignity of the comprehensive and practical hard-thinker to say that he is indebted to Mr. So-and-So for the "trifling matter of design"? Is it not better that some who are specially qualified should be encouraged to pursue the "aesthetic" part, that their brethren and the public should be

benefited by their labours, whilst men of sterner mould fight with the Philistines without? Should works still proceed around us "Artless" indeed, because we are too proud to acknowledge that we cannot master everything individually in a lifetime—that money, and power, and railways won't bring it to us at our bidding?—I am, Sir, &c.,

W. H. L.

FIRE-PROOF CONSTRUCTION.

SIR,—After reading Mr. Bellamy's description in your journal for a fire-proof construction, it occurred to me that the real problem to be solved is to obtain a floor in the form of a solid plate resting on four walls, and of sufficient mass to resist fire or forces of impact. The supports for the floor present no difficulty, because good solid walls and piers of fire-resisting bricks laid and keyed together with fire-clay can be so readily obtained. The principle of constructing floors in plates has not been adopted because there is not any very suitable homogeneous material ready to our hand for the purpose. I will, however, take the most suitable material we now have, and state the results which may be expected from its use. Portland cement concrete can be made moderately fire-resisting; it can be made strong and fairly homogeneous, and it can be cast in any dimensions. I will use this material for the floor-plate, and I will suppose it to be 2ft. in thickness, and that the edges are supported on four walls enclosing a clear space of 17ft. square. Under very special circumstances bricks joined together with pure Portland cement have resisted a shearing force of over 3cwt. per inch superficial. I may with safety claim a shearing force of 1cwt. per inch superficial for carefully prepared concrete made of one part best London Portland cement to three parts of broken bricks of all sizes, from dust, up to the size of walnuts, after the lapse of two years time, during which time the concrete would be hardening. I will take 1cwt. per inch superficial, or 7tons 4cwt per foot superficial as the basis for the calculation of the shearing strain of the concrete plate floor. At the junction of the floor plate with the four walls there is a length of 68ft. and a thickness of 2ft., which gives a total section of 136ft. superficial. To shear this superficies of concrete from the walls, a force of 136 times 7 tons 4cwt. (I have supposed) will be required, that is about equal to a distributed load of 979 tons over the floor-plate. Say that one-third of this load be considered a safe working load, that will amount to about 326 tons, and this over an area of 17ft. by 17ft. will in round numbers be equal to about 1 ton per foot superficial. It is very rare to obtain supporting walls on the four sides of a floor, and also rare to have these four walls enclosing a perfect square, and, unfortunately, the strength of a plate depends in a great measure upon the adequate support of all the edges, so that in adopting this system of construction it will be necessary so to design the building that the floor-plate can be supported on square rims of moderate extent. I will endeavour to show how this can be accomplished. Suppose the building to be 100ft. in length and 40ft. in width to the centre lines of the external walls. Divide the plan into ten equal squares of 20ft. each, then on the four internal intersections of the squares erect four brick pillars, each 3ft. square, and say 6ft. in height from the ground-floor line, and build the external walls 3ft. in thickness. It would not answer to lay a floor-plate of concrete 100ft. long, 40ft. wide, and 2ft. thick, upon these walls and pillars, because the pillars would be unduly pressed into the plate.

To overcome this difficulty, I place on each brick pillar four concrete cantilevers, extending outwards at right angles to each other; and in the external walls I place, in the ten positions opposite to the pillars, cantilevers extending inwards towards those on the pillars. The pressure on the plate will now approach that which would be exerted by square rims over the ten compartments of the plate, and the same forces will be exerted on the plate as in the first case stated, where the plate was supported on four walls. The size of these cantilevers need not be great; each cantilever has only to support the fourth part of 326 tons, that is, about 80 tons. A cantilever 4ft. thick, 3ft. wide, and projecting 7ft. from the centre of the wall or pier, and made to die into the plate as it projects, will require a greater shearing force than 80 tons, calculated upon the basis of 7 tons 4cwt. per foot superficies. The plate and cantilever would be cast in one piece, so that the 4ft. depth of the

cantilever, added to the 2ft. depth of the plate, will give a total of 6ft. in depth by 3ft. in width at least. Take it at 18 superficial feet altogether; this gives, at 7 tons 4 cwt. per foot, about 130 tons, that is, nearly double the 80 tons.

The price of this construction, if executed upon a large scale, is not likely to exceed £1 per cubic yard for the concrete, and £1 per square for centering; and as in the plate and cantilevers the mass of concrete would be 9 cubic yards per square, the total cost per square will be about £10. It may be urged that Portland cement concrete is not fire-proof; but in answer it may be said, a mass of 9 cubic yards of concrete in each 100 feet area would prove a sufficient damper in ordinary cases of fire. Further protection could be given to the concrete by means of fire-resisting tiles, keyed into the substance when in a soft state.

The drawbacks in the construction will be the extreme care which would have to be taken to prevent any subsidence of the supports, the care which would have to be taken in the preparation of the concrete, and the time which would have to elapse before such masses of concrete could be so thoroughly hardened as to be safely loaded. The advantages of the construction are the equilibrium of the masses, the imperishable nature of the materials employed, the facility with which the material can be used, and the economy of the construction.—I am, Sir, &c.,

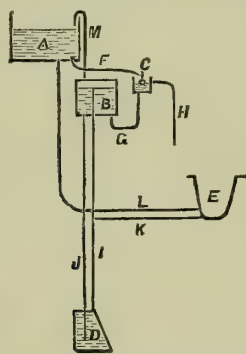
ARCHD. C. PONTON.

Bristol, 4th February, 1873.

FITTING UP BATHS.

SIR,—Your correspondents in this matter appear to me to ignore the results of expansion altogether. Take W.P. Buchan's, in your issue of 31st ult. The hot-water cistern being supplied direct from the cold-water cistern, the water in the expansion, or blow-off pipe, must be at the same level as in the cold-water cistern. As soon as the water had got warm the expansion would cause it to overflow from the pipe K into the cold-water cistern, and unless there was a great demand for hot water in the house, this overflow, as the circulation become more rapid, would soon be continuous; thereby making the cold-water cistern into a hot one.

In practice, I find it necessary to put a supply cistern with ball-valve to the hot-water cistern, and regulate it so that the cistern will not fill within 3in. at least, to allow for expansion; keeping the top of supply cistern a little above the level of hot-water cistern, and taking an overflow from it to the nearest available waste-pipe or sink (see diagram).



It is quite correct to take all services off the flow-pipe direct, as it is evident by so doing you draw water direct from the boiler.

A, cold-water cistern; B, hot-water cistern; C, supply cistern; D, boiler; E, bath; F, pipe from cold-water cistern to supply cistern, with ball-valve; G, connecting-pipe from supply to hot-water cistern; H, overflow; I, flow-pipe; J, return-pipe; K, hot supply from flow-pipe to bath; L, cold supply to bath; M, blow-off pipe.—I am, Sir, &c., G. B.

4th February, 1873.

SIR,—I have noticed the communications and sketches in your valuable paper on the above subject by "H. K." and latterly by W. Watkins. I wonder if the plan adopted by W. W. has been tried and found to succeed, or better than any other plan, for, from my experience in these matters, W. W.'s plan appears to be wrong in principle. I will try to explain how. Observe that W. W. proposes to draw off hot water from "return-pipe" G, which is for cold or rather the coldest water. Now as the water should circulate between the cistern B and boiler C, and cold water passes down pipe G, gets heated in boiler C, and proceeds naturally up pipe E to upper part of cistern B, and remains there (unless drawn off at that level) in accordance with the well-known natural law—

being lightest; and until the whole of water in cistern B is heated, hot water cannot be drawn from pipe G, a fault which W. W. ascribes to "H. K.'s" plan, but about which he is mistaken. Besides, immediately bath hot-water tap is opened I think the superior pressure and weight of water in upper cistern A and in pipe F connected to pipe G, will thus interfere with the circulation between cistern B and boiler C, and it is just possible that cold water would be drawn in consequence.

The hot water must be drawn either from pipe E (as suggested by W. W. for small quantities) or from the top of hot-water cistern or cylinder for larger supplies, as for a bath. In this respect I think "H. K.'s" plan the best, for he draws off the hot water from its natural position (top of cylinder), and assists to put and force it to that position by supplying, at a superior pressure, the cylinder with cold water at the bottom. This system I have proved, and have noticed the effect of water in cylinder becoming heated, the top part of which has been hot when the lower part was cold. I have another objection to W. W.'s plan. According to his sketch, there is nothing to hinder both hot and cold-water cisterns being emptied, and, as I have shown, I think the cold-water cistern would be emptied first. If the cold-water supply is cut off, and if this is not observed when drawing off hot water left in the lower cistern, water left therein and pipes and boiler may soon evaporate, and an explosion occur as a consequence whenever the supply of cold water is resumed (if the boiler is hot): this is simply the cause of many of the explosions, through cold-water pipes freezing and thus cutting off the supply.

In "H. K.'s" plan, if supply of cold water is cut off, the hot water cannot be drawn off, and all danger avoided, which is a great desideratum, for a large quantity of water is left for evaporation. "H. K.'s" plan, however, is open to improvement. His sketch only shows supply to bath by pipe C, the water in which would be cold until all was drawn out. This may be avoided by continuing pipe C (after supplying bath or lavatory and other places), downwards and connecting to return pipe F, which would thus cause a circulation if the water in pipe C became colder than water in "return" pipe; but it should be observed that no branch for supplying, say a butler's pantry, or sink in scullery, below cylinder should be connected at this circulating-pipe C, at a point below top of cylinder, otherwise the cylinder and pipes could be emptied of their contents down to that point of connection in case the supply of cold water was cut off, and until then it would not be discovered.

I believe it to be the safest plan to make it a condition in arranging hot-water supply in a house, that if by any means the supply of cold water is cut off (to supply the boiler), that it should be made impossible to draw off more hot water than will leave a sufficient quantity to require several days to evaporate, thus giving warning that something is wrong. Of course arrangements should be made, as suggested by "H. K." for emptying the cylinder if required for repairs, &c., but not otherwise.—I am, Sir, &c., TEO.

BUILDING NEWS SCHOOL-PLANNING COMPETITION.

SIR,—I wish to refer to one or two points in connection with Mr. Simpson's Prize Design for your School-Planning Competition, published in your last number.

The second rule, on Infant Schools, in the regulations issued by the London School Board, is that, "It should never be without a playground of at least 25 superficial feet to each infant, of which a portion must be covered." In Mr. Simpson's design the buildings on the ground floor occupy 6,229 superficial feet of ground; this, taken from the total area of the site, which is 11,243 superficial feet, leaves 5,014 superficial feet for playground, or a very little over 19 superficial feet per child in the Infant School.

Mr. Simpson states the cubic contents of his building to be 152,000 cubic feet, which, at 5d. = £3,166. 13s. 4d. Thinking this excessively low for Town Schools, I cubed it out as I did my own—viz., from the bottom of the footings to half-way up the roof (this is considered by Mr. R. Smith to be the best), and made 234,780 cubic feet at 5d. = £4,896. 5s. 0d., or about £7 per child, including outbuildings. I think Mr. Simpson has made some mistake in his calculations; his building at that price I consider low; mine was £8 per child.

In the planning, I think it a great mistake to have the Boys' Teacher's Room on the ground floor, as it gives him unnecessary trouble, and checks his oversight, the boys being able to hear him before he enters the school. The girls and infants have only one Teacher's Room, also on the ground-floor, and I think it better, where possible, to have the lavatories distinct from the cloak rooms, so that no articles of apparel may be damaged by splashing, especially in these days of coloured ribbons.

The site was small, but it was possible to get the full amount of playground, but only, I believe, by school above school. I also think that the judges, especially men in such a position, should see that the rules are observed.—I am, Sir, yours, &c.

Feb. 12, 1872.

ONE OF THE COMPETITORS.

ARCHITECTS' ASSISTANTS AND COMPETITIONS.

SIR,—The sensible letter of "Architect" in your issue of January 31st is suggestive of two or three very important questions. It is a well-known fact (or ought to be) that a large number of designs emanating from the various offices are not the original conceptions of the architect himself. An architect will

frequently give his assistant instructions to prepare designs of a certain building; his own time being taken up to such an extent, superintending the erection of various works upon which he is professionally engaged, that he is unable to make the much talked about "pencil-sketch." The assistant prepares the drawings, which merely await his employer's approval. The latter, from sheer pressure of out-door business, ushers a design before the public with his name attached, although it may quite fail to come up to his own standard of originality. The architect is then condemned, owing to his assistant's incompetency.

Now, Sir, the question arises, Is that architect justified in dismissing his assistant, and holding him up to the profession as an inadequate draughtsman and designer, thereby robbing him of his only means of livelihood, simply because he has produced a piece of work which does not approach the high standard of execution professed by his employer? An architect doing this would clear away the stain from his professional character, but would, nevertheless, be guilty of a very dishonourable proceeding, and the assistant would be equally wrong were he to inform the public that certain designs proceeding from the office in which he is engaged are his own ideas and not those of his employer.

Assistants are never anxious to rush madly into print when a design of their own, with their employer's name attached, is highly censured; therefore, I do not think it is fair that they should run headlong with feverish haste into the editorial sanctum, and blow their own trumpets, after having produced a piece of work of more than ordinary merit. They have already received their reward in the shape of £ s. d., whereas the architect, whose name appears as the author of the design, awaits with anxiety to be pitched and buffeted about by the billows of public criticism, frequently expending his time and money to no purpose.

If assistants are allowed to act in this dishonourable manner, architects will be compelled to make their own drawings, and employ small boys, who, through sheer innocence, are incapable of doing them any professional harm. By this means many honourable men will be thrown out of employment, who might ultimately become corner stones, and flowers of their profession. It is the universal rule for principals of firms to take credit for the productions of their employés, and this applies in the same way to an architect's office, and I think that an architect is perfectly justified in taking credit for all work emanating from his studio, whether it is originally the work of his assistant or not.

With reference to rough sketches, this opens another rather curious question. An architect, if he produced the original rough sketch, invariably claims as his own the ideas of his assistant. The first sketches of some architects are very elaborate, which enables the assistant to produce the scale drawings with comparative ease. On the other hand, rough sketches as a rule are very vague indeed, thereby leaving plenty of margin for the assistant to work out his own individual ideas.

I know from experience that rough sketches are of immense utility to the architect's assistant, giving him excellent practice in enabling him to give birth to his own conceptions. As a sculptor can see in the solid block of marble the figure he is about to chisel out, so can the architect conjure up a visionary counterpart of the edifice he is about to produce with his pencil. So opposite are the conceptions of various persons, that the same sketch worked out by different draughtsmen would be productive of designs varying almost in every individual detail, although the outline might to a certain extent coincide.

I am quite certain that your praiseworthy efforts in connection with the BUILDING NEWS Competitions will be of great benefit, not only to the architect, but more especially to the younger members and aspirants of the profession. DRAUGHTSMAN.

Intercommunication.

QUESTIONS.

[2785].—**Building Act.**—If I have occasion to put in force my right as a building owner, in accordance with Sub-section 3, Section 83, viz., to pull down a timber partition that divides my building from my neighbour's, and to build instead a party wall conformable to the Act, can I, in so doing, stop up his ancient light which overlooks my roof, his adjoining building being higher and having more stories than mine. The window referred to lights a room in his top story, and is a window existing in the timber wall which is to be pulled down and rebuilt with brick. It appears to me that it would not be in conformity with the Building Act were I to build the wall in brick and put a window in the place of the ancient window, as in the event of my house taking fire the flames would gain access to my neighbour by means of this opening. I should not be allowed to build an original wall with such a window, and the Act only gives me a right to build a wall in conformity with the Act. Have I any right, under Section 83, to underpin a party wall? Does Sub-section 11 of Section 83 give me any such right? Is there any annotated edition of the Building Act published, or any commentary thereon, giving notes of cases in the superior courts? There are some cases noted in "Laxton's Price Book," but very few.—S. D.

[2786].—**Warming Stables.**—Can any clever correspondent explain the following case, which I have to deal with professionally?—Large stables are built, at great cost, for a nobleman, in the country, with all modern appliances, ventilation, gas, drainage, &c., but without any special apparatus for warming. The woodwork (red wood deal) is painted, four oils, grained oak, and

varnished. A black-spotted growth, which I take to be fungus, has shown on the painting, and in the course of a few weeks has increased and spread like a skin disease on the human subject. (1.) What causes this—bad work, damp, or ammonia? (2.) Would fumes of ammonia so act on paint?—*ÆDILIS*.

[2787.]—**Infringement of Patent.**—In the event of an architect inadvertently having drawn and specified some method of construction, which method was the subject of a patent, and a builder having carried out the work according to the plans and specifications, and under the directions of the architect—who would be liable to suffer the consequence of the infringement of patent, the architect, the builder, or the owner?—*Q*.

[2788.]—**Quantities.**—Will Mr. Fletcher please answer the following? In measuring the brickwork to a copper, if it is set up in a circular form thus, would it be measured square, or *net* circular, and a separate dimension for circular face? In taking the run for cutting rafters to hips, supposing there are four hips, would it be four times or eight times the length of hip rafter? In analysing prices of barrel drains in a recently published price-book, I find the proportion very irregular. What is considered to be the comparative difference between drains and ordinary brickwork? I believe it is considered that small drains up to 18in. are worth a little more than ordinary work, and above that size about the same.—*Z*.



[2789.]—**Gelatine for Casting.**—Would any of your many practical readers inform me of the proper method of making gelatine as used for casting under-cut models, with directions for use, &c.?—*A CONSTANT READER*.

[2790.]—**Mediæval Wall Decoration.**—Will some one please explain the nature of the various methods of wall decoration, as practised in the middle ages—painting in sicco, distemper, tempera, and fresco; or tell me where I could get definite information upon them?—*ONE IN DOUBT*.

[2791.]—**Norton's Bitumen for Building.**—Can any of your readers give me any information as regards Norton's patent for building with bitumen? Has it proved a success, and what is the process in actual work? Can a man lay from 3,000 to 4,000 bricks daily, as stated in the prospectus? I shall be much obliged for the information.—*H. B.*

[2792.]—**Substitute for Wall Paper.**—Can any subscriber inform me of the cost of a substitute for wall paper? It is a French product, said to resist damp, and durable. It is a kind of tinfoil, the thickness of writing paper.—*B. F. G.*

REPLIES.

[2768.]—**Lining Factory Chimney.**—No material at present known serves better to resist sulphur fumes than ordinary good fire-bricks set in fire clay. They should be carried up the full height of chimney.—*E. G.*

[2769.]—**Dry Rot.**—In the case mentioned the wall and back of wood casing should be well cleaned, and twice washed with hot lime whitening, and provision made for a current of air to pass between after re-fixing.—*E. G.*

[2773.]—**Apportioning Cost of Drain.**—What "X" considers unfair seems to me the only just way of dealing with the subject. Suppose that A, B, and C had drained their ground independently of one another to the same plane of exit, and that a 4in. pipe was sufficient size for each, say:—

A, 10 yds. 4in. pipe, at 2s.....	£1 0 0
B, 20 yds. do. do. do.....	2 0 0
C, 30 yds. do. do. do.....	3 0 0
Total cost	£6 0 0

Then suppose A, to accommodate B and C, puts in a pipe large enough for all three, say 7in, and B to accommodate C, puts in a 6in. to join A, and C connects his drain to B with a 4in. pipe, each one joining their own to main drain, say:—

A, 10 yds. 7in. pipe, at 3s.....	£1 10 0
B, 10 yds. 6in. do. at 2s. 6d. 1 2 6	
C, 10 yds. 4in. do. at 2s.....	1 0 0

£3 12 6
Gained by joining 2 7 6

£6 0 0

Then $\frac{1}{3}$ of A = A's share £0 10 0

$\frac{1}{3}$ of B and $\frac{1}{3}$ of A = B's share 1 1 3

$\frac{1}{3}$ of B, $\frac{1}{3}$ of A, and all C = C's share 2 1 3

£3 12 6

—*A CONSTANT READER*.

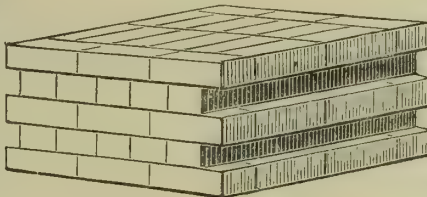
[2773.]—**Apportioning Cost of Drain.**—Replying to "X," in my opinion A. is right.—*E. G.*

[2775.]—**Wooden House from Norway.**—In reply to "N. H. H.," I beg to inform him that the above house was erected at North Tawton, Devon, by John Fulford Vicary, Esq.—*G. W. G.*

[2777.]—**Malt Kilns.**—In reply to "A Young Architect," the following information, condensed from "London's Encyclopedia of Cottage and Farm Building" may be given:—The common form of all kilns is that of an egg, with the broad end uppermost; or of two inverted cones, placed base to base, the floor for drying on being formed where the diameter of the shape so produced is broadest. The fire is made at the bottom of the kiln, and the smoke from the fuel and the vapour from the articles drying are allowed to rise directly through the floor above it, and to pass off by a chimney covered with a cap or cowl, mounted on an upright shaft, and furnished with a pivot, so as to turn freely with the wind and present the opening always on the sheltered side. The fuel used in England is generally wood, coke, or Welsh coal, none of which produces a smoke injurious to the flavour

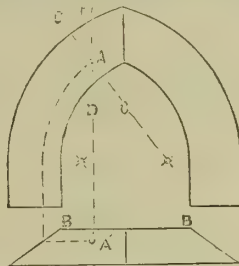
of malt. The principal modern improvement in the construction of malt kilns consists in the construction of a furnace and flues in the lower part of the kiln, by which common coal or any description of fuel may be burned there; and heated air being generated on the sides of the furnace and around the flues ascends through the malt, instead of the combination of air and smoke which issues from an open fire. The sides of malt kilns are of masonry, and the drying floor is commonly formed of cast iron plates 16in. sq. and $\frac{1}{4}$ in. thick, pierced with holes an inch apart, $\frac{1}{2}$ in. in diameter on the under side, and contracted to $\frac{1}{4}$ in. on the upper side. Sometimes pierced tiles are used instead of iron plates. In either case they rest loose on wrought iron joists, with a narrow rib along the middle of the upper edge, which forms two rabbets for receiving the plates or tiles. The space between the floor tiles and the top of the furnace is commonly between 5ft. and 6ft. This space is called the "dunge," and into it fall the chives or cooms which, in the process of turning and drying, are rubbed off the malt. For a kiln 27ft. square a circular opening at the top, of about 5ft. in diameter will generally be found sufficient; and the area of the openings on each side of the furnace and flues for the admission of cold air to be heated must, when united, equal that of the opening at top. These openings for fresh air should have regulators of sheet iron, balanced by weights, so as to adjust the draught as may be required.—*MALT*.

[2778.]—**Bonding Brickwork.**—"A Young Bricklayer" will gain all the information he requires by referring to the sketch or section of a three-brick wall. He



must be "A Young Bricklayer" to form a conclusion as to the joint A A on his plan being a certain result.—*R. S. N.*

[2779.]—**Distance.**—The difference between the sections C C and D D is that the former is a straight line, and



the latter a curve. The easiest way to find the distance required is shown in the sketch.—*EX*.

[2780.]—**Chimney Stack.**—Modern practice says the void for the purpose of draught should be larger at the top than the bottom, say 6ft. at bottom and 7ft. at top.—*R. S. N.*

[2781.]—**Selenitic Mortar.**—The sand, wherever it comes from, must be quite clean and free from loam, the presence of which is fatal to any cement. Ground burnt ballast, with an admixture of clean, sharp sand, produces most excellent selenitic mortar. If you will call at our office, we will show you specimens, and give you all information that you may require. The selenitic process has been successfully carried out by T. J. Chappell, Esq., builder, 6, Little George-street, Westminster, at his works at Brighton; also Messrs. Smith and Son, builders, at the "Criterion," Piccadilly; for Messrs. Spiers and Pond; also at the Holborn Schools, and is now being generally adopted by the London School Board; and the "Gaiety Restaurant," finished by Mr. Simpson, builder.—*JAMES HOLE, Selenitic Mortar Co.*

STAINED GLASS.

KILDWICK.—A stained window, supplied by Messrs Clayton and Bell, of London, has been placed in the north side of Kildwick Parish Church. The subject is the Transfiguration.

STATUES, MEMORIALS, &c.

THE ALBERT MEMORIAL.—It is said that in addition to the sum of £5,000, which has already been paid to the sculptors as the contract price of the four principal groups of statuary at the Albert Memorial in Hyde Park, the Committee of Management are considering the propriety of supplementing the remuneration. In consequence of the hardness of the marble, and the occurrence of unforeseen difficulties in the cutting of it, the sum named does not cover more than the actual cost of the work. Compared with payments for similar works, the artists will have scant justice unless their request be complied with. Sir Francis Chantrey, for the Wellington statue by the Royal Exchange, received £10,489, exclusive of the metal, which was supplied by Government. Wyatt, for the cenotaph of the Princess Charlotte, at Windsor, received £12,000; and the same artist was awarded £30,000 for the Iron Duke (made of bronze) perched above the chimney pots at Hyde Park Corner.

WATER SUPPLY AND SANITARY MATTERS.

BLACKBURN.—The new Corporation irrigation works, now in course of construction at Higher Park and Lower Park farms, are making satisfactory progress, and a portion of the farm will probably be completed in a week or two. All the main conduit pipes to carry the sewage from the tanks at Wensley Fold to the farms have been laid, and have been tested by being flushed with sewage. The result was satisfactory, the sewage being carried along without any interruption into the brook intersecting the two farms. The laying of the irrigation conduit pipes to communicate with the main pipes, and distribute the sewage over the farm, is being proceeded with. The time is hoped to be not far distant when the Corporation will be able to cast aside all anxiety as to litigation and claims for compensation for pollution of the Darwent and other streams.

LAND AND BUILDING SOCIETIES.

BATH LIBERAL BUILDING SOCIETY.—The third annual meeting of this society was held at the office, 3, Paragon, a fortnight ago. Mr. R. P. Edwards, chairman of the society, presided. This society during the third year of its existence has achieved a success beyond the expectations of its founders. The profits arising from the business transacted since the formation of the society have been such as to enable the council to declare the usual 5 per cent. interest, together with, in addition, a bonus of 1 per cent., and carry a balance to the reserve fund, which now amounts to £42. 14s. 4d. The members' subscriptions and repayments during the year amounted to £2,979. 5s. 7d., and out of the applications for advances received by the council, 17 have been granted, amounting to £2,424, for which the trustees hold good security. The names of 80 shareholders have been enrolled and 305 shares have been issued during the year, making a total of 326 members who have joined, and 1,007 shares which have been issued since the society first commenced its operations; in addition to these, 40 shares have been issued since the 31st of December last.

IMPROVED INDUSTRIAL DWELLINGS COMPANY.—The ordinary half-yearly general meeting of shareholders in this company was held on Wednesday. The report stated that the total amount received on capital account amounted to £133,818. The loans applied for to the Public Works Loan Commissioners amounted at the date of the last report to £84,000, and of this sum £69,000 had been received, and the balance would be shortly taken up. During the half-year the sum of £3,164. 0s. 6d., being balances, &c., due in respect of contracts completed, had been paid, and £6,720. 3s. had been expended on works in progress. The total expenditure on capital account was £235,268. 1s. 2d. The rents, &c., during the half-year amounted to £11,326. 14s. 4d., and dividends on railway stock and other items, amounting to £271. 17s., make the total income £11,598. 11s. 4d. The total expenditure, including the contributions to the Leasehold Redemption Funds and Repairs Account, amounting respectively to £113. 11s. 4d. and £879. 10s., had been £579. 6s. 2½d., leaving a profit of £580. 5s. 1½d. Of that amount, £395. 8s. 4d., repaid to the commissioners during the half-year, had been carried to the Public Works Loan Redemption Fund; and the balance, viz., £540s. 16s. 9½d. added to the balance, £332. 16s. brought forward from last half-year, gave a total of £578s. 12s. 9½d. available for dividend. The directors recommended that the usual dividend at the rate of 5 per cent. per annum, free of income tax, be paid, which would absorb £334. 13s. 1d., and leave a balance of £240s. 19s. 8½d. The directors suggested that £2,000 be added to the reserve fund for the equalisation of dividends, and that £403. 19s. 8½d. remaining be carried forward to the next half-year's account. The report was adopted.

Our Office Table.

OPENING OF KEW BRIDGE.—A fourth bridge on the Thames has been freed from tolls. Kingston-on-Thames, Hampton Court, Walton-on-Thames, and Staines, have successively been emancipated under the joint administration of the City Corporation and the Metropolitan Board. On Saturday the Lord Mayor and the President of the Metropolitan Board, with their respective retinues, marched in procession from Brentford to Kew Bridge, where Mr. Mason, as one of the trustees, handed his lordship a mediæval key for the toll-gate. When the gate had been solemnly opened, a body of firemen lifted it bodily from its hinges and consigned it to a drey. The procession then continued its march across the bridge, amid band-playing, salute-firing, bell-ringing, and promiscuous jubilation.

RISE OF PRICES IN BALTIC WOOD.—For some weeks past there has been an enormous rise in the price of wood in the north of Europe, recalling that which occurred at the end of the year 1853. Taking for a basis the prices current at the beginning of 1872, the increase already amounts to 30 to 60 per cent. in Sweden, and 20 to 50 per cent.

in Norway, varying according to description and qualities: and, from all accounts, we must expect from day to day still higher prices. That the price of wooden goods would infallibly advance in Sweden and Norway had been for some time expected, in consequence of the continually increasing distance of the forest districts from the coast, the difficulties always arising in cutting for sale and transporting the wood from the forests to the saw-mills, the enhancement in value of the forests in growth, with the expenses of maintenance and manufacture, and especially from the enormous increase of exportation to various countries, an increase which has now assumed such proportions as to exceed greatly the most favourable anticipations of the growers in the north of Europe. We must add that a belief prevailing in the Scandinavian countries that the total production of wood, however much it may be increased in 1873, will not, in the presence of such numerous inquiries, suffice to meet all requirements, still exercises a certain influence, and tends to exaggerate the demands of sellers. At any rate, it is evident that unless the full prices asked are paid, importers will not be able to get a single cargo for the opening of the coming season.

OFFICERS OF HEALTH.—The Hornsey Local Board of Health have resolved to appoint a medical officer of health, at a salary of £100 a year, under the provisions of the Public Health Act of last session, but will not bring themselves under the control or authority of the Local Government Board by accepting a portion of the salary from the Local Government Board, "so that they may be able to observe the working of the new state of things unfettered by the sometimes inconvenient control of the Local Government Board." A like course had been previously taken by the local boards of the suburban districts of Acton, Edmonton, Tottenham, Croydon, and South Hornsey.

CHIPS.

The Council of the Royal Architectural Museum announce that Mr. J. F. Redfern has consented to deliver a series of practical descriptions of the Figure Sculpture in the Museum, on the following Saturday afternoons, at a quarter-past three, viz., February 22nd, March 1st, and March 8th. Mr. Thomas Peard has also promised two addresses "On the Art of Producing Artistic Iron Work," on the following Saturday afternoons, at a quarter past three, viz., March 15th and March 22nd. The admission to these lectures is free (without ticket) on names being entered in the Visitors' Book on entering the Museum.

At a meeting of the Leeds School Board, on Monday last, a letter was read from the Education Department, stating that the plans submitted by the Board for the Mount-pleasant and Mold-green schools would not be objected to on account of their being based on the "wide" principle of school building, which hitherto the Department has resisted.

Mr. Arthur Taylor has been elected Chairman of the City Library Committee of the Corporation of London, and we understand that the new Library and Museum will shortly be opened free to the public.

A petition for winding up the Thames Plate Glass Company is to be heard before Vice-Chancellor Malins to-day (Friday.)

The St. Day Fire-brick and China Company is announced, with a capital of £25,000, in shares of £10 each.

The Salford Town Council on the 5th inst. discussed a proposal for laying stone tramways in Salford, and adopted a resolution to the effect that application should be made to the Board of Trade for a provisional order, authorising the Council, as the local authority, to construct tramways in the borough.

Mr. Welby Pugin writes:—"In October last I filed a petition for liquidation of my estates, including the 'Granville Hotel,' S. Lawrence-on-Sea, and the South-Eastern Works, Ramsgate, with secured and unsecured liabilities of £180,000. I am now pleased to state that I have been enabled to make arrangements for payment of my creditors in full, and hope to make the last payment within three months."

In digging the foundations for a new hotel at Athens, the remains of the Palace of Adrian have been discovered. Recently two statues were unearthed. The excavations are now being conducted under the direction of the Hellenic Archaeological Society.

The Leeds Industrial Co-operative Society has just laid the foundation-stone of a new building as a branch store for the grocery business in Burman-totts-street, Leeds. The architect is Mr. John E. Leak, Hunslet, Leeds. The cost of building will be £1,800.

WAGES MOVEMENT.

EDINBURGH JOINERS.—A mass meeting of Edinburgh joiners was held on Saturday afternoon, in S. Mary's Hall, Lothian-street, for the purpose of considering an overture received from a meeting of employers, requesting a conference with the men in regard to the demand for a rise of wages on 1st March. The meeting unanimously agreed to send several delegates to confer with the masters, and to report the result of the conference to a future meeting.

LONDON.—At a largely attended meeting of the delegates from the London carpenters and joiners, held in Broad-street, Bloomsbury, London, on Saturday night, the question was discussed whether the original demand for pay at the rate of 9d. per hour should not be now insisted upon, instead of the rate fixed last year by compromise, namely, 8½d. per hour. Some of the delegates had not yet received definite instructions from those they represented, and it being desired that any resolution adopted should be a unanimous one, the meeting adjourned for a fortnight. The labourers' committee are at the present waiting a reply to a memorial they have addressed to the Master Builders' Association, in which they request wages at the rate of 6d. per hour from 1st of March.

BIRMINGHAM.—The arbitrators of the employers met those of the workmen in the bricklayers', joiners', and labourers' branches, on Tuesday night, to discuss the notices and counter-notices which have been served as to the proposed alteration in the working-rules. After considerable discussion, in which the employers pointed out the unsatisfactory state of the trade in the town, terms were offered which were declined by the operatives. The demand of the joiners for more wages and shorter hours was refused. At present they work 54 hours per week, and propose to work only 48. It was shown by the employers that the other branches did not want any alteration in the hours, and that it would be impossible to have different times for commencing work. They also declined to raise the wages. Regarding the labourers, who only apply for more money, the employers refused to concede the request. The result is that the whole of the matter will now have to be submitted to the Arbitrator.

MANCHESTER.—The bricklayers of Manchester have given notice for an advance of wages from 8d. to 8½d. per hour.

BRISTOL.—An aggregate meeting of labourers in the Bristol building trade has been held during the past week, when speeches were made and resolutions passed with the object of procuring a higher rate of wages.

Trade News.

TENDERS.

BATH.—For the erection of a nave for S. Paul's Church, Bath. Messrs. Wilson, Wilcox, and Wilson, architects. Quantities by Mr. Arthur Deane, Bath:—

Hunt.....	£4,182	0	0
Ridout.....	4,085	0	0
Long.....	3,872	0	0
Morgan and Lovell.....	3,760	0	0
Mullings.....	3,500	0	0
Long.....	3,498	0	0
Bladwell.....	3,450	0	0

BOW.—SCHOOLS, OLGA-STREET.—In last week's list of tenders for this school, read £6,628 for £6,028.

CITY.—For warehouses, Holborn Viaduct. Mr. H. H. Collins, architect. Quantities supplied by Messrs. Batstone and Hunt:—

J. Kirk, Woolwich (accepted without competition).....	£7,067	0	0
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CITY.—For the erection of Norgrove-buildings, comprising wine vaults, shops, and offices, Clark's-place, Bishopsgate-street Within. Mr. Alex. W. Archer, architect. Norgrove-buildings, E.C.

Harding (accepted).....	£2,854	0	0
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CITY.—For rebuilding the premises, Nos. 44 and 45, Milton-street, City, for Messrs. Corke, Abbott, and Co. Mr. Edmund Woodthorpe, architect, 46, Moorgate-street. Quantities supplied by Messrs. Welch and Atkinson.

Sewell and Son.....	£3,674	0	0
Macey.....	3,560	0	0
Ashby and Sons.....	3,443	0	0
Brass.....	3,435	0	0
Pritchard.....	3,372	0	0
Cooke and Green.....	3,351	0	0
Perry Brothers.....	3,339	0	0
Colls and Son.....	3,260	0	0
Corder.....	3,229	0	0
Turner and Sons (accepted).....	3,147	0	0

DEVIZES.—For the erection of an Oddfellows' Hall. Messrs. Wilson, Wilcox, and Wilson, architects, Bath. Quantities by Mr. Arthur Deane.

Marquis and Munro.....	£1,870	0	0
Long.....	1,598	0	0
Chivers.....	1,559	0	0
Randall.....	1,420	0	0
Mullings (accepted).....	1,350	0	0
Brown.....	1,310	0	0
Aldridge.....	1,288	0	0
Durke.....	1,275	0	0

DUNFERMLINE, N.B.—For supply of pipes for extension of Dunfermline Water Works.

	Pipes	Branches	
	per ton.	per ton.	
D. Y. Steward and Co.....	£11 17	6..	£14 17 6
McLaren and Co.....	11 15	10..	16 0 0
Eddington and Sons.....	10 10	0..	15 0 0
Laidlaw and Son.....	10 8	6..	15 0 0
Jackson & Sons (accepted).....	9 10	0..	14 10 0

KENSINGTON.—For alterations and additions to shop and premises, Nos. 91 and 93, High-street, Kensington, for Messrs. Barker and Co. Mr. Jos. Houle, architect. Quantities by Mr. D. Cubitt Nichols.

Messrs. Langmead and Way.....	£1,395	0	0
G. Bowles (accepted).....	1,341	0	0

KENTISH TOWN.—For the first contract, Messrs. John Brinsmead and Sons' Pianoforte Manufactory. Mr. Chas. E. Evans, architect.

		Additional
		Story.
Morter.....	£9,830..	£1,140
Brass.....	9,780..	1,120
Scrivener and White.....	9,478..	1,094
Longmire and Barge.....	9,222..	1,153
Kelly Bros.....	8,617..	1,160
Gibson Bros.....	8,560..	1,035
Manley and Rogers (accepted)...	7,977..	1,120
Niblett and Son.....	7,299..	958

KINGSWOOD WARREN.—For sundry alterations and additions to mansion. Mr. William Smith, 10, John-street, Adelphi, architect.

Manley and Rogers.....	£5,347	0	0
Patman & Fotheringham (accepted).....	4,750	0	0

NORFOLK.—For the restoration of Pulham S. Mary, Magdalene Church, Norfolk. Mr. E. M. Phipson, F.S.A., architect:—

Hawes.....	£2,371	5	0
Cornish.....	2,366	0	0
Ludkin and Wells.....	2,250	0	0
Rotwright.....	1,871	18	0
Grimwood and Vine (accepted).....	1,825	0	0

NORFOLK.—For alterations and additions to Yelverton Rectory, Norfolk. Mr. E. M. Phipson, F.S.A., architect:—

Wright.....	£1,868	0	0
Downing.....	1,856	0	0
Newell.....	1,698	12	0
Cornish.....	1,695	0	0
Hawes (accepted).....	1,620	0	0

S. PANCRAS.—At the last meeting of the S. Pancras Vestry, the tender of Mr. Charles Killingback, of Icewell Wharf, Camden Town, for the execution of the general works contract, at 17½ per cent. below the Vestry's schedule of prices, was accepted.

WANDSWORTH.—For the erection of an English Presbyterian Memorial Church, at Merton-road, Wandsworth, Surrey. Mr. Thomas Arnold, architect. Quantities supplied by Mr. C. North.

Jackson and Shaw.....	£5,643	0	0
J. Perry and Co.....	4,800	0	0
Henshaw and Co.....	4,780	0	0
Avis and Co.....	4,723	0	0
Colls and Sons.....	4,700	0	0
Higgs.....	4,678	0	0
Adamson and Sons.....	4,654	0	0
Nightingale.....	4,614	0	0

(Including extra ragstone facings, &c.)

ASHTON & GREEN,

Slate, Iron and Marble Merchants and Quarry Agents.—**ROOFING SLATES.**—Bangor, Blue, Red, and Green. Blue, Portmadoc, and Whitland Abbey Green. The new "Permanent" Green, weight the same as Bangor and uniformity of cleavage equal. Marble and Enamelled Slate Chimney-pieces. Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A & G's **SPECIAL RED RIDGE TILES.** Large Show of all Goods at 14 and 15, Bury-street, St. Mary Axe, London, E.C. Drawings and Prices upon application accompanying trade card.

COMPETITIONS OPEN.

HALIFAX, Feb. 18.—For designs for a school at Booth Town. Mr. R. Ostler, School Board Office, Waterhouse-street, Halifax.

THE FROME DISTRICT AGRICULTURAL SOCIETY.—Feb. 20.—For adapting a field near Frome for the purposes of a Cheese, Corn, and Cattle Market, and for the erection of suitable buildings. Premiums of £20 and £5 for first and second best designs.—Messrs. Crutwell and Daniell, Solicitors, Frome.

MANCHESTER, March 1.—The Directors of the Manchester Conservative Club require designs for their new premises. Mr. R. E. Johnson, 37, Cross-street, Manchester.

LOWESTOFT, March 6.—For designs for laying out about 5 acres of land as a public pleasure ground. Premiums of £25 for the 1st, and £10 for the 2nd best designs. Mr. T. T. Marks, Town Surveyor, Lowestoft.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See **BUILDING NEWS**, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tiles, Worcester.—[ADVT.]

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—**ROYAL INSTITUTE OF BRITISH ARCHITECTS.**—"On the Mediaeval Brickwork of Pomerania and Mecklenburg." By Mr. J. Tavenor Perry, Associate. 8 p.m.

TUESDAY.—**INSTITUTION OF CIVIL ENGINEERS.**—Renewed Discussion "On the Gauges of the Indian State Railways." 8 p.m.

WEDNESDAY.—**SOCIETY OF ARTS.**—"On the Virginians: Their Agricultural, Mineral, and Commercial Resources." By Major Hotchkiss. 8 p.m.

ARCHITECTURAL ASSOCIATION.—Meeting of Elementary Class of Design; subject: "Elevation of a Two Story Clubhouse." 8 p.m.

FRIDAY.—**ARCHITECTURAL ASSOCIATION.**—Members *Soirée*, 8 p.m.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—"On the English Passage, and Channel Ferry Steamships." By Mr. B. Houghton. 7.30 p.m.

ROYAL ARCHITECTURAL MUSEUM.—"On the Figure Sculpture in the Museum;" Lecture I., Antique. By Mr. J. F. Redfern. 3.15 p.m.

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 21, 1873.

THE ROPER v. ROSS CONTROVERSY.

JUDGING from the number of letters we have received, it is evident that many of our readers are interested in this controversy. It having originated in our columns, it was, up to last week, kept within definite and manageable bounds. We purposely excluded many letters which had no direct bearing on the matter in dispute. But as other journals are content to pick up the tail of the controversy, and as Mr. Ross has introduced foreign elements into it by publishing extracts from private letters involving the names and interests of other architects—extracts, however, which in no way assist him—the whole matter has passed into a new phase. We have endeavoured to exclude extraneous considerations, and to fix attention on one fact—the real authorship of the design contributed by Mr. Ross to the Edinburgh Cathedral competition. We have no interest one way or the other, and are uninfluenced by partiality or favoritism in any way whatever; and what we say in these columns we are prepared to vindicate before any tribunal. We do not advocate the strongest, but the truest. We don't care a straw who is victorious in the controversy, provided the truth is made manifest. Before the appearance of our article which commenced the discussion, we knew neither Mr. Ross nor Mr. Roper, and all we did then was to put in print a rumour which had for months been in extensive circulation, and particularly in Scotland, and which, in September last, Dr. Eden, the Bishop of Moray, endeavoured to contradict. When a rumour like this is once mentioned it soon gets wind. The competition was an important one, and the architectural public naturally had a good deal to say about it; and, as one of the competitors told us in conversation this week, too many were interested in giving currency to the rumour when in was once mooted. In the same month of September Mr. Ross was invited, in Edinburgh, to produce the original sketches, in order to arrest, if possible, the circulation of the rumour. He said he would do so, but did not. In our comments on the different designs we alluded to the matter, and did not give Mr. Ross the credit of originating the design; but we had no idea at the time that Mr. Roper was the gentleman who had rendered such indispensable assistance. It was optional on the part of Mr. Ross to remain silent, to acknowledge that he was under certain obligations, or to say that he, and he alone, originated the design. Mr. Ross adopted the latter mode of vindicating himself. This vindication was so emphatic, and so exhaustive, that many persons who said they knew to the contrary unhesitatingly denied it. Unfortunately, some of those gentlemen will not tell what they know *unless in a court of law*. The letters of some, however, we have published, and Mr. Ross and Mr. Roper having spoken, the matter must now drop, unless Mr. Ross consents to the universally-expressed desire, and submits the original drawings. Many months since he said, in a letter to the *Primus*, Dr. Eden, that, fortunately for himself, he had preserved his original sketches, and would produce them in order to show their complete identity with the exhibited designs. What could be done then, when this matter was whispered in architectural circles in Edinburgh, may with propriety be done now the affair has obtained such publicity. We appeal to Mr. Ross to either do this now, or let the matter drop. Nothing would be more gratifying to us than to give Mr. Ross the amplest opportunity to substantiate his statements, and defend his

professional reputation. We have nothing to say on behalf of Mr. Roper. He may, or may not, have acted indiscreetly in saying anything about the matter when he had entered into a contract with Mr. Ross. He says Mr. Ross acted towards him in the most handsome manner, and Mr. Ross says Mr. Roper has betrayed his confidence. This may or may not be so; we are no advocates of Mr. Roper any more than we are advocates of Mr. Ross. The issue to be decided now is—Who originated the design submitted by Mr. Ross for the Edinburgh Cathedral? The original sketches alone can afford a satisfactory answer. Mr. Roper, in his letter in another column, asks for their production, and we are sure that Dr. Eden will second the motion.

And now a word on the general idea that underlies the dispute. We cannot but think that Mr. Ross is being made somewhat of a scapegoat in this matter. It is notorious that competition and other designs are frequently produced by others than those whose names are published. We have got too much into a system of permitting men to reap where they have not sown. Credit hitherto has not been distributed in proportion to the true work done. Hence a false system has been generated, and Art is the main sufferer. Particular individuals are not to blame so much as the circumstances which have been allowed to dominate. We are not admirers of the magnanimity which would visit the sins of a profession on a single head. Admitting, for the sake of argument, that Mr. Ross did not develop the design for the Edinburgh Cathedral, and that he employed another man to do it, he would only have done what very many others have done before him, and are doing now; and, strange to say, this unhealthy state of things does not lack advocates. We have further observations to make on this general question.

QUANTITIES.—VII.

JOINER AND IRONMONGER.

HAVING completed the Carpenter, I proceed now to treat of the Joiner, with which is usually incorporated the Ironmonger. I have thought it advisable to keep the Carpenter and Joiner apart from each other, so as to make the subject less complicated than it otherwise would be. One great distinction between the two trades is, that whereas the former is engaged on what is commonly termed the carcase of the building, the other is employed on the internal fittings and finishings. In the one case the labour would be ordinarily small in comparison with the material, whereas in the latter the reverse is the case, and the labour consequently requires more minute description, and greater care and precision in taking it off, than in the Carpenter. I have already stated the difference of measurement between them, and it must be borne in mind that in the Joiner the net superficial quantity only of the material is measured (except in certain cases, to which I shall hereinafter allude), all tenons, &c., being considered in the price.

In the Joiner I would advise the same course of procedure as in the preceding trade—namely, floor by floor, completing one floor before the second is commenced. Always begin with the flooring, then take the skirtings, next the windows and doors, staircases, &c., &c., as will be shown, taking the ironmongery as it occurs. Proceed then with

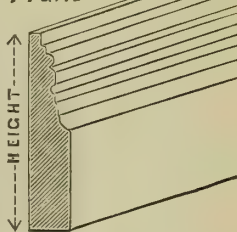
Floors.—Take the length by the width from wall to wall (including skirting), and add all the additional pieces of flooring, such as filling-in to recesses, windows, &c. Give the thickness of the boards, and a description of the material, with the method of laying same, whether straight joint, folding, doweled, or otherwise. It is also necessary to give the width, or gauge, of the boards, stating whether batten, or as the case may be. Make the deduction

for all projections, wellholes, &c., also for the slabs to fireplaces, though many surveyors make no deduction in the latter case, but allow it as an equivalent for the additional labour in putting a mitred border to the slab; but where no mitred border is provided they would deduct it. It is best, however, to make this deduction in either case, and then to take the border separately; but, it having been already measured in with the flooring, would only be described as "Extra to glued and mitred border to 1½ in. flooring," or as the case may be, the item being a "running" one, taking the extreme dimensions for the length; the width of the border, not being necessary, is not given, but the thickness of the flooring must be stated. Take a measurement where special features occur, as for sinkings for mats, &c., such measurements being described as "Extra to sinking in floor for mat," or as case may be; and if mitred border be provided round the same, take it as described to slabs. Where the room is irregular, it will be necessary to ascertain the average sizes, so as to arrive at the net area, and make an allowance for all irregular cuttings, taking the length by a width of 3 in. for the cutting and waste.

Scribing flooring to walls is measured by the foot run, stating the thickness of the floor, and is described as "Scribing (inch) floors to walls." Enumerate any notchings.

SKIRTINGS.—Collect on "Waste" the lengths of the several walls, making the deductions for doors, chimney-pieces, &c., and bring each room forward in one dimension only. It is customary to measure them at per foot run, stating the height and thickness and the description. Also state if the backings or grounds are intended to be included. If the latter be taken separately, they are measured by the foot run, stating length only, and described as "Narrow skirting grounds." It is also advisable to state how the grounds are secured to walls, whether plugged or otherwise. Number all the angles to the skirting, stating whether "mitred" or "tongued;" also the housings into architraves, &c., and any returned ends. These should in each case be abstracted and billed after the different skirtings to which they relate, as by this means labour is saved and an estimate is the better formed of their value, as it can be easily seen to which they relate. If billed among the "Numbers," it will be necessary to state the height and thickness of the several skirtings to which each of them refer; also whether moulded skirting or otherwise. In measuring skirtings, it is always advisable to give a sketch (I give sketch; see Fig. 19) where it is anything beyond the common mould, and even then it is preferable, as, should it be able to be prepared without making a new moulding-plane—that is, should the builder have the plane in stock, he will estimate less for it than where he does not know the character of the moulding, an addition always being made sufficient to cover the expense of a new moulding-plane. This is trifling in itself, but may be worthy of note by many quantity surveyors.

FIG. 19



SASHES AND CASED FRAMES are measured together as follows:—Take the measurement between the pulley-stiles, and add 4 in. on each side, being the width of the frame for the total width. For the height, take from the top of the oak sill to the under-side of the head of the frame, and add to this dimension 7 in.—4 in. being for the head, and 3 in. for the sill. This calculation would in each case be carried out on "Waste," so that the one dimension need only be brought forward for each sash and frame; thus:—

Width between pulley-stiles . . .	3 · 0
Add for frame, two 4in.	8
Total width	3 · 8
Height between head and sill . . .	6 · 0
Add for head and sill.	7
	6 · 7

3 · 8	24 · 2	Deal-cased frames, oak sunk and weathered eills, and 1½in. deal moulded sashes, double hung with patent sash-line, brass axle pulleys, and iron weights.
6 · 7		

It is always necessary that a full description should be given, as above, stating the thickness and description of the sashes. It is also necessary to state whether the sill is oak or otherwise, and the labour on same, whether sunk, weathered, &c.

The sash-fastenings are taken separately and the description given. Where the sashes and frames have circular heads, it is customary to measure the portion that is square (that is, up to the springing line) and to abstract it with the foregoing, but to take the circular head separately, measuring it as if square, taking the greatest dimensions each way, with the allowance for head and width as before expressed to ordinary sash-frames, and to make a separate item of it, describing it as "Circular head to sashes and frames, measured square." Or another way is to measure the whole sash and frame as if square, and take the circular head separately, and describe as "Extra only to circular head to sashes and frames, measured square." This I think the preferable, and I have so described it in the table. Where sashes and frames are circular on plan, it is necessary to take the girth instead of the net width, with the same allowances as for straight sashes; and they require to be separately described as "Circular on plan," in addition to the ordinary description. Should they be described as "circular circular," that is, circular on plan and circular in elevation, it will be necessary to keep the portion which is "circular circular" separate from that which is only circular, measuring, as stated to circular-headed sashes and frames; and they would consequently be described as "Extra only to circular heads to circular sashes and frames, measured square," and would follow in the bill immediately after the circular sashes and frames. Where the thickness of the several members of the frame, as hanging stiles, parting head, &c., are beyond the ordinary, it should be so stated in the description.

Where the sashes are fixed, they are measured similarly to those that are hung, the only difference being in the description.

French Casements are measured the net dimensions of the casements inclusive of frame, and described according to the thickness and workmanship. Where rebated, the dimensions must be taken to the extreme of the rebate each way. The frame would be measured and described as "Cube fir in wrought, rebated and stuff-beaded casement frames," or as the case may be. Be sure in the measurement to add the tenons. Transoms and mullions are also measured solid and described. Sills at per foot cube. If patent or other water bar, measure it at the same time. State how casements hung, and generally describe the same fully. Sashes fixed or hung on centres with solid frames are similarly treated.

Circular Heads—The method of measurement will be described hereafter in treating of door-frames.

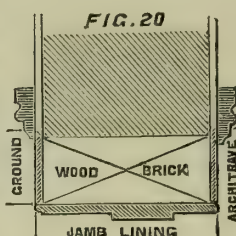
After the sashes and frames, proceed to measure the linings, taking them the net length shown, and adding for the passings, for the one dimension; and the width forms the other. State the width, and give description. The labour to the groove, when they are

grooved, is generally taken separately. It will form a running dimension, the length being the same as that for the linings.

Window Boards are measured by the foot superficial, taking the length by the breadth; and when they are grooved into the sill, the labour to groove should be taken separately, as described to the linings. If the sill be of oak, it must be described as "Labour to groove in oak," as, necessarily, greater labour would be entailed than if executed in fir. Give the description of the window-board, firstly stating the thickness; and where the corners are rounded and returned, it is customary to number them as "returned and rounded ends to window-board," and if notched, this must be stated in addition.

Where the window-linings or window-boards are on the splay, it will be necessary to keep them separate from those on the square.

The **Framed-grounds** (Fig. 20) are measured the extreme length each way—that is, taking the dimensions on the outer edge both for the height and width of the window; or another way is to take the net height and width of the jambs, and allow four times the width of the



grounds to allow for the framings; both results being of course the same. The latter I think the preferable, the collections for length being made on "Waste,"—thus,

Height of jamb	6 · 0
Ditto	6 · 0
Length of head	4 · 0
Framings four 4in.	1 · 4

Total length 17 · 4

This is brought into the dimension column and the width stated. Also, specify the thickness and description,—thus,

17 · 4	5 · 9	Inch deal framed grounds.
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Measure the architrave mouldings by the foot lineal, and specify the girth of the moulding. (See Fig. 21.) The round of the moulding is taken along the outer edge for the length.



Number all the mitres and state the girth of the mouldings to which they refer, as will be shown hereafter in the table. Some surveyors take the mouldings where over 4in. girth by the foot super., but I prefer to measure all by the foot run, for the sake of uniformity. Any pateras at angles must be numbered, as also plinths where they occur, as for example, to stop the skirting where it projects beyond the face of the architrave. Should the moulding to skirting be carried round window to form architrave, as is sometimes the case, do not omit to take the additional mitres.

Window-backs are measured the length by the height, the latter being taken from the floor to the under-side of the capping. In addition to the visible length, it will be necessary to add the thickness of the framing on each side. Thus, if the visible length of the back be 4ft. 0in., and the thickness of framing 1½in., we should collect on "Waste,"

Length	4 · 0
Two Passings	2½
	4 · 2½

by which means we obtain the total length. It is always advisable to show how a dimension is made up on "Waste." State the thickness of the framing and give a full description of the workmanship. The capping is taken separately, at per foot lineal, and described according to the nature of the work

upon it. The following is an example of how these would appear in the dimension book, the length being ascertained on waste as above.

4 · 2½	6 · 4	1½in. deal moulded and framed two-panel window-back.
1 · 6		
4 · 0	4 · 0	Deal beaded capping.

The **elbows** are measured similarly to the window-backs, taking the extreme widths, including the passings, for the one dimension, and the same height as the back (viz., to under-side of capping) for the other. The soffits are also measured the full dimensions each way. Describe how they are finished, whether splayed, plain, keyed, or framed in panels; and, if the latter, the number of the panels, and whether moulded or otherwise. The caps to elbows, and clearing-pieces, are numbered. The labour to splayed ends is measured at per foot run, as shown in the table.

Boxing-shutters are measured by the foot superficial, taking the height by the extreme widths, including all the rebates. State the thickness of the shutters and description of framing; also state the number of heights in which they are hung, if more than one. Back-flaps are also measured in this manner. Number all the ironmongery as it occurs; also the holes cut for the shutter-bars.

In the measurement of the back linings, add 2in. to the height of the shutter for the length; take this by the width, and state the thickness and description. If grooved, take a running dimension of the groove for labour. Shutter-boxings are measured the height by the width, including all the framings; and state the thickness and description, whether "proper" boxings or otherwise—proper boxings being wrought, framed, rebated, splayed, or beaded.

Sliding shutters are measured by the foot superficial, stating the thickness and description of the framing, and also the hanging, &c., as to sashes and frames. The flap to cover the same is measured by the foot run, if under 6in. wide. Number the ironmongery. B. F.

PLUMBING.—NO. XIII.

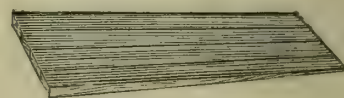
IN last article, wooden baths, and wooden baths lined with lead, were spoken of. In reference to both it must be clearly understood that in fixing on the bottom, the boards forming bottom must be put on across bath: this may be inferred from Fig. 134, page 6. Sometimes the joiner, without thinking, puts on bottom-boards longitudinally, but that is wrong. For wooden bath, such as Fig. 130, page 6, the bottom-boards should be jointed as per Fig. 140, which gives sectional view, a

FIG. 140



slip of wood or "feather" being inserted in centre of joint, as shown, and white lead also used. In cases where the floor under bath is off the level, and especially when the dip is away from and not towards the safe-pipe, to prevent water lying in such safes as shown in Fig. 130, before laying down lead-safe cause the joiner to lay down wooden-boarding under it, e.g. if floor were off the level ½in. in the 6ft., then joiner makes his boarding full size of sole of safe, and about ½in. thick at one end, and regularly diminished to ¼th. at other end, as per Fig. 141. In Fig. 135,

Fig. 141

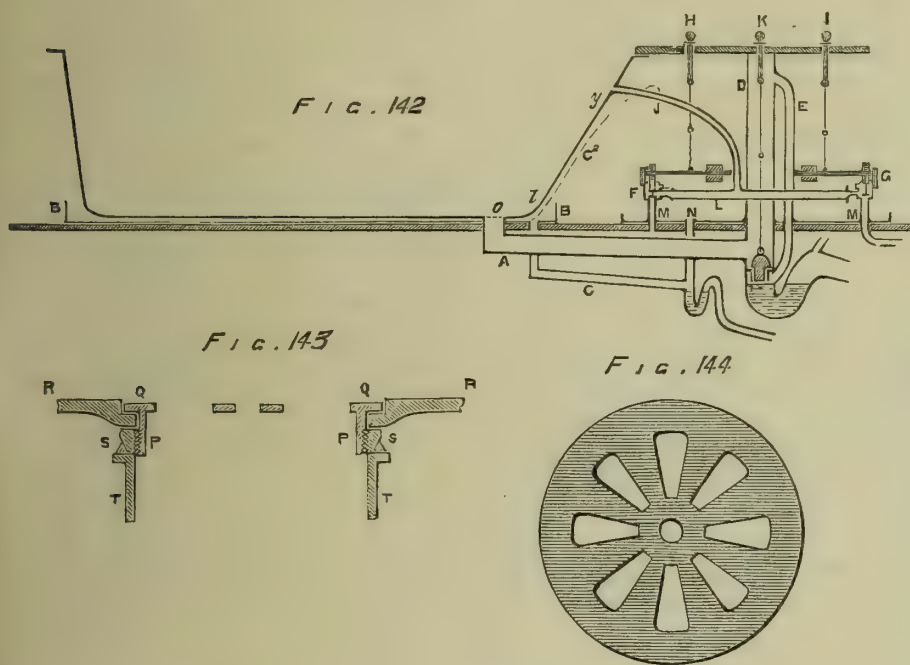


page 6, there is shown the way in which the

hot and cold water was generally admitted into bath when bath had a rod-pipe; now, however, in many places, since our water companies have begun to take more interest in the unnecessary waste of water, instead of the water being allowed to enter rod-pipe as shown at I I, Fig. 135, it must either enter bath near the top, as at Y, Fig. 142, or near the bottom, say at Z, Fig. 142. In other cases it may be made to flow in over top of bath, so that should either or both cranes be leaking, the leakage may be at once seen. This style of water-filling bath does not, however, interfere with the fitting up of the rod-pipe in all other respects as shown at Fig. 135; all the difference is that the connections, or joints, at I I, Fig. 135, are done away with, and the supply enters bath directly, as shown at Y, Fig. 142, instead of first down rod-pipe and then rising up through bottom of bath like a fountain, as is the case in Fig. 135. In the case of Fig. 135, however, the water enters bath with less noise, and less steam is also given off than in the case of Fig. 142. Fig. 142 shows iron

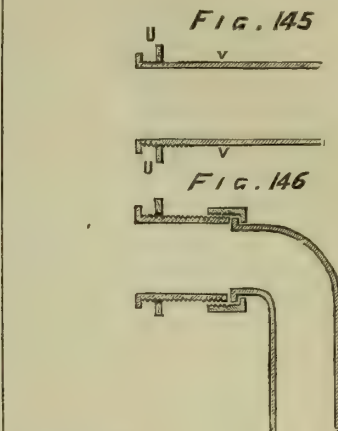
the same principle as that shown in Fig. 139, page 6. In the sketches hitherto given the knobs are all shown as working perpendicularly, but they can also be made to work horizontally—being pulled out instead of lifted—when desired, the pipes being fitted in to suit. L, Fig. 142, is piece of 12lbs. 1in. lead pipe, connecting outlets of hot and cold cranes, J being also piece of 12lbs. 1in. lead pipe, joined to L at one end and to bath at other end, as shown. MM are the inlets of cranes, to which supply-pipes may be joined in various ways. In order to fix these cranes, F and G, they are screwed to piece of wood fixed up firmly at back of them. It will also be observed in Fig. 142 that lead-safe is shown under cranes with safe-pipe N. Of course the style of fitting-up shown in Fig. 142 is much more complicated than that shown in Fig. 130 or in Fig. 148; but it must be remembered that, while there are many who wish their baths fitted up as simply and cheaply as possible, there are others who are ready to pay ten times as much if things are made to

pipe, then brass couplings, with gratings added, such as Figs. 145 and 146, may serve for the overflow; they should be made larger, however. Fig. 147 shows hot

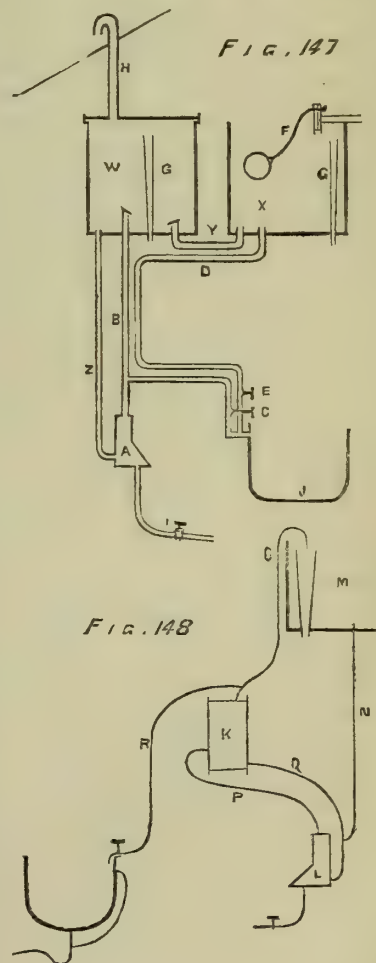


bath fitted up with rod-pipe and hot and cold water supply, the supply, as stated above, entering through end of bath near top, as at Y, the waste water being discharged through waste-pipe A, at bottom. BB is lead safe under bath (I consider that when iron baths are fitted up with rod-pipe and valve it is proper to put lead safes under them), C is safe-pipe, or pipe which takes away any water which may fall into safe. To prevent any chance of water coming back and overflowing up this safe-pipe C—say during frost—when bath is being emptied, it should be arranged for it to go out independently of bath waste-pipe, and to have a syphon-trap for itself. If discharging into drain, to prevent bad smell coming back, keep small syphon-trap charged by means of small pipe led from top of J, as per dotted line C², so that when bath is filled a little water runs into small syphon-trap. Lead perforated gratings should be put on at mouths of pipes C and N, Fig. 142. D is 3in. lead rod-pipe, and E 2in. overflow-pipe. F and G are ½in. Lambert's hot and cold water valve cranes, with weighted levers. When the knob H, Fig. 142, is lifted it raises the lever of hot crane F, and hot water flows into bath through pipe at Y. When knob I is lifted, cold water enters bath at Y, and when both H and I are lifted at the same time the hot and cold water mix together in pipe J, and flow out in one stream at Y. K is knob of waste valve: when it is raised bath empties, and when it is let down bath can be filled. These three knobs; H, I, and K, all work on

please them, and who, not content with the hot and cold supply to bath, as shown in Fig. 142, will also have other three, five, or more cranes, &c., besides; say one cold one for drinking, hot and cold for spray bath, and hot and cold cranes, with indiarubber pipes attached, for directing water to any part of body where wished. These latter are useful in rheumatic complaints. Fig. 143 shows section of brass grating, O, Fig. 142, *in situ*. It must be made to fit the hole left in bottom of bath for it; this must be especially attended to in the case of enamelled iron baths, for any attempt made to enlarge the hole afterwards, or cut a new one, injures the enamel. Fig. 144 is top view of this brass grating. It is about 3in. in diameter over all. PP, Fig. 143, is pap, or horn of grating projecting down through bottom of bath and screwed on the outside. Underneath Q Q, that is between brass flange and bottom of bath, RR, a bedding, say of red lead and hemp, or other suitable material, is placed. SS is strong brass ring screwed inside. It is soldered to lead waste-pipe TT, the brass grating being screwed into SS after bath is in its place. Fig. 145 is the brass coupling used at Y, Fig. 142, where the supply enters bath, U U is the back, or jam-nut, the tail at V V is left plain, so that lead supply-pipe may be soldered to it. The internal diameter of this coupling is 1in., and its length about 3in. Fig. 146 is another style of same. When iron bath is fitted up with simple brass socket, grating, and plug—as per bath in Fig. 148—in place of rod-



and cold-water cisterns for bath, &c., W being hot-water cistern and X cold-water one. The hot cistern should be a little taller or higher than the cold one, because the hot water is lighter than the cold. Y, Fig. 147, is 1in. or 1½in. lead pipe leading the

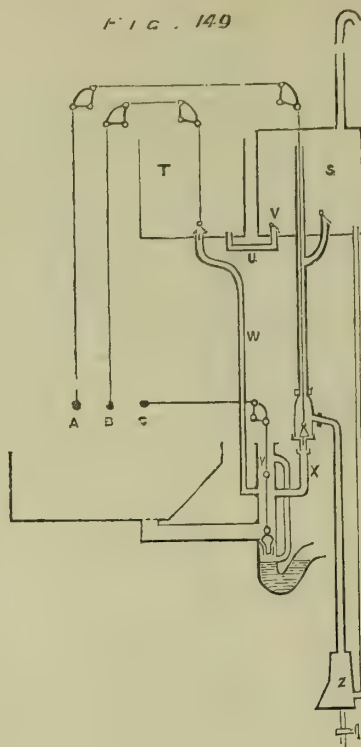


water from X into W. Upon the top of Y, in hot cistern W, a light hinged valve is soldered, which allows the cold water from X to pass into W, but prevents the water from W passing back into X. Z is ¾in 9lb. lead pipe leading water down to boiler A. B is 12lb. 1in. lead pipe leading hot water up from boiler.* Upon top of hot pipe B a light hinged valve is placed, which shuts when hot-water crane C is opened, thereby causing the hot water to be drawn from the boiler. D

* Of course these sizes are not compulsory, for both pipes may be only ¾in. internal diameter, or both may be 1in., or even more if wished or necessary.

is cold supply to bath and E cold-water crane. These two cranes in this case are two-pillared screw-down stop-cocks, with round or octagon knobs for handles. Lambert's cranes are largely used for these, but the great fault with Lambert's stop and bib cranes is that the working screws so often give way, and few things are more common in many plumbers' accounts, than "new bush and screw for Lambert's crane." It is surely within the power of our brassfounders to remedy this, and so to make this "bush and screw" that it will stand better and not be so easily overhauled as it so often is. For cold water especially, and for strong pressures, I know of no bib-cranes which give more satisfaction than Guest and Chimes' style of screw-down ones. It is a rare thing to see their screws overhauled. For ball-cranes, however, Lambert's patent seems to be the general favourite. A common fault with them is to put on too small balls at first, which have afterwards to be taken off and larger ones put on; better therefore to put on good-sized balls at first. With a good pressure, a $\frac{3}{4}$ in. Lambert's ball-crane works well. F, Fig. 147, is ball-crane, and G G overflow pipes. The hot-water cistern W, is covered, and has steam-pipe H led out to roof. The top covering of roof, which may be of wood, is readily moveable, at least in part. I, Fig. 147, is 12 lb. 1 in. lead pipe, with 1 in. ground stop-cock on it for cleansing boiler; it is connected to drain. J is cross section of bath, the waste-pipes, &c., of which may be fitted up either as those in Fig. 142, or in the simpler style of Fig. 148. When setting in the boiler A, Fig. 147, the end from which hot-water pipe is led out should, if anything, be kept the highest, and the hot pipe B, or rather its coupling, should not project down into the boiler, or if it does project down a little, a slit should be filed out on each side of it. I mention this, because when these precautions are neglected, and the steam thereby prevented from having free exit up hot pipe, disagreeable noises are often caused when boiler gets heated up. In regard to the hot and cold pipes from and to boiler, they should not be allowed to sink, or to "bag" down anywhere, but should have as regular an inclination in every part of their course as circumstances will allow; lowest next boiler, and ascending upwards from it. When being carried horizontally in any part of their course, the pipes should then be laid on a board or boards, properly supported or fixed, said boards having as much of a dip or inclination down towards the boiler as possible. This helps to prevent explosions, as it allows the heated water and any steam to rise up the pipe easily and naturally. The style shown in Fig. 147, if carried out as I have stated, is the safest of any in frosty weather, for if fire be kept on, the boiler pipes Z and B are both kept warm throughout their entire length from movement of water. For greater safety, however, it is well to wrap up pipes to and from boiler with felt (in fact as a defence from frost this is good for all pipes). To ascertain if boiler is being supplied properly, open the hot crane at kitchen sink or bath, and let it run a minute or so. This should always be done after the cleansing-cock I, Fig. 147, has been used (due time, five or ten minutes or so, being allowed for boiler to fill up), for no fire should be on when the boiler is empty, and no water should be allowed to enter an empty boiler when the boiler is hot. As regards the site of baths in houses, they should never be fitted up, as I have often seen them, right above the principal rooms, for as accidents will happen, and pipes will burst or overflow occasionally from various causes, the damage done in such cases is sometimes great. In Fig. 148, no hot cistern is used, but instead a plain malleable iron, galvanised iron, or copper intermediate close tank K, is used. This tank is generally placed in a

corner of the kitchen as near the boiler L as convenient; if in a one story-house it may be



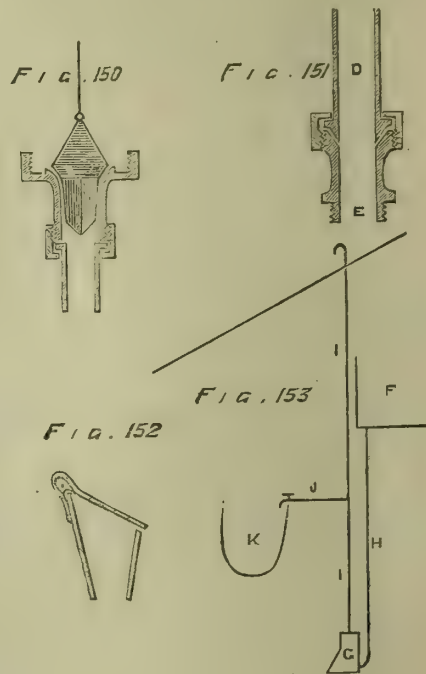
placed in garret or loft, &c., immediately above kitchen, and there being sufficient head-room, the cold cistern may be elevated on a strong wooden stool, or otherwise, above it, and the whole being properly boxed in, Mr. Frost may be defied so long as fire is kept on, and supply to cold cistern continues. If, however, the cold cistern, besides supplying tank, also supplies water for culinary or drinking purposes, the water from it would have a disagreeable and warm taste, especially in summer, so that in doing his work satisfactorily, the plumber has often many different things to consider.

In thousands of our houses the water-pipes lie quite exposed in our garrets, &c. Now if people would order or allow their plumbers, &c., to wrap up their pipes and cover in their cisterns, the frost would not interfere with the water-supply in the disagreeable manner it so often does. The hot-pipe O, Fig. 148, when bent over cistern, instead of being carried out to roof, can be bent down into overflow-pipe of cistern, so that should water in boiler begin to boil up hot-pipe, it does not dirty the water in cistern. M, P, and Q, Fig. 148, are the hot and cold circulating pipes between tank and boiler, while R is the hot pipe leading to bath and elsewhere where needed. In regard to cranes, I may here add that where the pressure or height of water-supply above crane is only about ten feet or so, then the best crane to use, and the one which gives most satisfaction in that case, is a gun-metal, or good brass, ground cock, requiring only a quarter turn to open or shut. In many cases, with only a few feet of pressure, the valve of a screw-down crane often refuses to open if kept shut for a day, the valve having stuck to its seat, there being too little pressure to open it. I could mention various places where this is the case, the plumber or architect having made the mistake I refer to.

I have been requested to give a specimen of bath supplied by means of valves—not valve cranes—and accordingly do so. Fig. 149 shows this style of fitting up. I would say it is more applicable to a gentleman's private country-house, where there is a good supply of water and no one to interfere, than for a town-house. S, Fig. 149, is the hot-water cistern, T, the cold one, U, pipe connecting hot and

cold cisterns, with a valve at V, at its mouth in hot one. W is cold supply to bath, and X hot supply, both entering into bath rod-pipe Y, and then rising up through bottom of bath, in which is brass grating, same as depicted in Fig. 137, page 6. Z is boiler. A, B, and C are the three draw-out knobs with small pulleys, which work the different copper wires and spring cranks (or weighted levers may be used were applicable) shown for hot, cold, and waste respectively. The hot valve shown in Fig. 149, a little above X, is encased in lead-box made for it. This lead-box has its bottom of brass, put on similar to the way in which the underseat or bottom of many beer-pumps is put on, this "brass-bottom" also serving as the seat for valve. This "brass-bottom" has also brass coupling attached under it for connecting to lead pipe; by this means the valve can be easily got at or got out for repair when necessary. The top of this valve must not be left flat however, but be drawn up to a point, so as to prevent concussion when used. Fig. 150 is section of this hot valve with "brass bottom" and coupling underneath. In the case of Fig. 149, as in Fig. 147, the hot-water is drawn direct from boiler, while the boiler itself again is supplied from the already-heated water in hot cistern, the valve which is put on upon top of hot-water pipe inside each hot cistern producing this effect. The intermediate hot-water tank K, Fig. 148, may also be used in houses fitted up as per Figs. 147 and 149 in addition to the hot cisterns there shown, and may be used for the purpose of heating the house.

Fig. 151 is style of brass couplings for boiler, &c., the upper half (which may be also had bent in place of straight), D, being soldered or connected to pipe, and lower half E, screwed into boiler; the internal diameter is generally either $\frac{3}{4}$ in. or 1 in., but for larger pipes larger couplings may be used. Fig. 152



shows section of brass light-hinged valve, used on hot pipes and in cisterns, in Figs. 147 and 149; its internal diameter at bottom is about 1 in. Fig. 153 is simplest style of supplying hot water, no intermediate tank or hot cistern being used. The supply of hot water to house is of course less in this case. F, Fig. 153, is cold-water cistern, G Boiler, H supply to boiler; I I, is hot-water and expansion or blow-off pipe out to roof. J, is hot-water supply pipe to bath.

Solid-drawn copper pipes have been much used of late for the hot-water supply pipes; the thickness of copper is almost about 1-in.; the internal diameter of pipe may be either $\frac{3}{4}$ in. or 1 in. as desired. They can be had tinned

both outside and inside, which is preferable; they are joined with plain couplings screwed inside, the ends of pipes being screwed outside (just as with malleable iron pipes). Cast tees are used for branches; all the joints, after pipes are screwed together, are soldered.

Errata: In foot-note, page 5, for "through lead pipe" read "through lead safe." Page 6, fourth line from bottom of first column, read "which gives 9ft. 1½in." Page 6, last line of first column, for "Fig. 137," read "Fig. 136." On page 5, eleventh line from top, read "made of 1½in. wood."

(To be Continued.)

THE DECAY OF WOOD.

WOOD being vegetable matter, is of course liable to decay; but how to turn it to the best account with this known attribute to contend with may be worth inquiry. The closer the grain and the heavier the wood the less liability there is to decay; but for building purposes, as at present carried on, light and open-grained woods must be used. We cannot, in these times of excessive competition, go back to the old oak-timbered and floored houses of our ancestors. It would, however, pay landlords to build solid, substantial houses, and let them even at the present scale of rental. For instance, in digging away the foundations of the Savoy Palace, built upwards of six centuries ago, the oak piles were found perfectly sound, as was the planking which covered the pile-heads. How long would even best Memel timber have lasted? But houses are built on a very different principle now, viz., to sell again, and perhaps again, before the permanent owner invests in them, and then a coat of paint and a judicious use of putty covers all imperfections.

Sap and shakes are the two principal causes of decay. The timber merchant, naturally wishing to get rid of his stock, will tell us, "Well, trees won't grow without sap;" but, on the other hand, it may be argued that green wood will not build good houses. Now the common kinds of Norwegian and such like woods imported are both waney and sappy, but they are eagerly bought up at low prices and in large quantities. They will not make cheap furniture, for such manufactures would warp into all sorts of shapes, even if the waste could be afforded, so they are almost all used in building cheap houses; and one of these houses keeps another up. In course of time one of the houses may be pulled down, and then such a sight may be seen as is now open to view in Young-street, Kensington, where the whole inside of a house came down with a crash directly its prop, in the shape of the adjoining house, was withdrawn; but happily in this case without loss of life. First-class builders never use such wood as the above, and only such as is thoroughly seasoned. Even best quality yellow pine, Onega and Archangel yellow, and such like goods, require seasoning, and exposure for some time to a thorough draught of air. The value of ground in London renders it next to impossible to stack deals on end so as to admit the air to the flats, but at any rate they should be "stacked"—that is, every tier should rest on pieces of wood the size of a pan tile or slate lath; this gives the necessary ventilation. Without this precaution, deals are apt to become what is called "tainted" or "doated;" and pine deals are peculiarly liable to this—so much so, indeed, that many a parcel of apparently splendid wood when the edges and ends are only seen, may really be worth only the price of fourth quality when the pile is taken to pieces. Shakes have the fatal fault of admitting the damp, and thus causing rot. All wood is more or less liable to them, but for inside work it does not so much matter. In an exposed situation rot is sure to follow. The above mentioned woods are the least liable to shake, and such as Riga, Petersburg, Wyburg, and best Holmsund (all best quality) can be recommended. It is impossible in the docks to keep deals in a

shady place, and on a hot summer's day they may be heard to crack if the ear is placed to the piles. The flooring boards, being kept in sheds, present quite a different appearance to the same quality of wood exposed on the quays. Putting on one side the question of expense, the practise of matting up the end of the piles, as practised in the north of England, cannot be recommended. It certainly preserves the fresh appearance of the wood, and makes it appear as if just discharged from the ship; but it impedes the free circulation of air, and anything that does that is strictly to be avoided. Better by far have the wood shaken at the ends than sweating inside, with here and there places where the penknife blade sinks in with hardly any pressure.

The decay of wood arises from internal and not external moisture; hence the danger of shakes, as they admit it often to the very centre; and so long as free evaporation is allowed, decay will not very readily set in. It would be very absurd to say that no paint ought to be used in the interior of a house, but it is certain that a piece of wood painted on both sides will not last nearly so long as one not painted at all. The reason is evident. The paint effectually closes all the pores and prevents the evaporation of the moisture, which even the best seasoned plank will contain, and hence decay sooner sets in in one shape or other. For the same reason wood painted on one side only will last longer than that painted on two sides. Thus, in an old building, the wainscot, doors, windows, &c., will be found to be affected when the staircases will be sound, because never painted. The old houses in the quaint city of Chester prove the truth of this. Some years ago a Liverpool builder, who had some contracts there, told the writer that the numerous exposed beams were generally sound, and they are all unpainted, but the inside work had apparently been renewed. The best that can be done, under all circumstances, is to give a coat of paint before leaving the workshop, and this is generally done, at least in the large establishments.

The great value which now attaches to imported wood, seasoned so far as perhaps lying abroad unshipped for a year or so, is a proof how much it is sought after here. Who does not know the difficulty of finding a parcel of best dry yellow pine deals (above eleven inches in width especially)? Such deals command the very highest prices, and are eagerly sought after for other purposes than house-building. There is less difficulty in dealing with white-wood, as it is much freer from sap and shakes, and it may be remarked that such a thing as a decayed scaffold board is seldom seen. These are generally of St. John's white spruce, bound with iron-hoop at the ends to prevent splitting, and are, of course, unpainted. It may also be mentioned that floor-boards are very apt to rot when covered with oilcloth; and indeed the mildew underneath which may often be found; is a proof that evaporation is prevented, and thus decay induced. Were we in a position to choose the trees from which to select wood, it would be well to be aware that the more light a tree has during its growth the more durable is the timber; and thus it is probable that the brittle wainscot oak of the Black Forest is produced by the very same species as that from which we obtained the solid unyielding timber of which our navy used to be built.

SLATES.

FOLLOWING the upward tendency of other building materials, Slates are as expensive an article as can be well imagined; and as there is, comparatively speaking, but little opposition, there is no probability of their being cheaper for some time to come. It is curious to note how fashion, more than reason, decides certain districts to patronise Bangor, Port Madoc, or Westmoreland slates. About Liverpool, Bangor are used; in some parts of

the Midland counties no builder will buy any but Port Madoc; and so on. The transverse strength of Welsh Slate is greater than any other mineral product of the same kind. For such qualities as strength and cleanliness no other material is so cheap. The large quarries at Penrhyn, near Bangor (Lord Penrhyn's), from which the best Bangor slates are obtained, are worked in successive terraces. The slate is obtained in immense quantities by blasting, and therefore the waste is enormous; but being quickly got rid of, the price in ordinary times is kept moderate; but it often happens that particular sizes have to be ordered even two years in advance. The Llangollen quarries are remarkable for the size of the slates obtained. The recent invention of machinery to excavate coal will no doubt affect the slate market in time, by rendering employers more independent of the caprices of labourers led by professed agitators from London. Scotch slates are not much in repute. In one quarry the weight of rubbish is about five or six times as much as the slates. In Ireland the more important quarries are Killahoe, Valentia, Benduff, and Curaghally. The colour is a dull bluish grey, preferred by many to the decided blue of the Bangor quarries. The colour of the Valentia slates is rather greener than those above mentioned. They are generally thicker and more uneven on the surface, and so are better suited for the exposed aspect of buildings in the western counties. A fine, sound texture is the most desirable among the properties of a slate, for the expense of slating being very greatly increased by the boarding whereon it is placed, if the slate absorbs and retains much moisture the boarding will soon become rotten. But a good slate is very durable. Its goodness may readily be judged by striking, as a piece of pottery is struck. A sonorous, clear, bell-like sound is a sign of excellence, but many pieces of the slate should be tried before such a conclusion is arrived at. Port Madoc slates have a sharp, clear ring, and the slates, though much thinner than Bangor, will bear throwing on the ground without fracture, while the latter often break in the mere handling. The colour also is some guide, the light blue sort imbibing and retaining moisture at a far less degree than the deep black-blue sort. The feel of a slate is also some indication of its goodness. A good one has a hard and rough feel, while an open and absorbent slate feels smooth and greasy. The best method, however, of testing the quality of slate is by the use of water in two ways. The first way is to set the pieces to be tried edgewise in a tub of water, the water reaching about half-way up the height of the pieces. If they draw water and become wet at the top in six or eight hours, they are spongy and bad, and as the water reaches less up them, so are the slates the better quality. The other method is to weigh the pieces of slate and note their weights. Let them then remain twelve hours in water, and then be taken out and wiped dry. Those that on re-weighing are much heavier than they were previous to their immersion, should be rejected. Where the character of a slate quarry is not known, these experiments should always be made. Bangor best slates can be bought here, alongside the vessel, at the following prices:—

Duchess best blue,	24 by 12	per 1,200	£13 10
Ditto	22 " 12	"	11 10
Countess	20 " 10	"	9 10
Viscountess ..	18 " 10	"	8 0
Ladies	16 " 10	"	6 10
Ditto	16 " 8	"	4 10

Blue Ridge Tiles, 18in. long, 9d., flanged, 11d., roll top, 10d. each; ditto grooved with crest, 18in. long, 1s. 8d.

Improved machinery has of late years been invented for sawing and smoothing the slabs of slate. One is a machine for hollowing out blocks for sinks, &c., by means of cutters secured to the ends of revolving shafts. Mr. Matthews's apparatus for cutting and dressing slate consists of a frame provided with arms, cutters, toothed wheels, &c., in such a way that the cutters may be raised by a lever and

THE NEW HOME AND COLONIAL OFFICES.

ON Saturday afternoon last a large party of the members of the Architectural Association visited the new Government buildings now in course of erection at Westminster for the Home and Colonial Departments. The buildings now in progress, and which are not expected to be fully completed until the Spring of next year, are very extensive, and comprise the eastern portion of the great block of buildings which stretches from Parliament-street to S. James's Park in one direction, and from Downing-street to Charles-street in the other direction, the India Office and the Foreign Office being located in those portions of the buildings which are nearest to S. James's Park, and which have been completed for some few years past. The architecture of the new buildings is of the Palladian type, harmonising with, and being in its main features a repetition of that of the New India Office and Foreign Office. There are frontages of 124ft. in Downing-street, 270ft. in Charles-street, and 320ft. in Parliament-street—which will be made upwards of 100ft. in width at this part by the removal of some existing houses. The Home Office will occupy one half of the front block facing Parliament-street, and will extend about half way down Charles-street. The Colonial Office will be accommodated in that half of the Parliament-street block nearest to Whitehall, and will extend some distance along Downing-street. The principal entrance to the Home Office will be in the centre of the Parliament-street façade; but this entrance will be exclusively for the Home Office, those portions of the building devoted to the Colonial Office being separated from the Home Office portions by a party wall to the right of the principal entrance as you enter, and the Colonial Office having its principal entrance in the great quadrangle, as hereafter stated. Of course the houses on the west side of Parliament-street are to be pulled down, and as we understand the leases of these buildings all expire on the 25th proximo, we hope we may look forward to the speedy removal of what we believe has been, and still is, a great obstacle to the satisfactory progress of the works, the buildings in question having been allowed to stand so long as they have in order to retain the rents, which amount to a considerable sum annually. There will be another entrance to the Home Office in Charles-street. The visitors to the works on Saturday last having met at the door in Charles-street, proceeded to the office of the clerk of the works (Mr. Sheffield, who, we believe we are correct in saying, acted in the same capacity during the construction of the new Foreign Office). Having inspected the plans and elevations of the new buildings, the visitors, conducted by Mr. Sheffield, proceeded to the great quadrangle, for the purpose of viewing the façades on this, the inner side of the buildings. Returning to the interior, they passed through the basement, ground, first, second, and third floors, and then on to the roofs of the external buildings facing Parliament-street, Charles-street, and Downing-street. The new buildings will face the whole of the eastern side of the great quadrangle (which measures 250ft. by 175ft., and is common to all the offices in this large block of buildings, viz., to the India, Foreign, Home, and Colonial Offices), returning half-way or thereabouts along both the northern and southern sides. One of the principal rooms in that portion of the building appropriated to the Home Department is, of course, the Secretary of State's room, which is situated on the first floor, and looks into the great quadrangle from the centre of the façade. Beneath this room will be situated, somewhat appropriately, the Under-Secretary of State's room; adjoining on each floor, and on either side of both of these rooms, will be a series of other rooms and offices for subordinate officials and clerks. On the first floor, and looking into the quadrangle from over the porch or entrance, will be the board-room, with waiting-rooms and other offices immediately adjoining. The library for the Home Office will be on the first floor, and will look into Parliament-street, but will not be above one-fourth the size of the Colonial Office library, which will also look into Parliament-street, but will be on the second floor, and, of course, in the other or Charing-cross side of the principal entrance in the Parliament-street block. Entering at this doorway, which, as we have before said, only gives access to the Home Office buildings, passing through the handsome hall, and ascending a short but handsome flight of steps to what will be called the ground floor

level (although necessarily rather above the ground), corridors lead right and left to the different portions of the building, the stairs being continued upwards a little to the left of the short flight just named. There will be another entrance to the Home Office buildings in Charles-street, midway between the corner of Parliament-street and the India Office gateway. This entrance leads to a very fine large octagonal staircase, leading from top to bottom of the building, and lighted from the roof, this staircase being situated just inside the south-east angle of the great quadrangle. Besides the large open quadrangle we have named, there will be two small inner courts for light and air—small, however, only when compared with the large quadrangle, for the one which will afford light and air to the Home Office buildings is about 60ft by 85ft., and the one which is to serve the same purpose for the Colonial Office is nearly as large. The smaller courts are placed one towards each end of the Parliament-street block, and are lined with very nice white bricks, the façades facing the great quadrangle and the streets being all of Portland stone of the best quality. The principal entrance to the Colonial Office will be through a porch leading out of the north side of the great quadrangle. This entrance will give access to a very handsome hall, from which corridors will lead right and left, and to a similar octagonal staircase to that previously referred to as being provided in the Home Office, this staircase being just inside the opposite or north-east angle of the quadrangle, the Home Office octagonal staircase being in the south-east angle. The Secretary of State's room (we are now speaking of the Colonial Office) is on the first floor, immediately over the entrance hall, and looking into the great quadrangle. The Library of the Colonial Office is a very large apartment, occupying the whole of the second floor of that portion of the Parliament-street block which is on the Whitehall side of the principal entrance of the Home Office. It will measure 96ft. by 32ft., and will be lighted on one side from Parliament-street, and on the other side from one of the small inner courts before described. As this apartment takes up the whole width of the building, whereas on the other floors rooms and corridors are provided (the rooms being lighted from the street, and the corridors from the small internal courts), provision has had to be made for carrying the corridor wall on the third floor—the floor immediately above the library; this is effected by a range of five strong iron columns running along towards one side of the library, which will be handsomely decorated with bronze foliated caps, &c. These columns will of course rest on the top of the corridor wall of the first floor, and will serve, in fact, as the continuation of the corridor wall from the first to the third floor, the wall being, but for this break on the second floor, continuous from top to bottom. The buildings are constructed on fire-proof principles throughout, Dennett's arched concrete construction being used for all the floors and corridors. All the corridors in both buildings are over one another, and all are lighted from the small inner courts described. There will be hydrants every few feet apart in all the corridors, for use in case of fire; these will be supplied with water from large tanks situate on the towers, which will flank the Parliament-street façade—one at the corner of Downing-street and the other at the corner of Charles-street. These towers will each be about 200ft. high, and it is the intention of the architect, Sir Gilbert Scott, that each shall be surmounted by a kind of cupola. Messrs. Jackson and Shaw are the contractors, and the total cost of the works will be, we believe, about a quarter of a million sterling. The visitors having thanked Mr. Sheffield for his kindness in conducting them over the works, the visit was brought to a close.

NEW PAUPER INFIRMARY AT CAMBERWELL.

TWO or three years ago the requirements of the poor of the increasing population of the large suburban parish of Camberwell determined the Guardians to erect a new infirmary. About a dozen sets of plans were sent in in competition, that of Mr. W. S. Cross being accepted. The contract was given to Mr. Hart, of Dover-street, Borough, the total cost being estimated at from £16,000 to £17,000. The foundation-stone of the new building was laid in 1871, but various obstacles have

delayed the completion of the work, which is now being rapidly effected. The pavilion principle of planning has been adopted, so that special cases may be isolated and effectually dealt with. The buildings have been erected in the rear of the Camberwell Workhouse, Peckham-road, and abut upon Brunswick-street. At the Brunswick-street end of the building a dispensary is already in operation. The several wards of the new building will accommodate 300 patients, and there are extensive recreation grounds adjoining. The portion now opened (according to the *South London Press*) consists of the basement, which contains the dispensary and rooms and apartments connected with it, including the medical men's consulting rooms, patients' waiting-room, and drug-room in the front portion, which is divided from the rear of the basement by a spacious corridor 7ft. wide. The basement rear beyond the corridor contains the domestic offices, which consist of laundry, kitchens, cellars, wash-house, and engine-house and boiler. The structure itself forms a large square block, covering an area of 1,900 square yards, and an area inclosed by the main frontage and wings of the building give to it within the character of a quadrangle. The main frontage in Havill-street is 150ft. long, and consists of a prominent centre and two wings, the latter having side elevations extending backwards 110ft. The central portion of the Havill-street elevation is 80ft. high to the top of the cornice, the wings being 60ft. in height. In addition to the basement and ground floor there are four lofty stories in the central elevation, and three stories in the sides or wings. The elevation is plain in character, the prevailing materials used being white bricks, with a free admixture of red brick and stone dressings. The windows have stone springers and keystones. Between the window-heads and sills of each story there are bands of red brick filled in with encaustic tiles, carried across the entire elevation. The cornice surmounting the elevation is of red brick. In the central portion of the elevation is a stone balcony, projecting from the top of the first story, above which a lofty window in Bath stone, and with red brick-arched headings and stone springers and key-stones, is carried up to the top of the third story. The windows in the upper part of the central elevation also form prominent features. They are carried much higher than in the two side portions of the frontage, and contain nine clustered windows, the whole being surmounted by a gable. The whole of the windows in the elevation, with the exception of those just-named, are in three bays. The principal entrance, which is immediately under the large central window, has on each side carved stone piers, surmounted by a carved stone archway. The ground floor of the central portion of the elevation contains the house surgeon's sitting-room, and also the matron's sitting-room, both in front of the building, the one on the right and the other on the left of the principal entrance. A wide corridor divides this portion of the ground floor from the rear, and this corridor leads to the house surgeon's bedroom, lavatories, stores, and other offices. The first floor contains the matron's bedroom, the nurses' dayroom, nurses' kitchen, stores, and nurses' dormitories. The second and third floors are reserved as special wards, whilst the fourth story in the centre of the building, beneath the gable, will be exclusively set apart as servants' dormitories. The whole of both wings, inclusive of both the ground floor and first, second, and third stories, are being fitted up exclusively as patients' wards, the female wards being in the south wing, whilst the male wards are in the north wing. These several wards have accommodation for 168 patients, and, with the special wards in the central portion of the building, there will be accommodation for a total of 300 patients, as before stated. The arrangements for conveying patients to any part of the building are on a scale of unusual completeness. In the corridor opposite to the principal entrance there are two lifts, connected from the ground floor with the top of the building, by one of which patients can be conveyed to and from any of the wards in the several parts of the building; the other is a dinner lift. Although the building is being rapidly proceeded with, some months must elapse before it will be ready for the reception of patients.

M. Thiers has deputed an architect to draw up a plan for the reconstruction of the Château of St. Cloud.

OUR LITHOGRAPHIC ILLUSTRATIONS.

MR. BURGESS'S DESIGN FOR EDINBURGH
CATHEDRAL.

Last week we gave the west-end view of Mr. Burgess's design. We now give Transverse Sections looking west, and east through transept; also Elevation and Section of Bay of Nave.

The following is the statement sent by Mr. Burgess to accompany his design:—

Accommodation.—The whole of the internal area, clear of columns, and excluding the choir, amounts to 11,989 square feet. This, divided by 7 ft. for each person, the usual amount allowed (including passages) by the London Incorporated Society for the Enlargement and Building of Churches, gives accommodation for 1,713 persons. Out of this must be deducted sundry spaces not available, so that the area may fairly be taken to give the required accommodation.

Chairs.—Chairs, in a building of this description, are much to be preferred to fixed benches,

Arrangement for Small Services.—For ordinary occasions a space might be inclosed by temporary wooden barriers, as in Continental churches.

Warming.—As it is well known that it is more advantageous and more economical to keep the warming apparatus always in gentle use, there will be no difficulty in securing a proper temperature for week-day services. On Sundays the apparatus will be worked to its maximum.

Organs.—It is proposed to place the large organ, divided into two parts, in the western gallery, while a smaller instrument to lead the choir is placed on the floor near the stalls.

Roofs.—The whole of the roofs, except the aisles, are intended to be boarded, which will preclude any difficulty as to the preacher's voice being distinctly heard.

Clock and Bells.—The clock and peal of bells may be placed in the north-western tower.

Design for Cathedral.—It is generally agreed that a complete cathedral should consist of three great divisions—arcade, triforium, and clerestory, and its parts should be nave and aisles, choir and aisles, transepts, and one or more towers.

In the present instance the sum of money to be spent utterly precludes any central tower, and the author has consequently elected to put two towers at the west end, where they not only help the western façade, but perform the useful office of masking the western end of the aisles. The spires will be of wood covered with lead, and the fleche at the intersection of the nave and transepts will also be of the same materials.

Retention of Coates' House.—The author would strongly recommend the retention of Coates' House, not only on account of its interest as a specimen of old Scottish architecture, but as affording the means of grouping the cathedral with the other buildings round and about.

The architects of our ancient cathedrals were most careful to surround their works with other edifices, and no greater mistake can be committed than that so frequently made of destroying the surrounding buildings.

Materials.—It is proposed to make the dressings, both external and internal, of Dalmeny stone; the hearting can be executed in Hailes stone; but it is probable that the excavations for the footings may supply some amount of local materials for this purpose, while red materials for the columns may be obtained from Lockerbie.

The slates would be procured from Ballachlisch, and flag-stones for the pavement from Arbroath and Caithness.

Expense of the Building.—In view of the comparative smallness of the sum proposed (£65,000) in relation to the accommodation required, it naturally follows that the fittings must be of the most simple character.

In order to reduce the expenditure still more, the author would suggest, in case of necessity, the substitution of a continuous wooden barrel roof for the stone vaulting in the nave and choir aisles. It should also be noticed that the figure sculpture could not be included in the sum, but would be a possible future extra.

NEW WAREHOUSES, SOUTHWARK-STREET.

We give an illustration of one of a block of three Warehouses which have just been completed in Southwark-street, from the designs and under the superintendence of Mr. Robert W. Edis, F.S.A., F.R.I.B.A., architect, of Fitzroy-square. The fronts are faced with yellow malm bricks, relieved with red bands and veil decoration. The stone used generally for the ground story, and all strings and weather mouldings, is Portland, the ashlar work and plain heads of windows and other stonework, when protected from the weather, being of Bath Ground stone—the enriched panels in the eastern of the three warehouses are executed in Ransome's patent stone. The works have been executed by Messrs. Browne and Robinson, the builders, of Worship-street, Finsbury, and

the total cost has been about £6,000. The illustration has been taken from the architect's large-scale detail drawing.

THE GIRGAUM CHURCH, BOMBAY.

Was erected by the Church Missionary Society, and by private subscription, for the Rev. T. K. Weatherhead. It accommodates three hundred persons, and consists of a Narthex, Nave, and Chancel, the latter being shown by the illustration. The materials used are blue basalt, and an oolite from Porabunder. The carving has been beautifully executed by Mr. Kipling, of the Bombay School of Art. It was erected from designs by, and under the superintendence of, Mr. Emerson, of Westminster Chambers.

CORBELS, BRIGHTON AQUARIUM.

We give as one of our illustrations two Corbels, taken from the Conservatory in the Brighton Aquarium. The subjects symbolise "Night" and "Morning," the types being in one case an Owl, surrounded by the poppy, ivy, and other objects associated with night. In the other case,

"The Cock, the herald of the morn,"

forms the leading feature. The remaining carvings throughout the building include an almost endless variety of marine animals, shells, and plants, selected with appropriateness to their situation, designed and executed by Mr. H. R. Pinker, of Grafton-street, London. The architect of the Aquarium is Mr. J. S. Nightingale, the engineer being Mr. Birch.

ITALIAN CHURCH ARCHITECTURE.

THE last number of the *Dublin Review* contains an article on Italian Church Architecture, in reply to a writer in a preceding number of the same review on Gothic Architecture. The writer states he is not an architect. He says:—

"Of course there is only one S. Peter's in the world—but the three characteristics, strength, grandeur, harmony of proportion, combined together, belong more or less to the Italian style in general, and so far as I can see, in a greater degree to the Italian style than to any other. The architecture of old Egypt was mighty and sublime, but beauty was wanting. The temples of Greece were of perfect beauty and proportion, but strength and grandeur were wanting. The great Mediæval cathedrals were beautiful and majestic, but neither strength nor unity were the leading features. Enter a Gothic cathedral or abbey, whether York, or Canterbury, or Westminster, or Amiens, or Cologne, and say whether the unity of the mighty whole is the first impression made upon the mind. The eye rests upon the beauty of some pointed arch, or upon the glories of some painted window, or upon some exquisitely carved shrine or altar-piece, but the grandeur of the whole, the unity of the whole, is lost sight of amidst the multitude of details. Enter, on the other hand, some Italian church—I do not say S. Peter's, or any of the great basilicas of Rome, or even such a church as S. Andrea della Valle, or S. Carlo in Corso, or S. Ignazio—but say of the more ordinary churches, although unprovided perhaps with the dome (the grandest feature of the Italian style) and far from free from many faults of detail and the mind is filled at once with the idea of strength and unity. The eye has no time to rest upon the details, nor does it ever occur to any one, I venture to say, to observe whether the windows are round or square, or even—at least for a long time—to notice whether the walls are of marble, or the pavement brilliantly reflective, or other features splendid, or the altars costly, or the capitals of one order or another, or the vault gilded. The perfect unity of the whole so fills and satisfies the mind as to cast a deep feeling of peace over the whole man, and thus to fit him in a very special way for the worship of his God. Add to this that the harmony of proportion, and the unity resulting therefrom, are best adapted for modern church architecture, because typifying the perfect unity of God's Church, which never perhaps was shown forth in so marked a way as in our days."

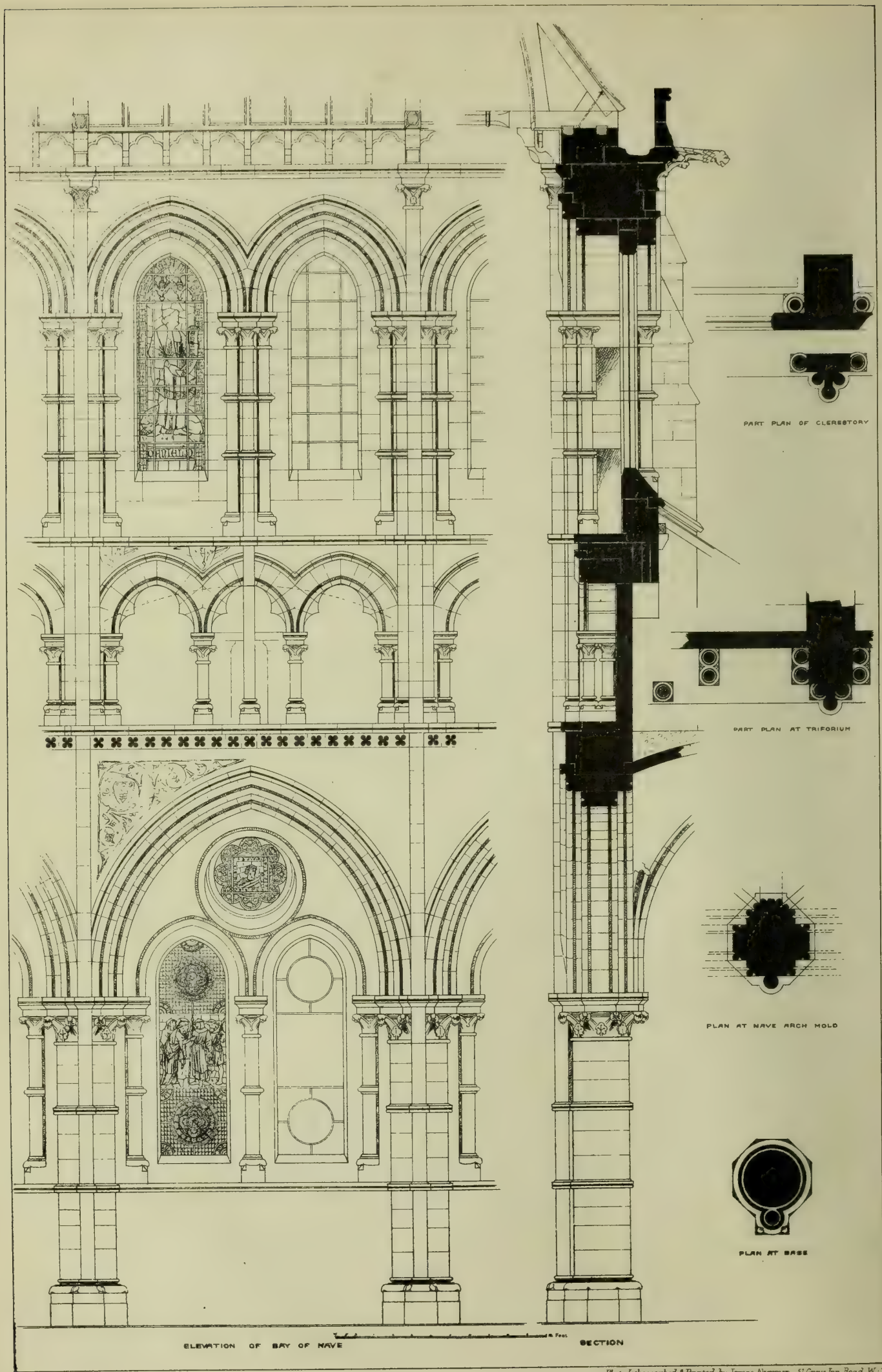
The parish church at Gildersome, near Leeds, which was rebuilt a few months ago, was completely destroyed by fire on Saturday morning.

THE ROMAN HYPOCAUST AS A MEANS OF WARMING BUILDINGS.

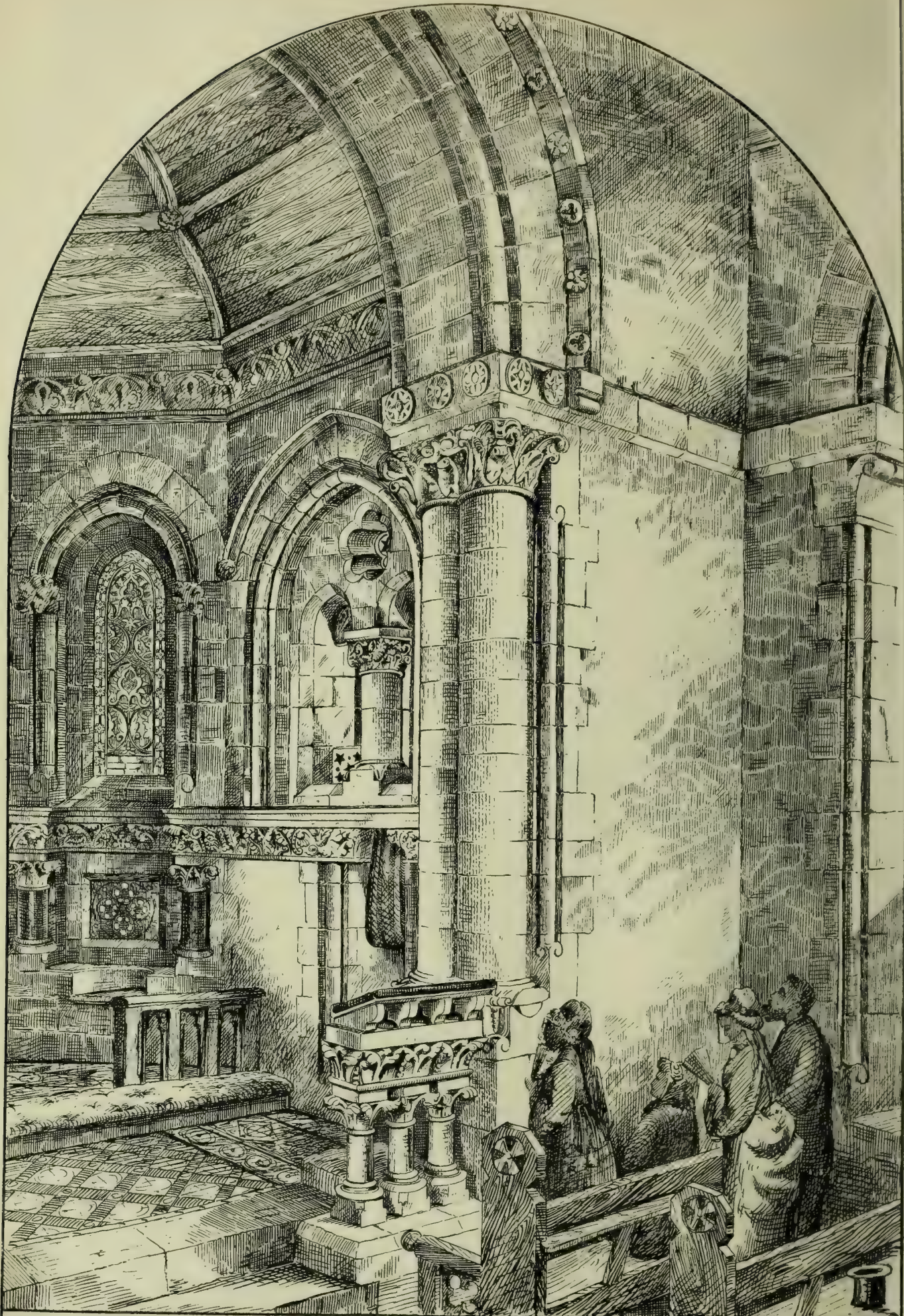
AS will be seen by our report (p. 225) of last Monday evening's meeting of the Royal Institute of British Architects, the Roman hypocaust as a means of warming buildings was referred to at some length by more than one of the speakers in the course of the discussion which followed the reading of Mr. Barber's paper, "On the Heating of Public Buildings, Churches, &c." As Mr. Roberts particularly referred to the hypocaust found at Silchester, we give the salient points of a letter which recently appeared in the *Times*, from the pen of the Rev. J. G. Joyce, F.S.A., whose name is so inseparably identified with the discovery of the very fine Roman remains at Silchester.* Mr. Joyce describes the *triclina*, or dining-room of one of the principal Roman dwelling-houses at Silchester of which any remains are left, and which belonged to one of the Duumviri at that place, being within 150 yards of the great Basilica and Forum there. Who designed this dining-room, Mr. Joyce remarks, it would be difficult to say, but the fashion which marks its construction was not peculiar to its locality, but its age; and it is for many reasons worth consideration, even by the enlightened sanitary engineers of the present day. The dining-room in question was about 20 ft. square, and if the floor of the room was taken up or removed (as it happened to be at present), the construction beneath, on which the floor had rested, would be found to resemble in plan very nearly the pattern of the Union Jack—the lines which cross the flag serving to indicate the course of certain ducts or passages of hot air. The hot-air ducts are about 2 ft. deep and 8 in. to 10 in. wide, and diverge from the centre to the walls, on reaching which every duct terminates in a small vertical flue, ascending from just beneath the floor-level in the thickness of the wall itself, and invisible to the eye when the wall was stuccoed over. The heat was supplied from a chamber outside the room at the back, having no communication of any sort with it. The floor was fireproof when in its place, and consisted of thick tiles covering over the heat ducts, and laid over the solid parts between; and having over this a bed of fine concrete, 4 in. or 5 in. thick, upon which was laid a handsome mosaic. Mr. Joyce is of opinion that with a thermometer hung behind the door, an attentive servant could keep an apartment so heated at a steady and equable temperature from the first day of winter to the last, and with the warmth of an Italian climate, for a most trifling cost of fuel. Mr. Joyce pertinently asks: In the disagreement of modern doctors, is there any authority able to say which is the more civilised or satisfactory method to heat a room—that used by the Duumvir at Silchester, or that inherited by us from our immediate progenitors? If ventilation as well as warmth be taken into account, is it not clear that the upcast shafts for hot-air within the walls might be made to perform this ventilation with a degree of facility and with an absence of draughts at present utterly beyond our most sanguine ideas? Nay, more; if the principle were applied, not to a single room, but to an entire house, could not a house be heated and kept steadily warm from bottom to top at a cost exceedingly under what a winter's fuel now amounts to? These questions, put by Mr. Joyce, are worth—nay, they demand—solution at the present time of high-priced fuel. As will be seen from our report of the Institute's proceedings, Mr. Roberts expressed his opinion that the hypocaust system can only be made subservient in the case of one-story buildings, the Roman house at Silchester being, like most, if not all, Roman buildings, of only one story in height. But even if the hypocaust system cannot be practically applied for the warming of mansions, factories, and other many-storied buildings, it seems capable of wide and successful application to churches, chapels, schools, public halls, &c. In fact, from what Mr. Roberts stated, this identical system has only lately been applied to the warming of a church, and with, he assures us, the most satisfactory results.

The Town Council of Bolton have decided to invite the Prince of Wales to open the New Town Hall, which it is expected will be ready for opening in June next. The building has cost nearly £150,000.

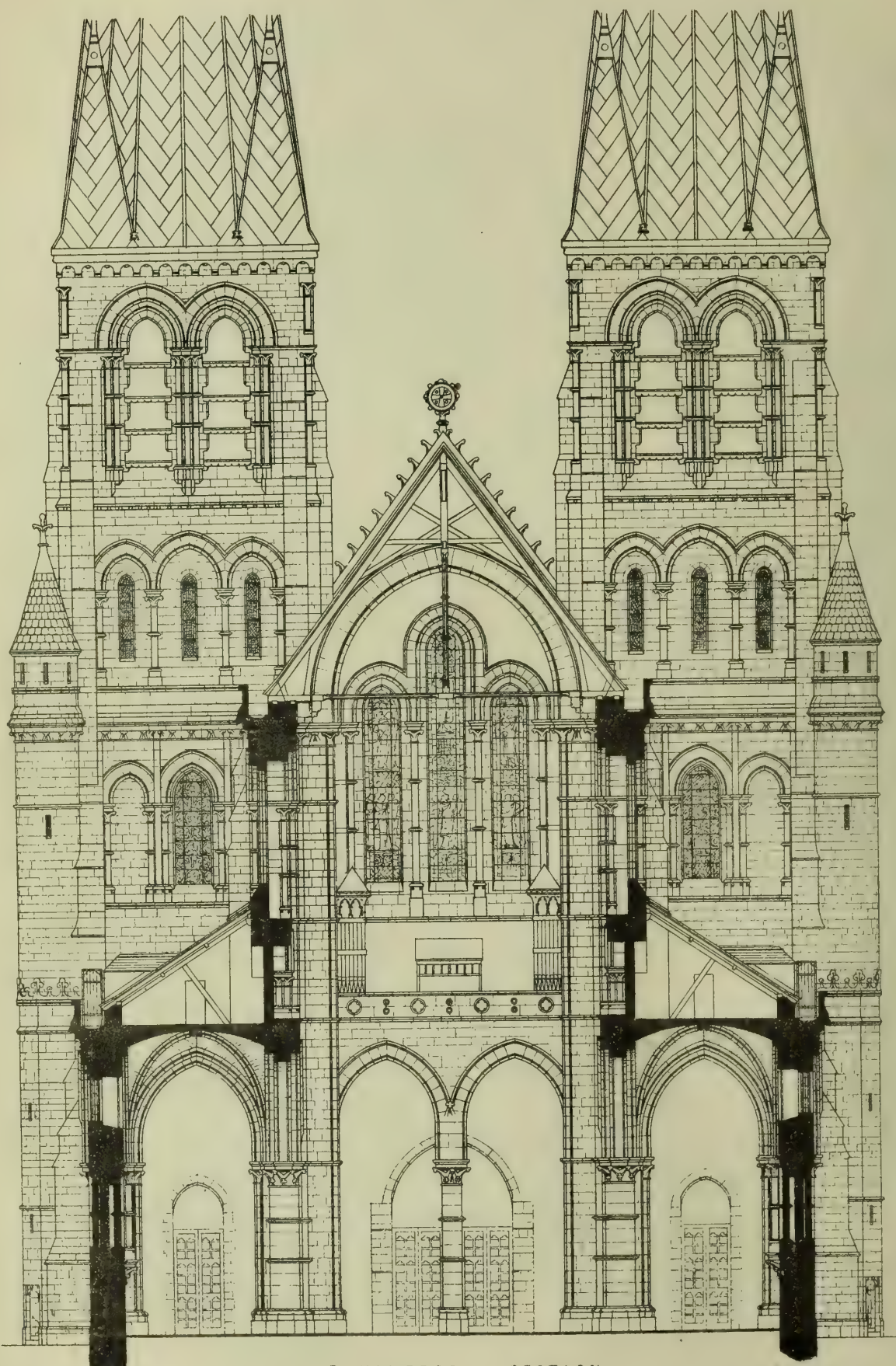
* Some account of these remains will be found in our report of last year's annual meeting of the Royal Archaeological Institute—BUILDING NEWS, August 16, 1872, Vol. XXIII., p. 120.



DESIGN FOR S. MARY'S, EDINBURGH.—WILLIAM BURGESS, ARCHT.



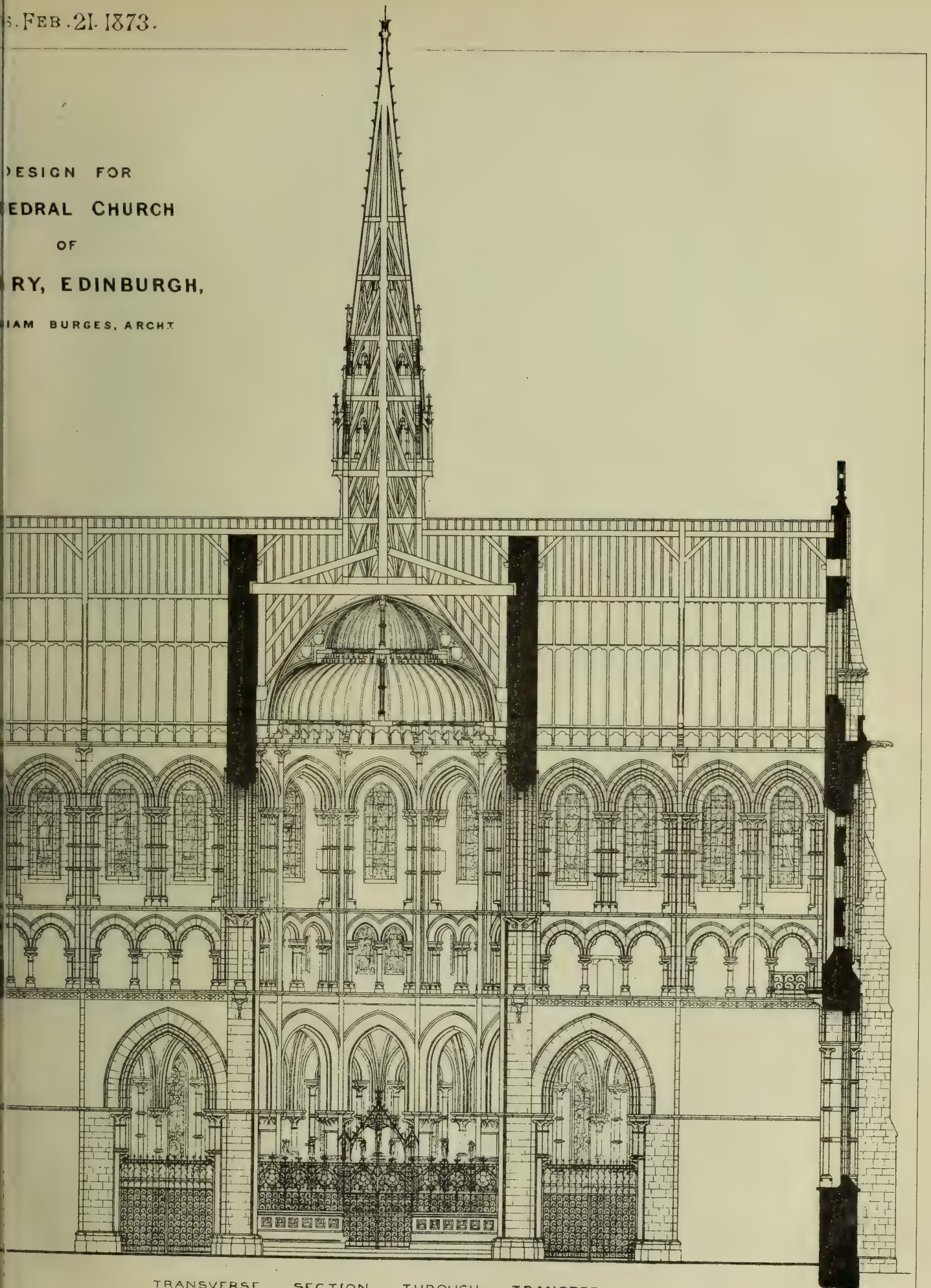
: Church : Bombay : Sketch : of : Chancel : W. Emerson : Archt :



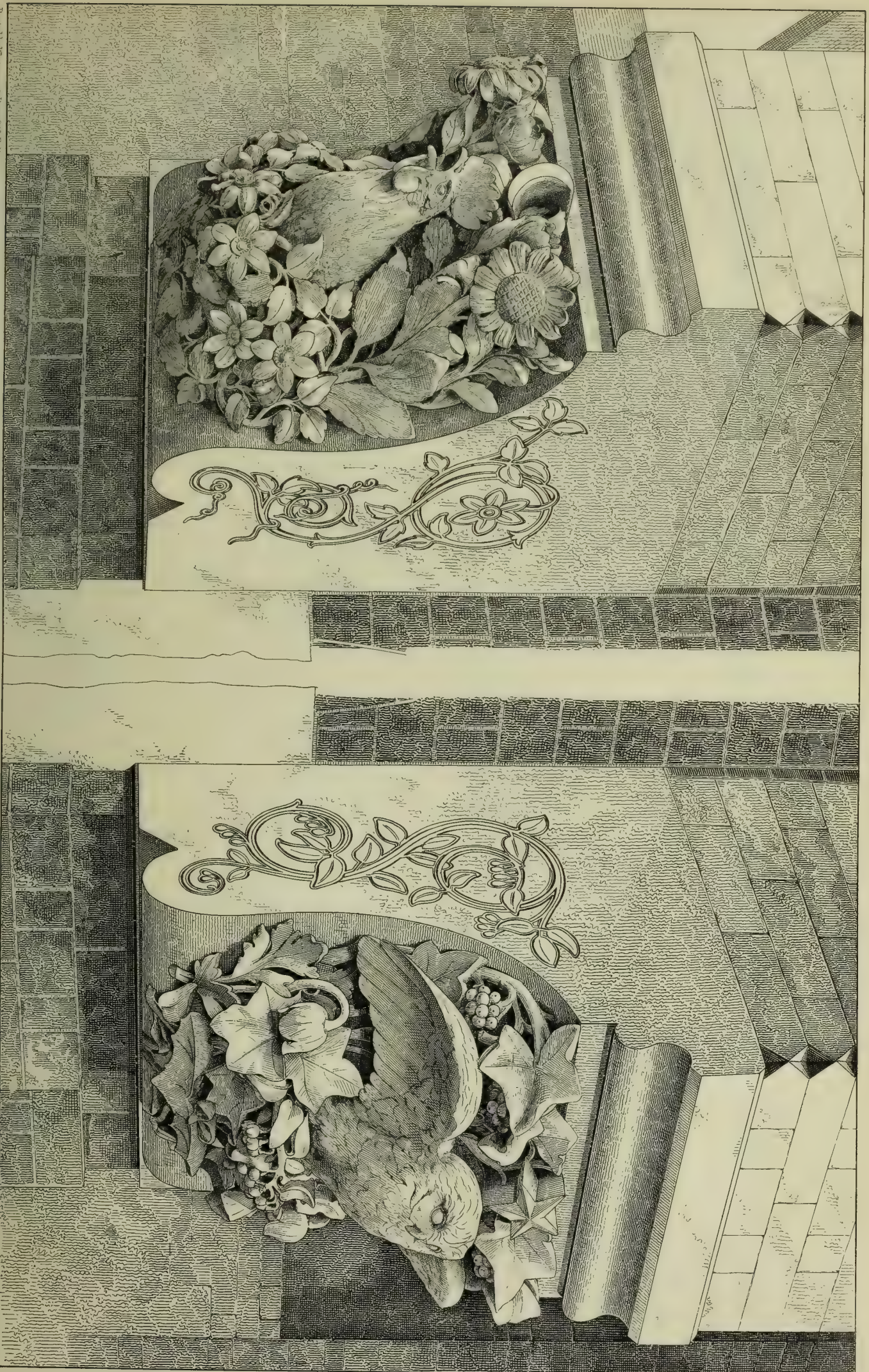
TRANSVERSE SECTION
LOOKING WEST

6. FEB. 21. 1873.

DESIGN FOR
FEDERAL CHURCH
OF
RY, EDINBURGH,
IAM BURGESS, ARCHT.



TRANSVERSE SECTION THROUGH TRANSEPT .
LOOKING EAST .



Designed by Mr. W. H. & B. 254, Balboan

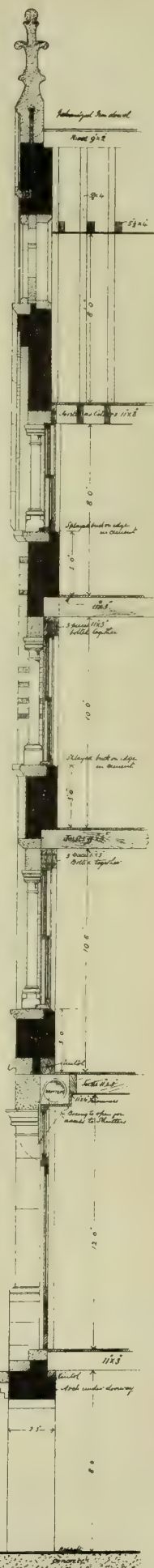
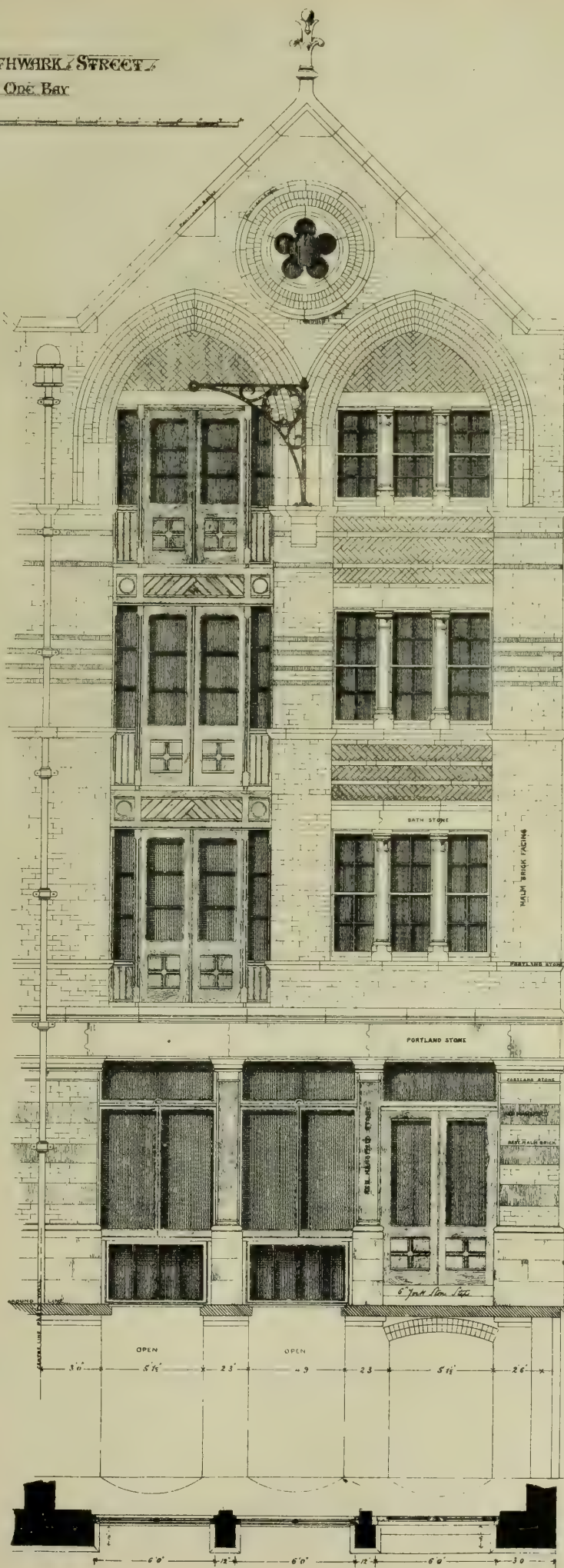
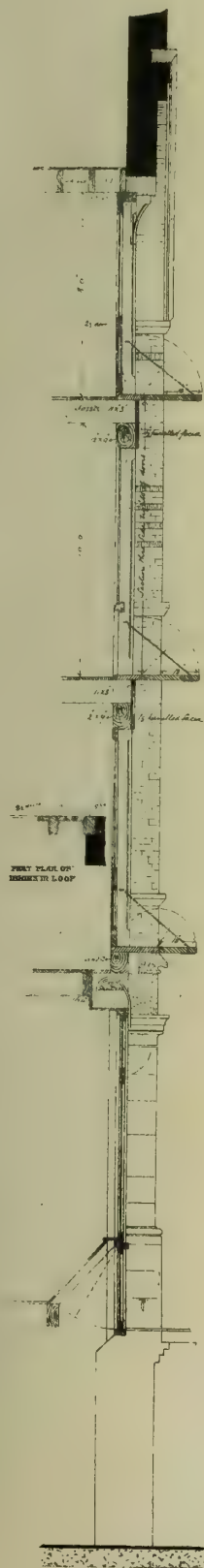
NIGHT AND MORNING — TWO CORBELS IN THE AQUARIUM, BRIGHTON.

DESIGNED & EXECUTED BY H. PINKER.

WAREHOUSES, SOUTHWARK STREET.

ELEVATION OF ONE BAY.

SCALE OF FEET



R. W. EDIS F.S.A. ARCHTCT.
14, FITZROY SQUARE, W.

CLASSIC ORNAMENT AT ROME.*

HYPERCRITICISM is disarmed when one has to review such a compilation as this, by a gentleman who is approaching the 85th year of his existence. When, therefore, among the numerous plates which embellish this second volume† of Mr. Taylor's autobiography, some, such as that of the Arch of Susa which forms the frontispiece, are found to be hardly up to the mark now expected of illustrations to architectural works, it is scarcely fair to complain. The author tells us that a considerable number of these have been drawn by his own hands recently, from his original sketches, made before most of his readers were born. But, if exception should be taken to such on this account, there are many engravings gathered together in this volume which may take rank with the very first of their class; and there are few architects of the present time, even among those who boast a foremost place as artists, who could produce, or cause to be produced from their sketches, such representations of sculpture as those given from the bas-reliefs on the Arch of Constantine and Column of Trajan.

Rome and her architectural antiquities are, as Mr. Taylor says in his preface, subjects that increase in interest as fresh discoveries are made. It is consequently somewhat galling to the feelings of one who has been a pioneer in this field, to find his efforts forgotten or ignored, and we cannot but sympathise with our author in the reasonable complaints that he makes on this account. It is certainly really strange that so noble a publication, in every sense of the word, as "Taylor and Cresy's Architectural Antiquities of Rome" should be omitted from the list of works on the subject given in "Murray's excellent Handbook of Rome," and that Mr. J. H. Parker should have announced a *new work* with exactly the same title. Ignorance of what has been done by others before them can be the only excuse such gentlemen can be able to advance for this oversight; and yet ignorance is hardly the plea that distinguished archaeologists usually are tolerant of. Even Mr. Burn, the author of "Burn's Rome and the Campagna," who refers to all the works, ancient and modern, with which he was acquainted, does not mention that of Messrs. Taylor and Cresy, although he cites Desgodetz as an authority! Now those gentlemen found the latter's work so inaccurate, that they took much trouble to take careful measurements and drawings of the same buildings and ornaments which that author professed to have illustrated.

We do not think that Mr. Taylor claims too much for the work of himself and his deceased friend, that it is the only book in the English language which gives a faithful and elaborate detail of the architecture and ornament of the ancient buildings of Rome which are left to us, from views and measurements made on the spot. It was compiled in the years 1817, '18, '19, and '20, with great labour, and at considerable cost in erecting scaffolds and in making excavations, and we quite agree that it should not be allowed to vanish from our sight, or the information it contains to be lost to rising architects or to amateurs. Mr. Taylor but too truly remarks that, just now a mongrel style of building is in vogue; and though we may differ from him as to whether Classic architecture and ornament will again take the place they once held as models for modern imitation, yet we cordially concur in the opinion which he advances that they ought to be taught to our pupils in our universities and schools, since, like the dead languages to modern literature, they should form the element from which living art, to a

certain extent, should be eliminated. We are glad, therefore, to learn that the plates of that folio-work are in existence, and that Mr. Taylor proposes to issue a new edition of it with additional matter. There are given as an appendix to this concluding volume of his autobiography, a certain number of these plates, chiefly those relating to the ornamental details, accompanied by explanatory notes which will be found very useful to students, and to the manner of the execution of which illustrations we can give unqualified praise. The thread of discourse in this volume is resumed at the period of 1850, when the author revisited Italy, and in Genoa made the acquaintance of the architects Rasasco and Gardello, with whom he formed an Institute of Architects and Engineers, which is still in existence. Having stayed three months in that city, he visited Verona, Venice, Vicenza, Mantua, Modena, Bologna, and Florence, and thence, after a residence of three months in that town, he proceeded by Pisa to Rome, where, it did not need the information he gives us that he was not idle there. We have, as some of the fruits of his labour, an excellent plan, to the scale of one inch to 100 feet, of the part of the city about the Forum Romanum, with recent discoveries and restorations of the various Fora. Mr. Taylor has not lost an iota of his keen interest in these matters, and is able thus to graft on to his own work the facts which have come to light during researches of younger men, to the value of which he bears grateful testimony. Of Mr. Burn's work; before referred to, in particular, he says he cannot sufficiently praise it for its research and scholarship.

Perugia, after Rome, appears to have occupied most attention, and is illustrated by a plan and drawings of six of the ancient gateways—a good lithograph of the well-known fountain by Niccola Pisano, and plans are given of the Cathedral, and the Churches of S. Domenico and Del Popolo. The plans also of the Cathedrals of Siena and Orvieto, are given; several careful plates of the Tombs of the Volumni, others at Faleri, and elsewhere.

This seems to have been the last journey or eventful circumstance to record in the biography, and the volume concludes with the description of the plates of ornamental details from Rome before-mentioned, a useful treatise on domes, and several sheets of plans of temples and cathedrals, with tables of comparative dimensions, all usefully given to the same scale of one inch to 100 feet. We think the venerable author of this autobiography has quite established what in his preface he stated was his object—namely, a character of industry and perseverance for himself and his friend Mr. Cresy and certainly they have contributed not a little information generally useful and instructive to the rising members of the profession. It is with pardonable pride that the author replies to the suggestions of some of the reviewers of his first volume that if some of the information thus collected were not now new to the profession, yet that in many cases it has gleaned it before from the careful and accurate works of himself and his coadjutor, such as their "Architectural Antiquities of Rome, Genoa, Pisa, Canterbury," &c.; and this effort to prevent their passing into oblivion at least deserves sympathy and encouragement.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the usual fortnightly meeting of this Institution on Monday evening last, Mr. Horace Jones, Vice-President, in the chair, the minutes of the previous meeting having been read and confirmed and several donations of books announced, the following Associates of the Institute were presented to the Chairman on their election, viz.—Mr. Hall, introduced by Mr. F. Anson, and Mr. Streatfeild, introduced by Mr. Eastlake. Mr. F. Anson said that Mr. Hall was his own pupil,

and had already distinguished himself as Silver Medallist at the Royal Academy. Mr. Streatfeild, it was stated, had been the pupil of Mr. Blomfield, and will be remembered as the author of the first prize essay on Eastbury Manor House, Barking, read before the Institute last year, (see BUILDING NEWS, April 22, 1872, Vol. XXII, p. 293).

The Chairman said it was his painful duty to announce the decease of one of the old members of the Institute,—Mr. R. P. Randall, who was one of the earliest pupils of one of the earliest Vice-Presidents of the Institute, Mr. Bellamy.

Mr. J. P. SEDDON (in the absence of the author) then read a paper by Mr. T. Barber, C.E., of Leeds,

ON THE HEATING OF PUBLIC BUILDINGS, CHURCHES, &c.,

The author commenced by pointing out that there were many details in connection with most buildings of any importance in which the architect would do well to ask the engineer's opinion and advice. He remarked that there was scarcely one item of the general fixtures required to make a building tenable, the minutiae of which did not come more within the province of an engineer's study than that of the architect. The architect would find the engineer's advice worth taking with regard to the value or otherwise of the many appliances and improvements (so called) to which inventors and patentees were always attracting the attention of architects and their clients. The introduction of iron as a material of construction was a subject which was very frequently mal-treated by the architect. Great saving might have been effected had the iron details of some buildings been designed by engineers instead of architects. The engineer's advice would be of especial value in regard to the heating of buildings. Two kinds of heat were at disposal, viz., radiated heat and transmitted or circulated heat. Heat from radiation, without the intervention of any foreign appliance, was that arising from open fireplaces as used in houses. Though this kind of heat was not applicable, as a rule, in large public halls and churches, a few remarks on the subject would not be out of place. It was not uncommon for people to say that nine-tenths of the heat of an ordinary fireplace goes up the chimney; they were short of the mark, for Mr. Barber contended that all the products of combustion and the heat thereby generated, went up the chimney, and it was well for our lungs that they did. But the heat transmitted to the room was not a product of combustion, but simply radiation from the glowing embers in the grate—the particles or globules of air in actual contact with the cinders impart heat to the adjoining globules, and so on until the heat imparted to the first particles has diffused itself over the whole apartment, the temperature decreasing as the radius from the focus increases. Fortunately, the radiation of heat travelled at a greater velocity than the strongest chimney draught; and hence, although the currents of air within a room must of necessity be all towards the chimney, still the radiation was travelling in an opposite direction, and though of course many of the particles of air heated by contact with the fire have been drawn up the chimney, they have not been drawn up before first transmitting heat by contact with the other particles adjoining. These remarks bore upon those patent grates which were perforated through the front plate all round the fireplace opening, these perforations being supposed to supply warm air to the apartment in which they were fixed. That warmed air did come in through these perforations Mr. Barber admitted, but he asserted that it went immediately round the corner to the chimney opening and up the flue, and so only affected the heat of the room to the slightest extent, due to the supply of external air to assist combustion, and thus causing a less rapid current of air from the room to the fireplace, thereby increasing the power of radiation. If, however, the air was heated in chambers at the back of the grate, and carried thence through flues, pipes, or other channels, and admitted higher up in the room itself, or in an adjoining apartment, as in Captain Galton's plan, the Manchester School grate, and other examples, the effect was economical, and then the room became warmed by transmitted heat, *i.e.*, heat produced by the circulation of air over heated surfaces or plates. Of the proper plan for the admission of such heated air into a room, Mr. Barber's opinion was that the point of admission should not be more than 7ft. from the

* "The Autobiography of an Octogenarian Architect," Vol. II. With the Addition of "Classic Ornament at Rome." By GEORGE LEDWELL TAYLOR, Architect. London: Longmans.

† Vol. I. was reviewed at some length in the BUILDING NEWS for Dec. 2, 1870, Vol. XIX, p. 407.

ground, nor less than 5ft. The subject of heat produced by the circulation of air over heated surfaces might be divided into four heads, as follows:—(1) Hot-water apparatus, (2) steam apparatus, (3) stoves (including hypocausts and gill stoves), (4) gas stoves. Firstly, hot-water apparatus was most generally approved of, because of its great safety and economy, and its freedom from derangement. On the other hand, the apparatus was most unsightly; nothing could be more so than the ugly perforated black iron gratings and coil boxes covering the pipes required to transmit the heat to the air circulating in the building. The heat derived by the combustion of the fuel was transmitted, with very little loss of temperature, through the boiler plates to the water next in contact with them; the water thus heated rose, and its former position was occupied by cooler water from below, which, in its turn, also rose; consequently, heated water might be led off in rising pipes, round corners, and up steps, to a part very remote from the boiler (the distance having, of course, its limit); thence it must be turned down and carried back to the boiler to be re-heated; hence the heat raised by the burning fuel was carried mechanically to a greater distance from its starting point or focus than could be expected from radiation alone. This, however, was not the point where hot-water heating was economical. The system of pipes became one long stove of large superficial area, and if free access of air was permitted below the pipes there was a very rapid current of heated air upwards throughout the whole length of pipe; but if the ready access of air was prevented by boxing-up or hiding the pipes, to prevent their unsightly effect, or placing them in channels, with a grating at the top, their heating property was much decreased, unless, in the latter case, frequent openings were made into the bottom of the channels for the outer air, so that the current coming in may readily displace the air which otherwise would lie partially stagnant around the pipes. Two rows of pipes 3in. in diameter for the flow from the boiler were better than one 6in. in diameter, for though they had the same superficial area, they only contained half the quantity of water, and consequently the same power of boiler in each case would produce much hotter water, at the same distance from it, in the 3in. pipes than in the 6in. pipes. Another cause of economy in hot-water apparatus was the outer casing of brickwork round the boiler absorbing much of the heat from the fuel, which would otherwise have passed up the flue; when the fire was neglected and got low, this prevented the sudden decrease of temperature which was obviously the case when the heat transmitted to the building was effected by circulation from an apparatus with a smaller superficial heating area. In this very changeable climate, it would be a very great advantage if hot-water apparatus were capable of more variation in temperature than they generally are. As a rule, the most economical hot-water apparatus was that containing the largest body of circulating water, because when once heated it took a long time to cool; but to be able to effect more extreme changes of temperature the following plans might be adopted: When the flow was arranged to travel in two rows of pipes, one row might be shut off, so as to diminish the superficial heating area; or the fire might be drawn and cold water let in, and the hot allowed to run to waste; this last would be very uneconomical. Or, in the channel system, the openings into the channels for the admission of cold air from without being, in the first instance, of much larger area than was actually needed for supplying air to be circulated, might now be opened excessively wide, so flooding the channels with colder air, allowing the warmed air previously in the building to escape by ventilation outlets. To avoid the unsightly appearance of hot-water pipes, gratings, and so-called "Gothic" coil-cases, Mr. Barber suggested that in churches the area under each block of pews or stalls might be made into a large heating chamber (the space below the floors of pews was frequently 3ft. deep and upwards, which would be sufficient). In these recesses or chambers could be placed the requisite area of pipes in connection with the boiler, and a good wide drain or channel could be arranged from each chamber to the outer wall for the admission of fresh air. For the escape of the warm air into the building, perforations of a trefoil or other pattern could be made all along the risers into the pews or stalls; or small gratings, out of sight, under or in the ends of the seats, might be used, care being taken that the

united area of such perforations or gratings was four times as great as that of the channel admitting fresh air to the heating chamber. Still better, the entrance for the warmed air might be where there would be much scope for architectural effect—as in a stringcourse of any perforated ornamental stonework pattern along the wall, about 7ft. from the floor. The same idea might, Mr. Barber thought, be carried out in the pillars of the nave, by having a similar hollow string course round the stem of the pillar communicating with the heating chamber by a central flue down the pillar. The capital of the pillar would also be a good place for perforations for the admission of fresh air, or, if very lofty, for the exit of foul air. The unsightly pipes might also be placed in hollow spaces specially prepared for them under the window-sills in churches, where the masonry need not, generally, be of the same thickness as that of the rest of the wall. In concluding his remarks upon this portion of his subject, Mr. Barber pointed out the importance of architects considering the whole matter of heating before commencing the foundations, and of not having an ill-considered apparatus fitted in hap-hazard, wherever it could be made to fit by some ironmonger who called himself a "hot-water engineer," and whose tender, being the lowest, might have been accepted by some building committee without due regard to the question of efficiency. Secondly, steam apparatus had all the same objections as hot-water apparatus, with the additional grave disadvantages of requiring more attention; that until steam is raised in the boiler, no heat whatever can pass round the pipes; and that when the pressure drops to zero the current of heat ceases; whereas water commences to circulate the moment one atom of heat is transmitted through the boiler to the water. Again, for want of attention, it may be dangerous; and again, steam being more volatile than water, it is more rapidly condensed or cooled, and so loses its heating properties: but it has the advantage of being more elastic in its treatment. It might be conducted in pipes, up or down, round corners and angles, and in this respect only did it excel hot-water apparatus. Some of the disadvantages might be overcome by the same treatment as recommended for overcoming the disadvantages of hot-water apparatus. The danger of blowing-up might be obviated by making the feed operation self-acting; but even then there was danger of the circulation of steam being stopped from the fire being neglected, and of more steam being raised than necessary by over-firing. Frequently, too, the boilers for steam-heating apparatus were badly designed and constructed of bad material. Coming to the third section of his subject, Mr. Barber proceeded to treat of stoves as a means of supplying heated air to public buildings. Foremost amongst stoves was the comparatively newly-invented gill-stove, but its old-fashioned predecessor, the long-barrelled vertical stove, deserved a few passing remarks. There was some merit in this curiosity, especially when accompanied by the usual vertical iron smoke-flue, carried, not always vertically, upwards through the roof. It afforded a regular temperature without frequent attention, and might be made to contain sufficient "green" fuel to last for twelve hours without attention; and there was little doubt that if the system of gills had been applied to them in days gone by, very few, if any of them, would have been abandoned. On the other hand, they were generally got up with a highly-finished surface, as smooth as possible, thereby greatly lessening their capacity for imparting heat to the surrounding air. For a given area of heating surface to be most effective, that area must be as rough as possible. A great merit in these "telescope" stoves was the ascending smoke-tube, the effect of which was positively to enforce ventilation; being warmed by the smoke and gases within for a great height from the ground, and not unfrequently quite through the roof, it caused all the air surrounding it to rise to the top of the building, and thence to escape through the crevices in the roof. The objections to this antique stove were (1) extreme unsightliness, which could not be remedied; (2) the nuisance of having the necessary fuel-box and firing implements within the building; and (3) its insufficient heating of a large building without resorting to great consumption of fuel. The gill stove, whether circular in form (as in the London Warming and Ventilating Company's stove) or in the barrel form, also frequently used, had proved to be, up to the

present, the most successful stove, mainly because it had increased the heating surface of the fire-box in such a way as to insure a larger volume of air coming in contact with its surface. To make any construction of gill stove thoroughly effective, it was necessary that it should be in a cellar or vault below the rooms to be heated, as in S. Paul's Cathedral—than the nave of which edifice Mr. Barber said he could not instance a better-heated building. As, however, country churches could not all be built with crypts, an alternative in their case would be to have a stoke-hole below the porch, tower, or vestry, according to the position required. He would encase the gill stove in brickwork, lead a channel of fresh air from the outside to the underside of the gills, and carry from the upper part of this chamber or casing a gradually rising flue (of brick by preference) to some point in the church most suitable for the admission of heat. The opening must be of large area, and covered with grating. The point where he preferred to make the opening was as near the centre aisle as possible, and directly opposite a north, south, or west door (as the case might be) of the nave of the church, so that every time the door was opened the in-coming air disturbed the pillar of heated air rising from the perforated grating, and assisted in disseminating it through the building; and its dissemination would be further materially assisted by having the ventilation of the building at the eastern end as much as possible. Of course, the perforated grating should never be placed immediately under a gallery. The combustion should be as slow as possible, and it would be found that the quality of the heated atmosphere would be improved by letting the gill stove stand in water. As a means of heating buildings to hold (say) up to 500 persons on the ground floor, the gill stoves were good, because it was not difficult to find a position for the admission of heated air where its influence might be felt by all. Brick furnaces, which baked the air as in an oven on its way to the building, and hypocausts of various construction, were all open to objection, on the ground of the great liability of the bricks themselves, or, at any rate, the joints, to crack, and allow smoke to escape direct into the building. One of the best plans of arranging the hypocaust was to have a long flue down the centre of the room, covered with firebrick lumps, terminating in a chimney with a good draught at one end, and having a small square furnace with a grate at the bottom at the other end, and others at intervals each of a few yards apart, according to the size of the building. A lid bedded in a groove filled with sand, and in appearance like a coal-cellar grid, formed a means of access to each of these furnaces, one being over each furnace. One or more of these furnaces might be lighted, according to the season of the year, and fresh fuel was put on by removing one grid at a time, and charging. This system was cheap in first outlay, was thoroughly out of sight, and if well attended to was not uneconomical. The smoke from the first fire passing over the second fire became in a measure consumed, and so on until little more than the smoke from the fire nearest the chimney escaped into the open air. More than ordinary attention was, however, required for this system to ensure its efficiency. Mr. Barber, in treating of the fourth and concluding portion of his subject, viz., gas-stoves, referred to the use which had been made of gas for heating and cooking purposes by a friend of his in Denmark. During a visit to Denmark, he (Mr. Barber) had entered a room which was very warm and comfortable, but he could not see how it was heated until his friend took a panel out of his window bottom, disclosing a few gas burners, with perfectly blue flames, playing on a fire-brick lump, with no pipe to take the products of combustion away. The heat from combustion and the heat absorbed and imparted by the firebrick was all allowed to enter the room, and though Mr. Barber was in the room for hours, he did not feel any choky or stuffy sensation. He believed it possible to burn gas, even in London, so that the heat arising from combustion should be neither unpleasant nor injurious; and, if so, he contended that we might reasonably expect to find economy in its adoption for warming houses and other buildings, and also for cooking, in lieu of coal fires. After arriving by experiment at the proper form of gas-jets to adopt in order to completely destroy any pernicious effects arising from the combustion of gas—a matter which yet required much investigation—it became an easy matter to arrange the form of stove to which the burning gas-jets were to

transmit their heat. He recommended the fixing of a line of gas-jets within a terra-cotta or earthenware cylinder, the outside of which should be ridged so as to increase the superficial area of the heated surfaces with which the air was in contact. Upon the top of this cylinder or terra-cotta gill stove he would place a vitrified earthenware trough, to be filled with water, and he would place the whole apparatus in a recess under the window-sill.

DISCUSSION.

Mr. ROBERTS, in moving a vote of thanks to Mr. Barber for his paper, expressed his regret at that gentleman's absence, as his presence might have enabled them to elucidate one or two points in the paper. Mr. Barber had refrained from remarking on several methods of warming which had been in practice at different periods of the world's history, and notably the Roman hypocaust, of which a very fine specimen had lately been described in the *Times* by Mr. Joyce, well known in connection with the extensive Roman remains at Silchester.* There could be no doubt that such a method of warming was a very practicable one—at all events for buildings of one story—the building warmed by the hypocaust referred to at Silchester being in all probability of only one story, like most Roman domestic buildings. Unquestionably this method of warming would prove very convenient and congenial, and very effective and economical, especially in such one-story buildings as churches and chapels. It so happened that within the last week or two he had adopted the system (which was supposed to be subject to a patent-right—erroneously, he thought) in a church, and its success on the two Sundays on which it had been tried was unqualified. The temperature could be steadily maintained as high as 70 deg., although between 50 and 60 deg. was found sufficient. Mr. Barber had said next to nothing on the matter of ventilation, although it was inseparably connected with the subject of warming—so much so, indeed, that it would be impossible to properly warm a building without making some provision for ventilation. He agreed that hot-water pipes should not be placed in channels, and instanced a case in which the hot-water pipes were placed round the cornice of a large room in a factory with the most satisfactory results. As to the use of gas, he hardly thought that an increased use of gas would prove more economical than coal; for if the price of the latter commodity kept as high, or anything like so high, as at present, it was a matter of certainty that the gas companies would not deliver gas at the present prices.

Mr. ROBSON, in seconding the motion, said he thought that such a paper as Mr. Barber's should never be read in the absence of the author. As to the Roman hypocausts, like most other things which had been dead for many years, they required a little reviving. Many scientific men asserted that this was the system of warming which was now coming into vogue. The cost of maintenance was trifling, and the results were good. He believed that if plates of metal were heated beyond 212 degs. the results would be injurious. As architect to the London School Board, he felt much interested in the question, for in large school buildings a good warming apparatus was absolutely essential to economy of time and labour. In some of the large blocks of schools with which he had to deal, if warmed by open fireplaces, as many as 25 or 30 grates would be needed, requiring a large staff of servants to keep them burning and in order, whereas, one caretaker, if he was a good artisan, could effectually manage a good apparatus.

Mr. CHATFIELD CLARKE and the Chairman having made a few remarks, the thanks of the meeting were unanimously accorded to Mr. Barber for his paper.

THE PUGIN TRAVELLING STUDENTSHIP, 1873.

The Chairman then announced that no less than nine gentlemen had competed for this studentship for 1873, and the drawings sent in by Mr. Aston Webb had been adjudged by the Council as entitling him to the studentship. Mr. Webb's drawings and sketches were mostly made abroad, and they formed, the Chairman said, perhaps the most elaborately finished set ever sent in for this competition. The Council also desired to

mark the unusual standard of excellence this year attained by the other competitors by awarding medals of merit to Mr. Marvin and Mr. Page, and to distinguish by honourable mention the names of Mr. James Garrard and Mr. W. L. Spiers. The Council begged it to be added that other sets of drawings sent in this year would have been fully entitled to mention, but for the unusually high standard of excellence attained by other competitors.

The next meeting will be held on Monday, March 3, when a special general meeting of Members only will be held, to determine the award of the Royal Gold Medal, and to consider the finances of the Institute.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

A MEETING of engineers and surveyors holding office under sanitary authorities in various parts of the country was held on Saturday last, at the Institution of Civil Engineers, Westminster, by permission of the Council, for the purpose of forming the above Association. The following rules, among others, were unanimously agreed to:—

"That the Society be called 'The Association of Municipal and Sanitary Engineers and Surveyors.'

"That the objects of this Association be (a) The promotion and interchange among its members of that species of knowledge and practice which falls within the department of an engineer and surveyor engaged in the discharge of the duties imposed by the Public Health, Local Government, and other Sanitary Acts; (b) The promotion of the professional interests of the members; and (c) The general promotion of the objects of Sanitary Science.

"That the members of the Association consist of civil engineers and surveyors who hold permanent appointments under the various Urban and Rural Sanitary Authorities within the control of the Local Government Board."

It is intended that the annual meetings of the Association shall be held in various parts of the country, the inaugural meeting to be in London on May 3rd next.

Mr. Lewis Angell, C.E., 12, Dartmouth Street, Westminster, and Town Hall, Stratford, London, has been appointed Chairman, *pro tem.*, of whom further information may be obtained.

WINDOW SASHES.

PARTICULARS have been published of another new invention in window sashes. One of the greatest objections to our prevalent form of window sash is the trouble of putting in a new line. This operation necessitates the getting at the edge of the sash, and, consequently, the removal of the beading; and any contrivance that will effectually surmount the difficulty is a boon that all owners of houses will appreciate. A simple and, it is said, secure contrivance of this kind has been devised by Mr. Meakin, of Baker-street, Portman-square. The apparatus, which may be described as a slotted tube, formed of sheet iron moulded in a press, drops into a groove formed to receive it in the edge of the sash, and the line being inserted is firmly held by pins of strong iron wire placed at equal distances, and passing between the plaited fibres through holes which have been pierced, from side to side. All that is visible inside the room is the small oval head of a pin-bolt, which, being thrust into a slot-hole in the face of the sash, keeps the tubular sash-line holder securely in its place. Cups and screws are entirely dispensed with. A second invention by Mr. Meakin is described as removing entirely those inconveniences which are an especial drawback on the merits of the best sliding sashes in mansions where the windows are of large size, and where, consequently, the crook-headed rod, familiarly known as the "long-arm," has hitherto been requisite in pulling down the top frames. By means of the new sash fastener—which is likewise said to be a secure self-acting sash fastener when the window is closed—the largest frame, fitted with the most massive plate-glass, may be lowered with ease. The Foreign Office, Privy Council Office, Board-room of Kensington Museum, and other buildings have been, or are being fitted, with Mr. Meakin's apparatus. Whether it will be found to be all its inventor describes remains to be seen.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

LONDON AND MIDDLESEX ARCHÆOLOGICAL SOCIETY.—The monthly meeting of this Society was held on Monday week last, at University College, Gower-street, J. Orde Hall, Esq., in the chair. Exhibitions of Samian ware and Roman glass, found in Plough-court, Lombard-street, by Mr. F. J. Hanbury; of an early gold and silver (mixed) needle, from the excavations of S. Mildred's Church, Poultry, by Mr. J. E. Cussans; silver plate and a silver-gilt triptych and plated dishes (late sixteenth or early seventeenth century workmanship), by Mr. G. Lambert, F.S.A., and other objects of interest. A paper by Mr. John G. Waller, on "Mediæval Moralities, the Wheel of Fortune or of Life, and the Seven Ages of Man in Ecclesiastical Art," was read, illustrated by well-executed drawings, prints, and rubbings of part of a monumental brass at Bruges, illustrative of the wheel and its various representations of the stages of life. A discussion ensued, in which Mr. Weil and others took part. Suggestions in favour of Sir J. Lubbock's Bill for Preservation of our National Monuments were freely made and commented on.

ARCHÆOLOGICAL.

ARCHÆOLOGICAL FIND AT ATHENS.—Some years ago, Mr. Zappa, a wealthy Greek, died in Wallachia, bequeathing a large sum of money for the revival of the ancient Olympian games, but in a manner adapted to the usages and requirements of modern society and civilisation. Amongst other particulars, his will provides for the erection of a stately exhibition building at Athens. After much controversy it was decided to erect this institution in the large plot of land lying between the Palace Gardens and the Temple of Jupiter Olympus. It is now about twelve years since several patches of mosaic of the Roman period and some walls built of common stones and mortar, and of an apparently modern period, were accidentally come upon at this very spot, but their nature was not such as to incite to further excavations. Now, however, while levelling the land for the site of the Olympian Exhibition building, the workmen discovered more remains of ancient constructions and, after a few cartloads of earth had been removed, the trunks of two statues larger than life. These discoveries have been made at a depth of only four feet, at a spot where the ground rises gently into an almost imperceptible hillock. The excavations are as yet incomplete, and no inscription or other indication has been found up to this whereby to determine the character, object, and epoch of these ruins; but nevertheless there are some indications by which a tolerably safe surmise can be formed. In the first place, the position—that part of Athens in which the Emperor Hadrian erected the new and then fashionable quarter of the city—and the material, brick and cement, indicate that the building is of the Roman period. As regards its use, the large area its foundations cover, the tanks (one large and two smaller ones), and the conduits for water, which have been discovered in tolerably good states of preservation, would point out that these were either public baths or the palace of some Roman emperor, possibly of Hadrian himself. The two statues found, one of a male and the other of a female figure, are evidently of the Roman epoch. The hands and arms of both are missing, but enough remains of them to determine the deities represented. These are Æsculapius and Hygeia (Heath). The legs of Æsculapius were found broken off, in another place; also three fragments of the right arm of Hygeia, holding a cup into which the serpent, descending from her left shoulder, dips its head. Of this serpent five other pieces have also been dug up. The statue of Hygeia resembles very much that in the Hope collection, as depicted in Müller and Oosterley's "Denkmaalen der alten Kunst."

It has been computed that, in common domestic fires, seven-eighths and even more of the heat capable of being evolved from the coal passes up the chimney unapplied, so far as mere warming is concerned. About half of the heat generated by the fire is supposed to be carried off with the smoke, about one-fourth in the constant current of the warmed air of the room into the chimney between the mantelpiece and the fire, and the remainder of loss of heat is represented by the unburned particles of carbonaceous matter in the smoke.

* Some account of this hypocaust will be found on p. 212 of this impression.

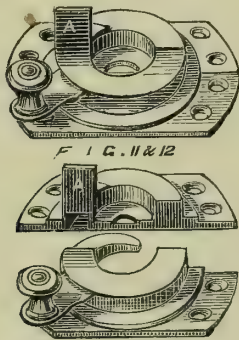
SASH FASTENERS AND SASH STOPS.—III.

Numerous are the letters I have received since I commenced these articles: they indicate the great interest that is taken in the subject. And is it to be wondered at? I think not, if we only consider the position of the matter. A sash fastener in olden times was of little importance; at the present time it is of the first importance. In former days the shutter was the great protection against the thief; to-day it is the sash-fastener: hence the interest in and talent and ingenuity displayed about this small item. To give one example; I live in an old house, and no fastener is really required to any window. All the windows have shutters, and every shutter is lined with iron or studded with nails; so that really if the sashes were entirely removed no thief could enter. No instruments they have even now could cut out panels so lined; and therefore it is because of the change in the method of building houses that the subject acquires importance: and yet, such is the love of precedent, that though we have abandoned the protection our forefathers relied on, we still use that sash fastener, because they used it. We must know, if we reflect, that they placed no reliance on it, yet we place *all*. Hence the almost daily robberies through the entry being made into houses by opening the sash fastener by means of the ordinary knife.

I cannot reply to the letters received from so many, but will try in this concluding notice to give the fullest information.

First let me consider a very recent patent—

MORGAN'S PATENT FASTENER,



patented 23rd September, 1872. To make this explicit I give two illustrations from photographs, one shewing the fastener open and disengaged, one shut. It is a very clever invention, because (1) the bolt is in a wedge form, helping thereby to close the window; (2) the addition of the tell-tale plate, marked A on drawing, to some extent meets the objection I have pointed out, namely, that the "bar might pass over and not into the staple." Still I cannot but think, even with this added advantage, it is not secure. I should regard it with more favour if the bolt were thrown from the outer sash; and therefore in the next invention, which is called the A B C sash fastener, though I illustrate both methods of working, I intend to confine my remarks to Fig. 13, where the bolt is thrown from the outer sash.

FIG. 13

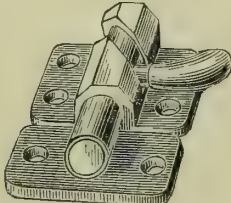
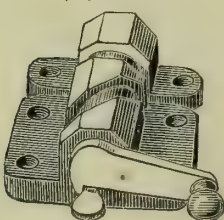


FIG. 14



THE A B C SASH FASTENER.

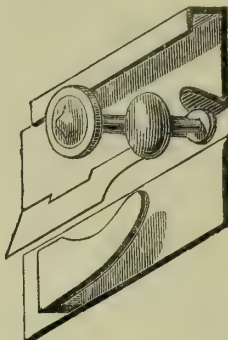
I give Fig. 14 because it is ingenious; but the

fastener, as shown in Fig. 13, would defy almost any efforts to open. The advantages it possesses are,—that it has only one spring; the action of pushing the bolt across the sash is performed very neatly by the diagonal groove in the tube. While very clever and simple, it lacks what many fasteners have, namely, the *grip* which prevents the rattling of the sashes; and it is somewhat difficult to see if the fastener is closed. The price is from 1s. 9d. to 2s. 6d. each.

The next for our consideration is

BURSTOW'S PATENT SASH FASTENER.

FIG. 15

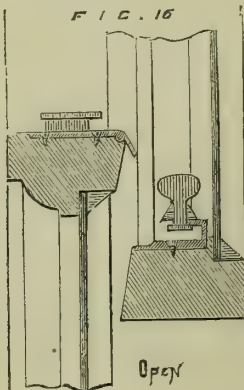


to which I should have been disposed to award the first place, but that I think the same result is obtained by Mr. Ellis, and by Messrs. Hart & Co., to which I shall allude by-and-by. Burstow's, no doubt, is good, but there is great wear and tear in its action. Again, the protecting peak does not guard or cover more than a portion. There is no guard on the left side (see B in Fig. 19); the result therefore is, that a hooked instrument can pull the bar open from one side, or push it from the other.

The next is a recent invention; it is called

ELLIS'S SASH FASTENER. (Fig. 16).

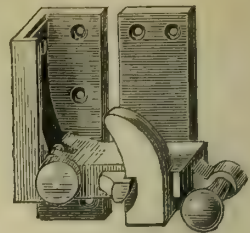
FIG. 16



It will be seen that it is like the last in having a hinged plate, but that, unlike the last, this plate is not forced up and down by the pressure of the bar, but simply drops as the sashes are opened, and in shutting the rabbeted part on the top sash, lifts the guard into its place. It possesses all the advantages of Burstow's without the drawbacks I have mentioned. I give a section (Fig. 16) which is sufficient to explain its action. I have had, I may mention, one of these fasteners in use some time, and it answers perfectly. I have not been unfortunate, like one of my correspondents, who says he has six fasteners, and has never been able to fasten one. I have already pointed out the defects in the fastener to which he alludes.

A correspondent ("An Architect") writes, recommending Messrs. Nettlefold's patent. I give a sketch of this patent lock sash and casement fastener (see fig. 17). But I do not consider it as good as those fasteners which have equal security and the knob fixed on the bar, for the reason that it is not so pleasant in use.

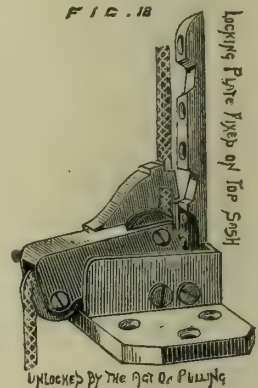
FIG. 17



The next invention deals with more than simple protection. It is called

MEAKIN'S PATENT SELF-ACTING SASH OPENER AND FASTENER.

FIG. 18

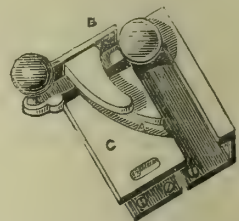


The price precludes its general adoption. There is, no doubt, an advantage in the fastener working into the style, instead of being fixed on the meeting bars. I do not go more fully into this fastener because it is clear that some cheaper invention is required for the general public.

Come we now to the last I have to mention; it is called

HART, SON, PEARD & Co.'s K. P. SASH FASTENER.

FIG. 19

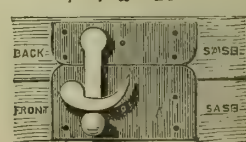


The K. P., I may enlighten my readers, means *knife-proof*. The sketch shows it shut. The security consists of a guard-plate, which a pin, projecting from the under side of the bar, running in the groove A, forces across the opening. It is unlike any other sash fastener that I have seen, and has many advantages. They are—(1) The guard-plate is much longer than Burstow's. (2) The action of the fastener is just like the ordinary sash fastener. (3) There is, beyond the guard-plate C, an additional guard, marked B, which moves across the opening, being attached to the guard-plate. This certainly is a novelty, and a great additional security, because it prevents the use of bent wire and other instruments.

Reply to some correspondents.—Many of the letters are answered in the foregoing remarks. In reply to the remainder—

"L. T."—The fastener, of which you send sketch, which I give in Fig. 20, is exactly on the principle of the one approved by Col. Henderson, and which fails because, if the plate A projects suffi-

FIG. 20

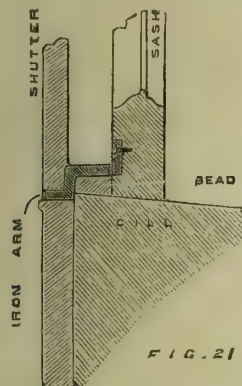


ciently far to be a real protection, the sashes cannot be opened fully; the first cross-bar will

stop the plate passing. Where there are no cross-bars the top rail will have the same effect. This is the reason of hinging the plate in Burstow's and in Ellis's.

"W. T. & Co., and Others.—No doubt you are quite right. A very little violence—the use, as you mention, of the "jemmy" underneath the sash—will almost noiselessly draw the screws which fasten the arm-plate. Certainly the sash-stops are necessary where force has to be guarded against.

"J. J. T."—The American invention I cannot find in use in England. I think, if it had been very good, we should have had it sent over. I give your suggestion for fastening the lower sash where there are shutters, because it is good and simple, and may be of use in the country, where shutters still are the rule and not the exception.



The sketch almost explains itself. It is only necessary to say that the iron arm in section is 1 in. by $\frac{1}{4}$ in., which is to be screwed to the bottom rail of the sash, so that the shutters pass over it when shut. The sash, it will be seen, cannot be raised until the shutter is opened, neither can the shutters be shut until the sash is closed

B. F.

ARCHITECTURAL DETAILS IN COMMON USE.*

THAT a good deal of our present architecture has too great a tendency to the minute and sometimes even frivolous elaboration in matters of detail, both constructive and decorative, there can be little doubt. Many existing works bear testimony to the better judgment and taste of the old architectural masters, and the lapse of perhaps ages has not obliterated the fact that had they a wall to build, a column to erect, or an arch to turn, there is something about the mode of doing it so thoroughly earnest and consistent as to be very much at variance with the makeshifts, coatings, casings, and daubing of too many modern works. We shall therefore do well to pause and consider and profit by the example precedent sets before us in these matters, without the least fear of servility, as there will always be abundance of room for originality in the various requirements as they arise under totally different circumstances. Although the author did not mean to depreciate the Classic or any other known and esteemed school of architecture, either generally or in regard to their details—ideas and external circumstances having since their creation so materially changed—still he might be permitted, without offence to the admirers of any particular order, to express his thoughts with regard to some parts which "from his youth upwards" he never could understand as necessary, either in construction or otherwise, although the discovery and introduction of them were backed by various plausible theories as to fitness, &c., and even interspersed here and there with beautiful and romantic stories to account for the happy chance by which suggestions were afforded by some well-known combinations worthy in themselves of being handed down from very early times, on account of their intrinsic beauty. Let us take, for instance, the well-known triglyphs dividing into metopes the entablature of the Doric order, which are said to represent the ends of timber beams forming a portion of the internal construction of the roof or ceiling; recollecting that these are worked out of the solid stone, and that it is essential they

should be accurately formed in the extreme, it might be asked what particular element of beauty is contained in them, that any architect should follow, along with the arbitrary rules of modules and minutes applied to every part of the structure over the ground line, and perhaps beneath it? In the same way consider the details of any of the other orders, that is to say, as parts of the construction essentially necessary, and it might be affirmed that it would be found necessary to invent reasons for their introduction, for certainly they would not be apparent. Mr. Owen would be inclined to fearlessly omit the imitation of such matters as guttae in the soffit of a cornice, patera, floral wreaths, bulls' heads, or mouldings, and other details, some of which might be in a position never to be seen by mortal eye after that of the mason who cut them, together with myriads of dentils, consoles, and the like, and numberless repetitions of diminutive pediments, doing nothing except wearying the mind and looking very costly where costliness is not required. Instead of these, he would rely more upon good and well-conceived proportion of masses consistent with general arrangement. Instances could be adduced of buildings in Dublin where the breach rather than the observance of the strict rule gave by far the most successful productions—e.g., the Bank of Ireland, the Four Courts, and other works of the late architect, Gandon. In referring to what were called the Classic styles, Mr. Owen did not intend his remarks to apply exclusively to them, but to all styles, whether Greek, Roman, or the more recent ones, including the Gothic, each of which have more or less a relationship the one to the other in order of time. He failed to see the propriety of adapting or naturalising, as it were, an order of things to a considerable extent at variance with existing conditions and requirements. Why should we so carefully copy and adopt a system, and at much fruitless labour try to make it fit—numerous elegant columns, it may be, surrounding a building, the walls of which ought not to be pierced with windows (or you commit an error in the order), although in a country where all the light and heat we can possibly get are absolute necessities? Suppose we try to analyse, as it were, some fine old building; and as we cannot remove its array of columns without bringing down the entablature and pediment about our ears in the one case, or the array of sturdy buttresses, &c., in the other, without perhaps a similarly undesirable effect, we will leave them where they are, and proceed to ruthlessly strip the carcase of every detail, sculpture included, which is not necessary to the actual constructive stability—what would remain?—a very plain-looking piece of work indeed; still a great amount of dignity might remain, arising from good, well-balanced parts and general proportion; not, however, thus denuded, would it appear such a model of perfection as to induce the careful copying, irrespective of time and place. No one of us, of course, would desire literally to treat such grand old works with this imagined Vandalism; but we might feel such a desire with regard to modern efforts, and so treated, a good many of them would have nothing left but naked ugliness, as any pretensions they possess are those produced by the unseemly application of "borrowed plumes." Some one has said (Mr. Ruskin?) that the buttress and other important portions of Gothic architecture are "idle servants"; but, with all deference and respect to the author of that remark (whoever he was), Mr. Owen presumed to deny the accuracy of the assertion; for whether that member be used in connection with a lofty tower, great gable, or an extended flank, it was excellent construction, and perfectly consistent when judiciously applied, for it enables the use of a thinner wall, and still thick enough for all practicable purposes, than if it were dispensed with; and allows of placing the maximum of stiffness and strength exactly where it is wanted, and without waste of materials; in any other situation either it, the pilaster, or other member of an order, is really and in fact an idle servant, and a costly one to boot. The use of iron, however manufactured, has of late years taken a prominent place in many buildings, and of course is admitted to be a most important material, and is perhaps destined to become still more important in future architectural works; but I at present think, as a purely architectural material, it has not been fairly dealt with. But, like many other useful things, it can and does help the architect and builder over many important difficulties, which might otherwise cost

a little more money. But in really good architecture, whether costly or otherwise, there are certain situations and conditions in and under which it should not be admitted. Mr. Owen instanced a building the construction of which would serve as an illustration of the use, and also of the abuse, of that material. In the building alluded to there are four stories, exclusive of the ground story, which is a lofty one, resting on an iron girder, supported in its turn by a series of thin metal columns; and the space beneath is equal to fully one-half of the whole ground-floor, and this covered space is used by large numbers of persons every day; and what Mr. Owen thought objectionable was this—that say nothing of the general construction—that these columns, girders, &c., are all carefully concealed, and boxed up in such a way that no possibility is afforded of getting at them, should any contingency arise requiring their examination, without considerable and unnecessary expense; for they are made to assume, by dint of bracketings, boxings, and any amount of plaster, &c., the proportions and external appearance of an elaborate and full-blown order in one of the richest of the Classic styles, so as to have quite a presentable appearance. This mode of treating materials was anything but true architecture, and ought to be positively avoided as dangerous, although the danger might appear remote. Similar objections might justly be raised with regard to street architecture, so called, in our large cities, where we see story after story piled one over the other, apparently in "mid air," but in reality upon refined and sometimes very elegant castings, like bamboo canes, placed a little to the rear of the glass or other equally fragile front. Now, all that business and common-sense requires can be obtained without this; and being architecturally bad, and dangerous into the bargain, we should set our faces against such temptations without fear, even although we know it to be possible that Mr. So-and-so will get his builder to do what his architect will not. If, however, cases should arise in which such a mode of construction is resorted to under special circumstances, when heavy masses may have to be carried over space, in no instance should the iron beams or other medium of support be so situated as to be concealed, or difficult of access. But Mr. Owen recommended as preferable in the majority of cases the retaining of the unmistakable, though somewhat antiquated brick or stone vault, arch, and pier, without forgetting the old and honest timber-work, whether in the roof, truss, framed partition, or simple beam, as things less likely at times to overwhelm us with sudden destruction than some of their more modern competitors, which, after all, give one the idea of clever architectural gymnastics. Mr. Owen imagined that we had done with the vault or dome in old-fashioned materials, at least, for all future time; and that we must confine ourselves to timber, iron, &c., perhaps concrete. Great respect should be given to timber, because ideas in that material were not even yet exhausted. The ugly, but serviceable and common, tie-beam—whether king, queen, or a combination of both—was familiar to all, as was also the hammer-beam and the varied forms found in old works, in many of which the effort to get rid of the horizontal beam without waste of material was evident. Now whilst respecting all, whether ancient or modern, for the useful suggestions they may contain, we should try to make intelligent progress from the apparent success, or comparative want of it, which the varied kinds present, by studying the circumstances which appear to govern each particular case, rejecting what is not now necessary, either in quantity or quality of the materials, or the principle of construction adopted, providing always that we are quite sure that the conditions by which we may be governed are so far in advance that we can honestly lay claim to better things. Concrete and similar compositions may tend somewhat to modify the more ordinary and unpretending class of buildings, and may perhaps take a yet more important place, in an architectural sense; but they have not yet stood the test of time, or other trials to which all kinds of buildings are more or less liable, and therefore should be employed with due caution. Referring again to the roof in relation to the ordinary modes of covering it. One reason, probably, for the apparent desire to hide it may be that to most people it appears very flat and tame, especially when slates are used. The way was open, however, to remove the objection—at least in a great measure—by the combination of mate-

* Abstract of paper by Mr. E. TREYOR OWEN, read at meeting of Architectural Association of Ireland on the 30th ult.

rials from different localities, choosing, of course, such as are most suitable to go together; and it may be possible to use two of quite different characters with a little management, as, for instance, slates with tiles or rough glass in bands or patterns, but of course sparingly. The customary one-quarter pitch of roof was much too little for this climate; and in a style where a very steep one would be inadmissible, a much greater pitch than that would be an advantage, and with a little care and forethought it might be made to harmonise with almost any of the severer styles, and, whilst being more satisfactory in appearance, neither waste of material nor space need occur in its adoption. In fact, if a roof, which from its nature would exclude a parapet, could invariably take a more prominent place, I think a great step in the right direction would have been made. In all ordinary buildings parapets should be avoided as much as possible. If height to the front or elsewhere is wanted, it should be obtained in a more legitimate way than by carrying up a piece of the wall. There are many unnecessary and expensive things in every style and order which might be omitted with general advantage and without prejudice to the main points of the composition. Ornamental details should not be used indiscriminately, or solely because the several kinds may have been found to be beautiful or very appropriate in this or that building. The architect should rather consider the varied circumstances and requirements of his work as they *naturally* occurred, when, supposing that he had arrived at a just conclusion as to what would best suit those circumstances, he could show reasonable cause for the mode of treatment adopted in every part of his work. In the use of sculptured work, it was objectionable to observe a good thing done too much. In ordinary city houses, amongst other things capable of improvement, may be mentioned the entrance door. The peculiar whims and fancies displayed in some are decided examples of what to avoid. Taking into consideration the labour of skilled workmen in every branch connected with building, and the materials employed—frequently of a costly nature,—and the evident industry and perseverance expended in many very indifferent designs, and comparing it with what might have been done had the same efforts been rightly directed, we should find that real extravagance had been indulged in, though quite unwittingly. Our plain duty would, therefore, appear to be the task of teaching, as much as in us lies, that right way whereby we shall not only disseminate the beautiful and true more widely, but, in so doing, save also our clients' pockets.

PARLIAMENTARY NOTES.

SANITARY ACTS.—Sir C. Adderley, on the 13th inst., asked the President of the Local Government Board whether it was his intention to introduce measures this session amending any of those sanitary Acts imposing duties on local authorities which the Sanitary Commissioners recommended to be repealed and re-enacted in one Bill.—Mr. Stansfeld was not able to give as definite an answer as might be desired. He should be glad to introduce a measure of that nature, but whether he could do so or not would entirely depend on the progress of public business.

EUPHRATES VALLEY RAILWAY.—Sir G. Jenkinson asked the First Lord of the Treasury whether any steps had yet been taken by her Majesty's Government to carry into effect the recommendation made by the select committee on the Euphrates Valley Railway at the end of their report last session; and if so, what had been the result; and if not, whether it was their intention to carry out that recommendation; and if so, when.—Mr. Gladstone said he understood from the Indian Department that they had given up the practice of guaranteeing, and did not propose to take any steps with reference to the railway through the Euphrates Valley; and so far as the British Government was concerned, he was unable to give any undertaking with reference to the report of the committee.—Sir G. Jenkinson gave notice that he would take an early opportunity of calling attention to the subject, and of moving a resolution.

THE THAMES EMBANKMENT.—M. W. H. Smith gave notice of his intention to call attention at an early date to the surplus land on the Thames Embankment.

PUBLIC HEALTH MEASURES.—Mr. Raikes on Monday asked the member for North

Staffordshire whether he intended to introduce during the present session any measure relating to the public health.—Sir C. Adderley hoped the members of the Sanitary Commission would be permitted to introduce their measure this year, in order that they might deal with those parts of the subjects which were neglected by the Act of last session. He trusted that, after what fell from the hon. gentleman at the head of the Government the other day, they might have the assistance of the Government, and that a satisfactory measure might be produced.

LABOURERS' DWELLINGS (IRELAND).—In answer to Sir F. Heygate, The Marquis of Hartington said he hoped to be able to introduce this session a Bill for giving additional facilities for the erection of labourer's houses in Ireland.

THE NATURAL HISTORY MUSEUM.—Mr. Slater-Booth asked the First Commissioner of Works whether a contract had been entered into for the construction of the Natural History Museum at Kensington; and if so, how many persons were invited to compete, and what was the amount of the tender accepted.—Mr. Ayrton replied that it was the duty of the Board of Works to invite tenders, and upon their invitation a great number of proposals were sent in, though it was found that only 17 were regular in character. They all proved to be in excess of the sum intended to be spent upon the building. The matter was referred to the architect for further consideration, and a contract was subsequently entered into for £352,000. There were other sums which would bring the sum up to the amount originally intended. He was not aware that it was the intention of the Government to propose the removal of the collection this session, and, in fact, the removal could not take place until the building was complete. The time to be allowed was three years.

THE SERPENTINE.—Mr. F. Powell asked the First Commissioner of Works what was the nature of the works of which a commencement had been made by the construction of an embankment in the Serpentine; and whether he had any objection to place in the library plans and drawings in explanation of the designs.—Mr. Ayrton stated that this work was of a character very different from that which his hon. friend supposed. The object was to construct a small island for the protection of the wild fowl on the Serpentine.

THE HOUSE DUTY.—Mr. Alderman Lawrence gave notice that it was his intention to move, on an early day, that the house duty, which had been removed and subsequently reimposed, ought to be discontinued for various reasons, but especially because it left a large amount of house accommodation entirely unused and entirely wasted—an evil to be deprecated, peculiarly in the interests of the working classes.

COMPETITIONS.

LEEDS BOARD SCHOOLS.—The competition designs sent in to the Leeds School Board for Green-lane schools, New Wortley; Jack-lane schools, Hunslet; and Beeston schools, were on view to the public on Saturday and Monday. For Green-lane schools twelve sets of designs had been sent in, the calculated cost of the buildings varying from £6,980 to £10,870. The design entitled "Semper Virens," sent in by Mr. George Corson, Cookridge-street, was selected by the Board. In this plan accommodation is provided for 1,084 schools of four departments, viz., a department for boys over nine and one for girls over nine, a department for boys and girls from seven to nine, and a school for children under seven. The estimated cost of the buildings is £9,983, or about £9. 4s. per head. The site, which has an area of 8,144 square yards, has been purchased for £1,425. 4s. For the Beeston schools, the site of which (2,362 square yards) has cost £590. 10s., ten sets of designs, varying in estimated cost from £2,400 to £4,428, were sent in. Mr. Backhouse, South-parade, has been the successful competitor. His plan, marked "A B C Black," make provision for 446 children in the two departments of boys and girls under seven, and infants. He estimates the cost of the buildings to be £3,150, or just over £7 per child. A dozen sets of designs were also sent in for the Jack-lane schools, and design No. 11, Messrs. Adams & Kelly, Park-square, Leeds, was selected by the Board. The estimated cost of these buildings is £4,000, or six guineas per child, as there is accommodation taken for

632 children in three departments—boys over seven years and girls over seven, and infants. The cost of the site, 6,646 square yards, was £1,080. The accepted designs of the three schools have not yet been approved by the Education Department. When the requisite sanction is obtained tenders for carrying out the work will be invited. The Education Department architects prefer that the schools shall be 18ft. to 22ft. wide, but the Leeds Board adhere to their decision that they shall be 30ft. wide, and the Education Department have given way.

CORPORATION STABLING AND STORES, BIRMINGHAM.—The Town Council have adopted the competitive design of Mr. W. H. Ward, architect, Paradise-street, for the above works in the latter end of last year, and they have just accepted the tender of Mr. J. Hartley, contractor, for the execution of the works at the sum of £3,000. There is stable accommodation for fifty horses, which is circular on plan, and wheelwrights' shopping, curb and stone-breaking sheds, paint stores, &c. The site is at the corner of Sheepcote-street and S. Vincent-street.

THE NEW CHESTER WORKHOUSE.—The designs sent in in competition for the erection of the new Chester Workhouse have been on exhibition in the Town-hall, Chester, this week. They are thirty in number, and the estimates accompanying them range in amount from £27,000 to £30,000. The Building Committee met on Wednesday week for the first time to examine the designs, and have since been occupied in their consideration.

Building Intelligence.

CHURCHES AND CHAPELS.

BRADFORD-UPON-AVON.—The interesting little church of Bradford-upon-Avon, described by a correspondent as a pre-Norman building, is about to be restored. It consists of chancel, nave, and north porch, the former for years having been used as a cottage, and the nave as a parish school. Formerly it belonged to the Abbey of Shaftesbury, upon the dissolution of which, as pertaining to the manor of Bradford, it was granted to Sir Francis Walsingham. It afterwards passed into the Methuen family, by whom, in 1715, it was given for the above purposes. The chancel has been purchased by the committee; the next object is to acquire the nave by providing another school building, the expense of which, together with the restoration, is estimated at £1,200.

INCORPORATED SOCIETY FOR PROMOTING THE ENLARGEMENT, BUILDING, AND REPAIRING OF CHURCHES AND CHAPELS.—The usual monthly meeting of this society was held on Monday. Grants of money were made in aid of the following objects, viz.:—Building new churches at Pleckgate, in the parish of S. John, Blackburn; Longford, in the parish of Foleshill, Warwick; Moor-down, S. John's, in the parish of Holdenhurst, near Bournemouth; and Mawansmith, near Falmouth. Rebuilding the church at Aston Flamville, near Hinckley. Enlarging or otherwise increasing the accommodation in the churches at Beckingham, near Frome; Bitchfield, near Grantham; Denford, near Thrapstone; Huish-Episcopi, near Langport; Lelant, near Hayle; Littleton-on-Severn, near Bristol; Llandilo-Fan, Brecon; Llanfair Talhairn, near Abergele; and Toft Monks, near Beccles. Under urgent circumstances, the grants formerly made towards enlarging, &c., the church of S. Giles's, Reading, and towards reseating and restoring the churches at Llantrisant, near Pontypridd, and S. Mary's, Sandwich, Kent, were each increased. The society likewise accepted the trust of a sum of money as a repair fund for the church at Halton, Sussex. Grants were also made from the School Church and Mission-House Fund, towards building school or mission churches at Brynmaur, near Llanelly; Lower Tramere, near Birkenhead; Wellingborough, Northampton; and Woolwich, Kent.

MIDDLETON, YORKSHIRE.—S. Andrew's Church, Middleton, was reopened, after extensive restoration, on Tuesday, the 5th inst. The building is a very ancient one, the chancel bearing date of 1280, and the nave probably about 1360. A stone tower was erected in 1830, in lieu of a small octagonal turret with a dwarf spire, and the building then underwent the process of plastering and whitewashing in vogue during the old "Churchwarden" period. It is said that, instead

of the dingy barn-like appearance which the church had presented for years, the parishioners have now an elegant open and well-lighted church, admirably adapted to the uses of the parish. The tower, west front, north wall of nave, and south porch, have been entirely rebuilt; the chancel arch has been made wider and heightened, and handsome windows inserted in the east and west ends. The lancet windows on each side are glazed with cathedral glass, and that over the altar in the chancel with stained glass—the gift of Mrs. Blanchard, the mother of the present rector, in memory of her father, husband, and son. The floor of the chancel is paved with Minton's encaustic tiles. On the south side of the altar is a sedilia, divided by a triple arcade, and beside it is a credence of early date, while on the opposite wall is an old ambury, where the vessels of the church were formerly kept. A new altar and altar-rail, with choir stalls, have been provided. The total cost of the restoration is about £2,600.

WEST BLATCHINGTON CHURCH, SUSSEX.—The ruined church of this parish is about to be replaced by a new building, to be erected in the Spring. Some months since the present building was examined by an architect, with a view to effecting a restoration; but it was found that the walls had no foundations at all, and were so far gone that they would not support the slightest of roofs.

BUILDINGS.

NOTTINGHAM.—The corner-stone of the new Joint-Stock Bank has been laid at Nottingham. The building will be four stories in height. The interior of the banking-room will be 20ft. high, with arcaded walls, enriched ceilings, spandrels, and capitals. The frontage is Italian in design, with porticoes at each corner, in which a considerable amount of polished granite is introduced with pediments, pier-caps, window arches, main cornice, and stringcourses enriched with carving. The frontage will be in Darley Dale stone. The architects are Messrs. Evans & Jolley, Wheeler Gate, Nottingham. Messrs. Fish & Son are the builders.

WOOLTON.—The new Convalescent Hospital at Woolton, near Liverpool, which has been erected with the balance remaining from the "Cotton Famine Relief Fund," will, it is expected, be opened by the Premier at Easter. Messrs. Haigh and Co., of Liverpool, are the builders, and Mr. Thomas Worthington, of Manchester, is the architect. The style is Gothic, and externally the building is of grey brick, with red local sandstone dressings, and bands of blue bricks. There is accommodation for 100 patients, allowing 1,000 cubic feet of air space to each. In each wing there is a large dayroom 38ft. by 24ft., and access to an arcade running round the outside is obtained by glazed doors reaching to the floor. The basement of the building is devoted to the kitchen and stores. One of the most interesting features of the building is the "Gladstone Hall," which is situate over the dining hall, and is of precisely the same dimensions as that room, but more lofty. In 1868, when Mr. Gladstone was defeated in the contest for the representation of the south-west division of Lancashire, the working men of the district originated a penny subscription to raise a testimonial in his honour. Contributions were received from working men in every part of the kingdom, and when the list was closed the amount had reached the sum of £1,250. This sum was invested at 4 per cent. interest, and must now amount to about £1,400. Some difficulty was experienced in determining how the money should be expended, but the matter was settled by the request of the Premier that it should be appropriated towards the erection or support of a convalescent hospital in the neighbourhood.

SCHOOLS.

KETERING.—A new church school has been opened at Kettering. In design it resembles the letter T, the base of the letter being the master's house, and the stem and cross the schoolroom proper. The extreme length of the body of the school is 64ft. by 18ft. in width; the top cross being 51ft. by 18ft. The roof is open, is supported by polished beams, which rest on carved corbels, and to the ridge is 26ft. high. It is built in red brick, and has stone window frames. Mr. R. W. Johnson, of Melton Mowbray, is the architect, and Mr. Charles Sharman, of Kettering, the builder.

NEWPORT.—The new National Schools, in the Cemetery-road, commenced in May last, are now

completed. The accommodation provided is for 250 children in all, and consists of a boys' school-room (41ft. 6in. by 19ft.), a girls' room at one end adjoining (33ft. by 18ft.), infants' room, same dimensions, with two class-rooms (18ft. by 10ft. 6in.), and separate porches and lobbies for boys and girls, with all needful offices, &c., outside. In addition, and adjoining, there is a master's house, with sitting-room, kitchen, back kitchen, and pantry, on ground floor, with three bedrooms and cloak-closet on the first floor. The whole of the works have been carried out by Mr. John Turnbull, builder, of Cheswardine, Shropshire, from the plans and under the superintendence of Mr. J. Ladds, architect, of Chapel-street, London.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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RECEIVED—P. J. L.—J. P. S.—T. H.—W. H. L.—G. W. and Co.—J. L. B.—L. and N.—N. G.—J. F. R.—G. E. and Co.—C. M. B.—M. A. B.—Assistant.—J. M.

H. C. MACANDREW, Sheriff Clerk of Inverness-shire.—We cannot spare room for your long letter, which proves nothing. If you can certify to a single fact, we will gladly publish the certificate. Mere comments will now avail nothing. The original drawings are the best testimony. Let them be produced before an independent and disinterested arbitrator, or a British jury.

JAMES HICKS, Redruth, Thos. Charles Sorby, H. Jackson, Liverpool.—See our answer to H. C. MacAndrew.

CUI HONOR, HONOREM—You confirm in detail what you said in a former letter. But the controversy has reached a point when it is necessary to authenticate statements. As you can testify to what you know and have seen, we will insert your letter with your name and address appended. Unauthenticated correspondence would now very properly be regarded with a certain amount of suspicion.

E. T.—See our answer to "Cui Honor, Honorem." What is wanted now is reliable and authenticated evidence. Your suggestion about publishing some of the designs of Mr. Ross and Mr. Roper, independently of the Edinburgh Cathedral competition drawings, is a good one, and we will do our best to satisfy you.

E. B.—Your query is too much of an advertisement.

T. C. WILBERFOSS.—Drawing of window in Abbot's House, Waltham Abbey, to hand.

STEPHEN E. EARLE (Worcester, U.S.)—Thanks for congratulations and efforts in our behalf. Thanks also for photograph, which is, however, hardly suitable for illustration.

Correspondence.

EDINBURGH CATHEDRAL COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—In answer to Mr. Ross's letter in your last issue, I will only remark that the construction put upon the garbled extracts from my letters to him (*which were marked private*) is calculated to lead to conclusions other than my entire letters would convey. As an instance, I need only say

that Mr. Ross has thought it to his advantage to quote nearly the whole of my letter dated January 21st, with the exception of the following passage:—"Many of the features in the design having been compared to Messrs. Godwin's and Burges's work, I must own that the little I know of architecture I have learnt by studying these architects' and Mr. Street's designs, in connection with old examples, and I use them freely."

I wish to add nothing to my former statement; and should Mr. Ross choose to submit my designs, drawings, and the whole of my correspondence, together with the letters I have received from him, and my own notes as to the origin and development of the design, to an impartial and competent authority, I am quite prepared to abide by the result.—I am, Sir, &c.,

GEO. FREETH ROPER.

SIR,—Until the original sketches are produced Mr. Ross may be quite sure that architects who can and do design their own works will continue to hold it as an impossible feat that the designer of Inverness Cathedral is identical with the designer of Edinburgh Cathedral. If Mr. Ross designed the latter, who designed Inverness?

Architects care not for any of the arrangements or correspondence between Mr. Ross and Mr. Roper. In default, however, of the production of the sketches, will Mr. Ross and Mr. Roper both give us the original sources of the design? For, to whomsoever it belongs, it is not only manifestly founded on a certain school, but contains portions of other designs, with little or no disguise.—I am, Sir, &c.,

E. W. GODWIN.

SIR,—As my name is mentioned by Mr. Ross in the letter in which he insinuates that London architects are in the habit of being indebted to their assistants for their designs, I beg to say that no assistant has ever made a single design of mine. Mr. E. W. Godwin and I conjointly sent in a design for Mr. Holloway's Asylum, and Mr. Roper assisted in making some of the drawings.

As to the criticism in the article I wrote, I see no reason, from the evidence adduced, to alter one iota of what I therein said about Mr. Ross's published design.—I am, Sir, &c.,

JOHN P. SEDDON.

THE ARCHITECTURAL ART CLASSES.

SIR,—Will you kindly notice in your next issue the underwritten memorandum respecting the Architectural Art Classes:—At a meeting of the joint committee of the Architectural Art Classes, held at the rooms of the Royal Institute of British Architects, on Thursday, the 13th inst., a resolution, of which the following is an outline, was passed:—"Looking back upon the efforts which have been made, though it cannot be said that the benefit to the students has been such as was hoped for, yet the results as regards the excess of working expenditure over the receipts from the fees of the students have not been worse than our calculations have led us to expect, nor than can be fairly looked for in the future. These efforts have resulted in a loss which falls upon the members of the committee. We are therefore reluctantly obliged to discontinue our efforts to carry on the classes as at present constituted." Arrangements were made to facilitate the carrying on of classes for the study of the Living Model and the practice of Figure Design for architectural purposes—for which a class, properly organised, will probably be formed, at no very remote period, in accordance with the rules of the Architectural Association.

For the present, therefore, the Profession has nothing to show as a result of all the discussions and loud demands made for the artistic training of the future architect—beyond a few stools and easels, and a disused room at the Architectural Museum.—I am, Sir, &c.,

THOMAS HENRY WATSON, Hon. Sec.

9, Nottingham-place, W., Feb. 18, 1873.

"BUILDING NEWS" SCHOOL-PLANNING COMPETITION.

SIR,—It would be very interesting to know how 220 can be seated in the boys' and girls' school-rooms of the selected design, as it can only seat 96 at 18in. to each. On the other hand, along with the arbiters, I recognise the ease with which the difficulties have been met, as, for example, the boys and girls playing together; providing about half the number of basins required by the rules; no urinals for the boys; the w.c.'s placed so near the stairs; the infants having to make a passage of their

school-room to the playground—the easiest plan being, of course, to leave the difficulties unsolved.—I am, Sir, &c.,
AN ASTONISHED COMPETITOR.

SIR,—I submit the following observations in reference to the design bearing the motto "We Strive to Win," for the consideration of your readers, being what I consider defects, unnoticed, or, at least unmentioned, by the referees.

Only one gallery exists in the infant-school, instead of two, as provided by the Committee of Council on Education, and this gallery inadequately provides for the children for whom accommodation is required; no provision for desks for the older children. The arrangement of gallery in the class-room is unsatisfactory, as some of the children would be 25ft. from the light, and the light being on the right hand instead of the left, I question whether they would be able to see. The lavatory to this school faces the entrance, and is without any screen whatever, and being only 7ft. wide, is utterly inadequate for so large a number of children. No communication exists between the girls' and infant's school, except through teacher's room, and the latter would be in a better position if attached to the school-room.

With respect to the graded schools, they are of insufficient length to see 100 children, this being the number to be taught therein, according to the conditions—Mr. Simpson having shown four classes of 24 children each only—and it is a much better plan to adopt a gangway between each class, instead of the curtains, which are now nearly obsolete, as the children will have less distance to walk to and from their seats. No means are shown, or explained, for accommodating the whole body of the children at meeting and dismissal. The seats in the class-rooms seem expressly arranged to suit the conversion of the two rooms into one, an occurrence which does not take place more than once or twice a week. Those in two of the rooms have the light on the right hand instead of the left, and in all cases they are placed the farthest possible distance from the light. No glass in class-room doors, which would render them more under the supervision of the master or mistress. The teachers' desks are not shown, and, as far as I can see, they would come in each case in front of the fire. There is no mistress's room (contrary to the conditions), and it would be much better to have placed the master's room on the same floor as the school-room, as in addition to the inconvenience there is the loss of time. The lavatories and w.c.'s are not in accordance with the regulations, and the lavatory and cloak-room to girl's school is very small. The idea of arranging them on the ground floor is open to objection, as the teacher has no control over the children leaving the school, and particularly in the present case, where the children could leave entirely without his knowledge.

The playground is badly arranged, as the shape of it affords the children an opportunity for evading the teacher's eye, she being unable to see over the whole of it at one time. The covered way to the w.c.'s in centre of ground I consider a further objection.

As the cost of the building was one of the points to be considered in awarding the premiums, I think it a pity that Mr. Simpson's error of calculation was not pointed out in the report.

As will be seen, some of the foregoing objections are in violation of the conditions, and the others have been founded upon my own practical experience during the many years I was engaged both as a teacher and master in one of the largest London public elementary schools. I shall watch with interest the productions of some of the other competitors, but, at the same time, I cannot help remarking that I consider the one to which the first place has been given is very far from perfect, and not one to be recommended as worthy of adoption.—I am, Sir, &c.,
QUI DOCET, DISCIT.

London, Feb. 18, 1873.

SIR,—In examining the first premiated design in the above competition, illustrated in the BUILDING NEWS of February 7th, we see that the author has four groups of benches and desks in each school-room, each group 12ft. long. You will readily perceive that it is impossible to seat the required number, viz., 100, if 22 inches be allowed, according to the regulations of the Board of Education. If 18 inches were only allowed (which is certainly not sufficient for writing purposes), even then Mr. Simpson could only accommodate 96.

We should be glad to know how this is to be accounted for, as your reply to correspondent "T," in BUILDING NEWS September 6th, distinctly states that the "school-room for class teaching will only be required to accommodate the children for whom there is no provision in the four class-rooms."

Further, the superficial area of the infants' school and class-rooms, according to the dimensions figured on plan, does not work out as your conditions state, viz., 9 superficial feet per scholar. Again, the infants' school is figured 53ft. in length, and is only drawn 52ft.

We also beg to endorse the remarks made by your correspondent, "One of the Competitors" (in last week's issue), in reference to the cubical contents of the building. We have carefully gone into the matter, measuring from 2ft. below finished level of playground to half-way up the roof, as your conditions state, and find the total cubical contents to be 220,648ft., which, at 5d. per foot = £4,596 18s. 8d.

This total is somewhat less than that marked out by "One of the Competitors," but greatly in excess of the measurement given by Mr. Simpson, viz., 152,000 cubic feet. By inserting the above in your next issue you will oblige yours faithfully,

WHAT WILL BE, WILL BE.

Preston, February 19th, 1873.

"BUILDING NEWS" TOWN CHURCH COMPETITION

SIR,—As I suppose, an Act of Parliament was never yet framed through which a coach-and-four might not be driven, so your instructions for the above are not wholly such as to bar out dual interpretations:—

1. "Sittings are to be provided for 1,200 persons." In an article in the same number of your paper, signed "J. P. S.," entitled "Suggestions for a Town Church Competition," the writer devotes some fifteen lines or so of type to the special accommodation which should be provided for children. What number of the above are to be provided for according to the scale of accommodation adopted for children? Or are the

whole 1,200 to be on the adult scale—situation alone being the distinguishing characteristic of the children's seats?

2. In speaking of the perspectives to be submitted you say "the drawing in each of these should not measure more than 16in., &c., &c." Does this size refer to the representation of the building or the sheet which contains that representation?

3. "Competitors may at their option, &c., &c." Since this would appear to be purely optional, will the non-submission of such drawing by any competitors disadvantage them, as compared with those who choose to submit such detail drawings?

4. May not the window and other openings be thrown out in black similar to the drawings of Edinburgh Cathedral just illustrated by you?

"J. P. S." recommends the porch of S. Maclou, Rouen, and the narthex of many churches in the Rhine Provinces as suggesting fitting treatment of entrance. Might I suggest that an illustration of one or more of these would be by no means inopportune? I, for one, have no such materials to refer to.—I am, Sir, &c.,
Feb. 11th, 1873.

AIDE-TOI.

(1.) The 1,200 sittings are to be on the adult scale of 20in. in width for each sitting, the seats being 2ft. 10in. from back to back.

(2.) By the size of the perspective drawing (fixed at a maximum of 16in. in length), we mean the size of the space inclosed within the boundary line of the picture, which in an exterior view embraces the building with, usually, some sky and some foreground. For instance, we should describe the view of Willesden Church in last week's BUILDING NEWS as being about 9in. long.

(3.) It is difficult to answer so very wide an inquiry. If any competitor, after dealing satisfactorily with the general problem, also sends a sheet of details showing special excellence, the circumstance will, of course, count in his favour; but there will be no advantage in sending details unless there is some special knowledge or invention displayed in them.

(4.) There is no objection to blacking-in openings, or the walls in the plans.

(5.) Photographs of the porch of the Church of S. Maclou, and others of a similar type, may be found in the South Kensington Library.—ED.

SIR,—Referring to your Church-planning Competition, there are a few queries which you will oblige me by answering in your next number of BUILDING NEWS.

1. Have you included Sunday school scholars in the number of sittings mentioned? If so, how many?

2. I suppose the windows in elevation may be blacked?

3. May the drawings be mounted on linen?

4. I find, in setting out the plans to scale, that one sheet of double elephant will not comfortably hold the number of drawings you have specified without cramping them together, and thereby rendering them unsightly. Would you have any particular objections to the drawings being done on two sheets imperial?—I am, Sir, &c.,
M. R.

(1.) and (2.) See answers to "Aide-toi's" letter.

(3.) Drawings may be mounted on linen, if desired.
* (4.) Designs may be upon two sheets of imperial, instead of on one sheet of double elephant. Hot-pressed paper is best for drawings to be photolithographed from; and hot-pressed imperial, extra thick, is pleasant to draw on, and not very likely to be injured by creases.—ED.

THE INSTITUTE MEETINGS.

SIR,—On the 31st ult. you inserted a timely protest against the way in which the time of the members of the Royal Institute of British Architects is frequently wasted by the want of punctuality in commencing the fortnightly meetings, and by the thrusting-in unexpectedly of matters other than those officially announced for consideration. As another reader of your paper, I should like to ask why the Syllabus of "Sessional Papers" cannot be drawn up with something like an approach to certainty? It is true that it is stated that the list is "subject to such alterations in regard to date as circumstances may require;" but surely when the programme is to be departed from, it would be possible to announce it a fortnight beforehand, or to send an intimation to the professional papers? I, and I have no doubt many others, went to the Institute on Monday evening last expecting (according to the announcement in "Meetings for the Ensuing Week" in your impression of Friday last) to hear a paper—which I have no doubt would have been extremely interesting—by Mr. Tavenor Perry, "On the Mediaeval Brickwork of Pomerania and Mecklenburg." I was disappointed, however, and learnt that Mr. Perry's paper is now described as "in preparation," and that it will probably not be read until after the 9th of June—and this, be it remembered, after the paper has figured in the syllabus as to be read at an early date from nearly the commencement of the Session! But this is only a solitary instance of the shortcomings of the Institute in this respect. Its members hardly ever know, and it is questionable whether the Council ever knows, what papers will be read at the meetings—whether they will be read at the beginning, the middle, or the far-end of the session. Last year, I remember, a paper was announced by the President, Mr. T. H. Wyatt, "On the Works at the New Liverpool Exchange;" this paper, after being shifted about from date to date (in the syllabus), was never read, and as yet, I have not seen it figuring in the prospectus for this session. As a member recently remarked, such papers as this, dealing with large and important works carried out by its members, are of just the sort which ought to be read before the Institute, and it is to be hoped that paper has not been lost sight of. The subject on Monday evening was not, as I expected to find, the "Mediaeval Brickwork of Pomerania," but the "Heating of Public Buildings"—a very useful subject, and one on which all present were capable of learning something. The paper was rendered less valuable, however, by the absence of its author; and owing to the subject not having been correctly

announced, doubtless many members who could have discussed and thrown some light on a matter of so much importance at the present time were absent; while those denizens of this city of brick who expected to learn a few hints on the treatment of brickwork from Mr. Tavenor Perry's paper were disappointed. Cannot the Institute draw up a syllabus of papers that may be, at least to some extent, depended upon? The Architectural Association is able to do so, and surely the Institute, with its greater resources and prestige, might succeed.—I am, Sir, &c.,
Feb. 18, 1873.

DELTA.

"ARCHITECTURAL PERSPECTIVE."

SIR,—In reply to Mr. Godwin's letter in your last issue, I am not to blame for the error in Fig. 8. The engraver has drawn the cube inaccurately, and as a consequence, the octagonal prism is distorted. In Fig. 7 the eave lines are omitted. With regard to the method of drawing arches in perspective, I agree with Mr. Godwin that the diagonal is more expeditious than that shown in my paper. The system of ordinates is, however, very useful in getting in large arches, as you can get as many fixed points as you wish, and are of course enabled to draw the contour of the arch more accurately. I think that a clever draughtsman, with some experience in perspective drawing, may dispense with both methods, by merely getting the width of the ogee and height of the arch, when it may be drawn free-hand by the eye.—I am, Sir, &c.

JOHN L. ROBINSON.

198, Great Brunswick-street, Dublin, Feb. 17.

QUANTITIES.

SIR,—Mr. Fletcher, in a recent article on the above subject, suggests that it is customary to include in the "Bricklayer the parochial and other fees," &c. This leads me to think that he intends to ignore a most important bill, viz., the "Preliminary Bill," which should contain the items he alludes to, and many others selected from the general conditions of contract, and which may affect the pricing-out of the quantities. He also says that brickwork in cement is "measured with the ordinary brickwork in mortar, &c.," and that "the same item appears a second time as extra only in cement." I think that Mr. Fletcher is not quite clear here—of course the item is measured in the ordinary way, but does not appear twice in the dimensions. It would be written as "Brickwork in cement," and the abstractor would separate it in the abstract. In fact, unless there is but a little brickwork in cement about a job, it should at once be written, abstracted, and billed, as "Brickwork in cement." There is a price per rod for brickwork in cement, as there is for brickwork in mortar; and why the trouble of twice abstracting and twice billing?

The "Setting to chimney-pieces" in the table is, I think, out of place: it is essentially mason's work, and should be with the mason. "Beads and quirks" executed by the bricklayer are, I also think, rare. I do not know whether or not Mr. Fletcher has finished with the bricklayer, but he might perhaps have touched upon the measurement of "accidentals," such as work in underpinning, new work built against old, raising to chimney-stacks, &c., all of which should be kept separate; and very large chimneys, about the correct measurement of which, judging from your "Intercommunication Column," there seems some doubt, &c. "Stop and twice lime-white" is also a bricklayer's item.

Mr. Fletcher very truly says that great care and circumspection will be necessary, in order to obtain a good abstract. I venture to say that scarcely two out of six gentlemen can abstract properly. It requires the power to grasp the whole of the trade, and neatness is most essential; and to obtain a really good abstract time is required. If the work is what is called "slashed off" more time has to be expended in billing it, the value of which is greater. When Mr. Fletcher comes to the Joiner, he will, no doubt, insist more upon this point.—I am, Sir, &c.,
W. W.

Intercommunication.

QUESTIONS.

[2793].—Geology and Building Stones.—Would the writer of the articles on Stonework kindly point out what books he would recommend for a beginner to read who wishes to begin the study of geology, especially in connection with building-stones?—A NINE YEARS' SUBSCRIBER.

[2794].—Fireproof Flooring.—Whilst thinking over what I saw last Saturday during the Architectural Association's visit to the new Home and Colonial Offices (Sir G. G. Scott, B.A., architect), the following question suggested itself to my mind—will any reader of the BUILDING NEWS be good enough to answer it?—The underside of the fireproof arches in the floors is constructed of a superior concrete, composed of finely broken brick and coarse sand mixed with plaster, while the required thickness of the floors above this is made up with a coarser concrete mixed with Portland cement. Why not turn the arches entirely with of the lacing material, and so save the expense and trouble of lacing the underside of the arches, as is done when the former is used, in order to obtain a key for the plastering?—A STUDENT.

[2795].—Bricks and Mortar.—What is the cause of adhesion between bricks and mortar?—B.

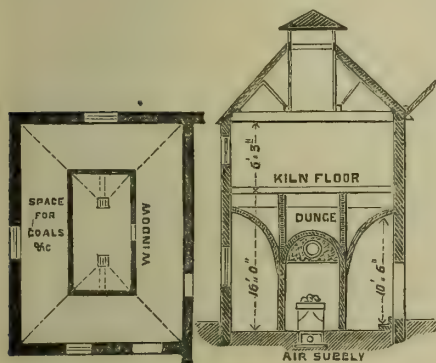
[2796].—School Stove and Partition.—Can any reader of the BUILDING NEWS inform me of a good stove for heating a school, the smoke to be taken in a tube down and along underneath the floor? Is this found to

work well? Also I want a light and easily removable sound-proof partition across a school-room, opening 25ft. wide and 22ft. high to the collar of roof. The lower 14ft. could slide aside in two parts. Can any reader recommend anything? I have thought of a wood skeleton framing, covered with felt, kamptulicon, or something of that kind. I should be glad to be favoured with advice.—ARCHITECT.

REPLIES.

[2775].—**Wooden Houses.**—The name and address of the owner of the wooden house from Norway, recently erected, is "John Fulford Vicary, Esq., Boucher's Hill, North Tawton, Devon," and he writes to the *Times* (Feb. 4th) that he is domiciled in his new dwelling, and finds it very warm and comfortable, and that, although the house is large, and the number of its inmates the same as occupied his previous habitation, yet his present consumption of fuel is only one-fifth of that expended there.—E. G.

[2777].—**Malt Kilns.**—Vide rough sketch of kiln for 45qr. malting. Malt laid on floor about 8in. thick to be used for making pale malt. Dimensions 40 by 27. An inner chamber is built in kiln 9 by 23, in which two iron fire-baskets are placed. The space between walls of kiln and this chamber is arched over in $\frac{1}{2}$ brick all round, there being 4ft. or 5ft. left between top of arch and underside kiln floor. This floor to be supported on iron joists, with iron bars arranged transversely, to carry tiles, called "kiln tiles," on which malt is placed for drying. An iron door closes the ingress to fire-chamber. Air flues, formed of drain tiles, are carried under fire-baskets to supply fires, the outer opening of which have small sliding doors for regulating draught. The ordinary disperser, placed 5ft. or 6ft. over fire, is formed on suspended iron frame, 5ft. or 6ft. square, covered with iron plates, flag stones, or tiles. The sketch shows a different method. The fire chamber is arched over, ends left

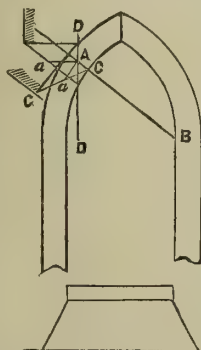


open, and the alternate bricks at sides left out for heat to escape. I cannot speak of the practical value of this method; but it is being adopted in principle in some new maltings at Burton. The roof of kiln is an ordinary ceiled one, and instead of revolving cowl, a cupola is shown, with an open space all round of 15in. from curb of kiln roof framing. Louvres to open and shut may be fitted to such an opening, but they are thought expensive, and the above method answers, I am informed. I should like to hear other opinions from some who have had practical experience in the erection of maltings concerning anything I have mentioned, particularly with regard to ceiling of roof over drying floor. What material could be substituted for plaster, of a durable character, that would resist the effects of the rising steam and withstand the constant transitions from heat to cold? In course of time plaster drops off in pieces, and requires frequent repair. The best authority I know to which I can refer "A Young Architect" is "The Maltster," published by W. R. Loftus, 146, Oxford-street.—E. J. P.

[2778].—**Bonding Brickwork.**—To construct a three-brick wall, with whole headers, and yet avoid the straight vertical joint, is impossible. The following makes a good job.—ANTI-QUARIAN.



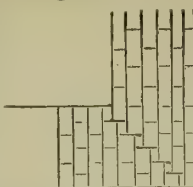
[2779].—**Distance.**—I rust the enclosed sketch will meet the requirements of "H. B." by which I show the relative distance of point A by sections C C and D D.—LLANELLY.



[2785].—**Building Act.**—In the case *Weston v. Arnold*, recently heard before Vice-Chancellor Malins, he decided that a wall in which there are ancient lights overlooking roofs is a front wall, and not a party wall; therefore the adjoining owner can reinstate the ancient lights in the new wall; but in the appeal, which will come shortly before the Lords Justices, it will be contended, under the provisions of the Building Act, a new wall cannot be built with the lower portion a party wall, whilst the upper part is considered a front wall. The question being of so much importance, I hope you will have several replies.—ARCHD. C. PONTON.

[2778].—**Bonding Brickwork.**—If we have whole headers and stretchers, in the way "Young Bricklayer,"

has seen English bond described, we should have straight joints, as he shows; but in no instance is a brick to be placed with its whole length along the side of another, but to be so situated that the end of one may reach to the middle of the others which lie contiguous to it, excepting the outside of the stretching course, where three-quarter bricks necessarily occur at the ends to prevent a continued upright joint in the face work. The accompanying rough sketch is the plan of an angle in a three-brick wall in Old English bond, showing headers on one side and stretchers the other, and the mode of bonding in the angle.—GEORGE DURRANT.



Our Office Table.

THE MESSAGE OF ART.—On Thursday, the 13th inst., Mr. Wyke Bayliss, F.S.A., delivered a lecture before the members of the Society for the Encouragement of the Fine Arts, Dr. Gladstone, F.R.S., being in the chair. Mr. Bayliss said:—"The Message of Art is always and everywhere for our good. He that is not better for looking upon the splendour of the Creation would not be better for looking upon the face of the Creator; he would only shrink blasted from His presence by the excess of light. Is there evil in the world?—then the Message of Art is always and everywhere a protest against it. Against the raging fire of sensualism and the dead ashes of materialism alike, Greek art gave its protest in the passionless splendour of ideal beauty. Against the brutish law of force every gentle legend of the North was like a soft hand uplifted—weak, it may be, physically, as the gentle hand of a woman, but with another kind of strength, mightier than the hammer of Thor. Was there an evil in the cruel and stern dogmatism of the Medieval Church?—then every sweet picture of the Holy Child or the Virgin Mother was a message to stay the fire and sword and rack of the Inquisition. And yet, once more, is there an evil still existing in the hard, grinding, pitiless competition of our own times?—then poetry and art give their perpetual protest against it—in every delicate rendering of Nature by the painter, in every refined thought or noble aspiration of the poet. But the Message of Art must always be about the Beautiful. I know that in taking man for its theme, it must take him with all his passions, good and evil; but the good and evil must not stand as co-ordinates. If art is to be the King's Messenger, it must show the mastery of evil, the ultimate triumph of the right—it must rise—

'In ever highering eagle-circles, up
To the great sun of glory, and thence swoop
Down upon all things base, and dash them dead.'"

After the conclusion of the lecture, Mr. George Browning, the honorary secretary, Dr. Gladstone, and several others made some interesting remarks, and the proceedings terminated with the usual votes of thanks.

INSTITUTION OF SURVEYORS.—At the ordinary general meeting, held on Monday, the 10th inst., a paper was read by Mr. E. J. Castle, entitled, "The Origin of Parochial Relief." A discussion ensued, and a vote of thanks was unanimously given to the author of the paper. The following candidates were balloted for and declared duly elected:—As Members—John Morgan Davies, of Froodvale, Llandilo, Carmarthenshire; Henry Drew, of Exeter; Richard Gouthwaite, Lumbey, near South Milford, Yorkshire; Thomas Miller Rickman, of 8, Montague-street, Russell-square, W.C.; and Richard Woodcock, 20 Darlington-street, Wolverhampton. As Associate—Walter Feilde Ingram, of 25, Gresham-street, E.C.

PRIZE FOR STEEL.—The Council of the Society of Arts have resolved (1) to offer the gold medal to the manufacturer who shall produce and send to the London International Exhibition of 1873 the best collection of specimens of steel, suitable for general engineering purposes. 2. The specimens exhibited must include a complete illustration of the applications of the varieties of steel submitted. 3. Each manufacturer should send with his specimens a statement of the nature of the tests he has applied to each kind of steel submitted, and give the results of such tests. 4. The samples tested are to be exhibited, together with duplicate samples, or portions of the same samples; these will be submitted to tests, should the Council consider it desirable. 5. All persons using steel for general

engineering purposes, who are not manufacturers of such steel, are also invited to exhibit specimens on the above terms and conditions. 6. The Council reserve to themselves the right of withholding the premium in the event of the specimens exhibited not being sufficiently meritorious.

AMATEUR FINE ARTS EXHIBITION.—Major Donnelly, hon. sec. of the committee, having received several inquiries on the subject of the Army and Navy Amateur Fine Arts Exhibition, wishes to state that the works of the intending exhibitors must be delivered at the Exhibition, free of any charge, on the 24th March. The rules for the exhibitors, as well as the special labels to be attached to the works, may be obtained on application to the Secretary, Annual International Exhibitions, Upper Kensington-gore, London, S.W. Her Majesty's Commissioners have undertaken to frame temporarily all works sent from abroad which may be accepted for exhibition.

IMPROVEMENTS IN GAS MANUFACTURING APPARATUS.—On Wednesday a number of scientific men met at Fore-street, Moorgate-street, City, to inspect Vincent's Patent Simplified Gas Generator, which the inventor states may not only be used in gasworks, but also without danger or inconvenience be fixed up in private dwellings for illuminating and heating purposes. In this invention a cylindrical retort is placed within a portable furnace. The mouth of the retort, which is conical in shape, is covered without being sealed, and a removable grating is constructed inside, through which the tar is allowed to flow freely from the charge, after which it is consumed and manufactured into gas. Thus, what is refuse tar by other operations is by this process claimed to be utilised, and a saving of 25 per cent. effected.

TRAMWAYS IN THE CITY.—At a meeting of the City Commissioners of Sewers on Wednesday, a deputation representing the North Metropolitan Tramways Company attended to petition the court to sanction the introduction of tramways into the City. The company had laid down and completed more than twenty miles of tramways, and were now working them down to the City boundaries at Finsbury and Aldgate. They carried, during the last half-year, 6,500,000 passengers, or more than thirteen millions per annum. As a matter of public convenience the necessity for the tramways in the City was very great, since passengers coming from the northern districts were now obliged to alight from the cars at Finsbury pavement and to walk into the City, and those from the eastern districts were set down in High-street, Whitechapel. On the other hand, if the company were authorised to carry their line to Lothbury and Aldgate respectively, passengers would be able to alight in the very heart of the City. The petition was referred jointly to the Streets and Finance Committee for consideration.

THE BUILDING TRADE IN BERLIN.—The relations between masters and men do not present a very encouraging prospect for Berlin in the approaching spring and summer. Three of the most important trades—the bricklayers, the carpenters, and the joiners—are at present in a state of angry excitement, and evidently contemplate a strike for higher wages and shorter hours. So-called "agreement offices" have been proposed by the trade unions, but rejected by the bricklayers and carpenters. The men of these two trades held a meeting recently, and there seemed at first to be some disposition towards entering into friendly negotiations with the masters; but it led to nothing. At a subsequent meeting of the journeymen joiners, a resolution was passed to demand the reduction of working hours to eight; four hours before and four hours after dinner; and also 33½ per cent. additional wages for piece work, and a thaler a week for time work. The number of men who have agreed on striking if their terms are not accepted is at present about 4,000, and they have formed a Strike Association.

CHIPS.

Lord Eldon has given a donation of £500 towards the restoration fund of Salisbury Cathedral.

The Stockton Corporation have agreed to grant permission to the promoters of a tramway scheme to lay down a line from Norton through Stockton to Middlesbrough.

The works on the East Norfolk Railway Company's line are about to be recommenced, Messrs. Lucas Brothers having entered into a contract to complete them.

Trade News.

TENDERS.

BATTERSEA.—For the building of S. Philip's Schools. Quantities by Messrs. Paice Bros. Mr. J. Knowles, architect.

Daymond	£2,534	0	0
Brown	2,222	0	0
Sabey and Sons	2,138	0	0
Quemell	2,100	0	0
Mann	2,074	0	0
Tibbitt	2,056	0	0
Cooke and Green	2,036	0	0
M'Lachlan	1,938	0	0
Vaughan	1,930	0	0
Lacey	1,940	0	0
Gording	1,930	0	0
Keast	1,893	10	0
Niblett and Sons	1,890	0	0
Boyce	1,881	0	0
Wright Bros. and Goodchild	1,873	0	0
Johnson	1,850	0	0
Shurmur	1,844	0	0
Warr	1,715	0	0
Blandford and Jones	1,679	0	0
Johnson	1,569	0	0

CITY.—For sundry alterations and fittings at 27, Milk-street, City, F.C. Mr. Herbert Ford, architect.

Henshaw and Co.	£511	0	0
Crabb	493	0	0
Perry Bros.	485	0	0
Brass	467	0	0

DOVER.—For new vicarage house, at River, next Dover, for the Rev. Chas. Morice. Messrs. Whitley and Fry, architects. Quantities not supplied.

Harnett	£2,379	0	0
Wilson	1,923	0	0
Wise	1,770	0	0
Adcock and Rees	1,742	0	0
Bourne (accepted conditionally)	1,660	0	0

GRIMSBY.—For Co-operative Ice Stores (Limited). Mr. David Pick, architect.

BRICKLAYER'S AND MASON'S WORK.			
Enderby and Sons	£435	0	0
Waller	430	0	0
Johnson	417	0	0
Surflett (accepted)	387	0	0

CARPENTER'S AND JOINER'S.			
Hobson	£466	0	0
Nottingham	425	0	0
Chapman	399	10	0
Coulson and Heywood	385	0	0
Snowden	380	0	0
Thompson (accepted)	359	0	0
Sutton	344	0	0

GRIMSBY.—For biscuit warehouse for Messrs. Wat-maugh and Sons. Mr. David Pick, architect.

BRICKLAYER'S.			
Moody and Co.	£240	0	0
Waller (accepted)	211	0	0
Riggall and Co.	115	0	0

CARPENTER'S.			
Sagger and Co.	£156	0	0
Nottingham	154	0	0
Beells	150	0	0
Coulson and Heywood (accepted)	125	0	0

GUILDFORD.—For coal stores, shedding, and mortuary at Mill Mead, Guildford, for the Urban Sanitary Authority. Mr. Henry Peak, architect.

Brett (Godalming)	£453	0	0
Swayne and Sons	437	5	0
John Mitchell (Farncombe)	4	0	0
Pearce and Clark	405	0	0
Garnett	401	13	6
H. J. Lee	398	0	0
R. Mason	395	0	0
Strudwick	391	0	0
Pollard and Son (accepted)	360	0	0

KENILWORTH.—For additions to Thornby House, for Mr. Alfred Jepson. Mr. George Hart, architect.

Jones	£1,310	0	0
Davis, jun. (accepted)	1,277	10	0

LEAVESDEN.—For washing apparatus, and other machinery under Barford's Patent, for the S. Pancras Industrial Schools. Messrs. Richardson and Waghorn, architects.

Wonthor Smith (accepted)	£549	0	0
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LONDON.—For re-seating S. Mary's Church, Seymour-street, Somers Town. Mr. James K. Colling, hon. architect.

	Quebec	Pitch	Wains-
	Pine.	Pine.	cot.
Kelly Bros.	£756	£1,105	£1,490
Axford	677	868	1,115
Mann	652	844	1,082
Kirk	590	960	1,260
Nightingale (too late)	532	6	1,116
Cornish (Norfolk)	490	490	595

These amounts are worthy of note, from the variation made for the same work in different materials.

LONDON.—For alterations and additions to premises for public-house, Coventry-street. Messrs. Bird and Walters, architects.

Henshaw	£1,780	0	0
Newman and Mann	1,766	0	0
Avis and Son	1,730	0	0
Manley and Rogers	1,720	0	0
Brown	1,690	0	0
Williams and Son	1,683	0	0
Nightingale	1,626	0	0
Ennor	1,476	0	0
Marks	1,453	0	0
McLachlan	1,418	0	0

STAFFORD.—For terrace of six houses to be erected in Rowley Park. Mr. H. J. Paull, architect, Manchester and London. Quantities supplied by architect's surveyor.

Pemberton	£6,726	0	0
Whitton	6,667	0	0
Gee and Co.	6,300	0	0

TAUNTON.—For building the Royal Marine Inn, Silver-street, Taunton, for Mrs. Crane. Mr. A. W. Galbraith, architect.

Fox	£440	0	0
Templeman and Handford	420	0	0
Moss	392	10	0
Smith	360	0	0
Spiller	338	0	0
Yandell (accepted)	317	0	0

WANDSWORTH.—For schools, Lower Wandsworth-road, for the School Board for London. Mr. Rickman, architect.

J. W. Faulkner	£8,250	0	0
Marsland and Son	8,150	0	0
J. Cooper	8,147	0	0
E. B. Gammon and Son	7,596	0	0
B. E. Nightingale	7,595	0	0
W. T. Nixon and Son	7,589	0	0
Newman and Mann	7,578	0	0
J. Cook	7,565	0	0
W. Higgs	7,549	0	0

ASHTON & GREEN.

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portmahad and Whitland Abbey Green, the new "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.			
24 by 12	20 by 12	18 by 10	18 by 9
42s.	37s.	25s.	24s.
16 by 10	16 by 8	14 by 10	14 by 8
22s. 6d.	17s.	21s. 6d.	13s.
			77s. 6d.

Per m. of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Slate Tiles. Large quantity of all Goods at 14 and 16, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ALTRINCHAM, Feb. 26.—For the supply and immediate delivery of 50 iron bedsteads for children, and ten iron cots for infants; also the purchase of 32 bedsteads, of good convertible wrought-iron. John B. Outler, Clerk to the Guardians, Union Offices, Knutsford.

BILSTON, Feb. 27.—For the supply of 500 tons of broken Rowley rag-stone. John D. Wassell, Clerk, Commissioners' Office, Bilston.

BELFAST, March 4.—For the erection of new school buildings at the Union Workhouse. Mr. W. F. Boyce, Union Clerk, Board Room, Belfast.

BRADFORD, Feb. 24.—For the erection of buildings at the S. James's Market, Leeds-road. W. T. McGowan, Town Clerk, Corporation Offices, Bradford.

BRISTOL, Feb. 25.—For altering and widening Bristol Bridge. John G. Heaven, clerk, 13, Prince-street, Bristol.

CHESTER, Feb. 27.—War Department.—For the performance of works and repairs, and supply of building materials to War Department buildings and property at Chester and Scarborough. Royal Engineer Office, 12, Prince's-street, Cornbrook, Manchester.

DURHAM COUNTY LUNATIC ASYLUM, Feb. 24.—For the following works:—Contract No. 1. For the completion of the new west wing. Contract No. 2. For the erection of an engine and boiler-house. Contract No. 3. For the erection of an engineman's cottage. John Watson, Clerk to the Visitors, Durham.

GREAT FLOAT, NEAR BIRKENHEAD, Feb. 26.—For the construction of a brick gasholder tank (94 feet diameter by 21 feet deep), at the gasworks. Somerville Jones, Clerk to the Board, Public Offices, Egremont.

GREAT NORTHERN RAILWAY COMPANY, March 4.—For the construction of the line between Finsbury Park and Canonbury. W. R. Johnson, Engineers' Office, King's-cross Station, N.

GREAT SANKEY (Lancaster), Feb. 24.—For the erection of farm buildings and repairs to the farmhouse in the occupation of the representatives of the late Thomas Kelsall. Messrs. Nicholson and White, Warrington.

HULL, Feb. 24.—For the erection of a block of school-buildings for boys, girls, and infants, in Courtney-street, D. Jno. O'Donoghue, Clerk to the Board, Town Hall, Hull.

KINGSTON-UPON-HULL, March 12.—For the foundations, abutments, approaches, &c. of a swing bridge across the River Hull. J. Fox Sharp, Borough Engineer and Surveyor to the Local Board, Town Hall, Hull.

KNIGHTON, Feb. 28.—For the erection of a new inn and stables on the site of the "Red Lion." Mr. Griffiths, Red Lion Inn, Warrington.

LEEDS, Feb. 28.—For the erection of a shop, &c., in New Brigate. Stephen Ernest Smith, architect, 30, Park Square, Leeds.

LIVERPOOL SCHOOL BOARD, March 17.—For the erection of public elementary schools in Queen's-road, Chatsworth-street, and Roscommon-street. Mr. E. M. Hance, Municipal Building, Dale-street, Liverpool.

LONDON, Feb. 24.—For the erection and completion of a detached house in Tufnell Park-road, Holloway. Mr. Joseph Thomas Barlow, 26, Belle Vue Villas, Seven-Sisters-road, N.

LUDLOW, March 11.—For the erection of fever and vagrants wards at the Union Workhouse. Mr. Earnest James Davies, Clerk to the Guardians, Ludlow.

MERTHYR TYDFEL, Feb. 27.—For the erection of school-buildings and masters' house. J. Thomas, Clerk, 5, Courtland Terrace, Merthyr.

MIDDLESBOROUGH, March 3.—For the new Cart Ferry works on the North and South Side of the River Tees. J. T. Belk, Town Clerk, Middlesborough.

MILTON (near Settringbourne), Feb. 25.—For the erection of a new male casual ward at the Union Workhouse, Milton. W. J. Harris, clerk, Sittingbourne.

PORTSMOUTH, Feb. 28.—For the construction of a quay wall, about 345 feet long and 27 feet high, and other works. John Howard, Town Clerk, Portsmouth.

REIGATE, March 10.—For sewerage, forming, making, and metaling Allingham-road, Crescent-road, Holmesdale-road, Priory-road, Somers-road, North-road, and South-road, and parts of Park-road and Sanderson-lane. Clair J. Grece, Town Clerk, and Clerk to the Local Board.

S. AGNES (Scorrier), March 6.—For the erection of new schoolrooms to accommodate 260 children. G. Coulter Hancock, Clerk to the S. Agnes School Board, S. Agnes, Scorrier.

SALFORD, Feb. 26.—For the erection of new detached schools in connection with the Union Workhouse. Messrs. Medland and Henry Taylor, 2, St. Anne's Churchyard, Manchester.

Mr. Rhind found in the tomb of Seban, at Thebes, a place of sepulture which he had reason to believe had not been opened during 2,000 years, iron hasps and nails on the massive doors of the inner repositories, "as lustrous and as pliant as the day they left the forge."

The Church of SS. Philip and Jacob, Bristol, was reopened on Sexagesima Sunday after restoration. The flooring has been renewed throughout, and the building wholly reseated.

At the meeting of the Leeds School Board on Thursday week, it was decided to appoint an architect to the Board at a salary of £400 per annum.

The members of the Institute of Painters in Water Colours propose, in future, to ballot for candidates for admission to their Society not oftener than once a year. For the present year the 24th of March next is the day appointed. The current winter exhibition of the Institute will close on the 15th of March. The summer exhibition will be opened on the 28th of April.

On Monday evening the annual soirée and ball in connection with the Amalgamated and General Union Societies of House Carpenters and Joiners, took place in S. George's Hall, Liverpool, in aid of the fund for the erection of the proposed central workmen's hall in that town.

On Sunday the church of S. Bartholomew, Moorlane, was reopened, after restoration. The galleries have been removed, the chancel has been entirely redecorated, and the windows are all filled with stained glass representing S. Paul and S. Bartholomew.

The Mercers' Company have voted two hundred guineas towards the restoration of S. Alban's Abbey.

WAGES MOVEMENT.

DUNFERMLINE.—The operative joiners and cabinet-makers in Dunfermline have applied for a rise of wages to the extent of ¼d. per hour, and intimated to their employers that they will come out on strike, after giving a fortnight's warning, if not granted on the 1st of March. The non-society men have given their consent to this resolution. Two of the masters have given a favourable reception to the demand. Certain by-laws for the regulation of all disputes connected with the trade have been submitted for consideration to the masters.

EDINBURGH.—No steps have yet been taken by the Masters' Association towards meeting the demands of the men. The resolution arrived at on Wednesday week at a meeting convened by the Carpenters' and Joiners' Association were, it is alleged, brought forward by men the majority of whom came from Glasgow and the provinces, where they have been engaged for the last few months in agitating for an advance. The great majority of the ordinary hands are said to acknowledge that the masters cannot concede anything more than they have done, and it is believed will readily accept the ¼d. which has been offered. In March last there was a general rise of ¼d., and the masters seem to consider that the present demand for another 1d. is not justified by the prospects of the trade. Some of the employers, we are told, could part with a number of their men, and, except in the case of those who have large contracts on hand, something of this kind is spoken of as not unlikely to happen after Whitsun Day. The Leth joiners have given in an intimation similar to that of the Edinburgh men.

LEAMINGTON.—About a month ago, the local Trades Council, which represents the bricklayers, masons, carpenters, joiners, and labourers, served notices upon the master builders, relative to a new scale of wages, and fresh regulations as to working hours, which they desired to see introduced on the 1st March. The demand led to a meeting of the employers of labour in connection with the building trade, at which a resolution was adopted in favour of a union to resist these fresh demands on the part of the men. Subsequently the masters had a conference, and decided upon a new scale of wages, which was forwarded to the local Trades Council acting on behalf of the men. The terms of the masters are as follows:—Working hours during the summer months, from 6 to 5:30 up to Friday, with one hour and a half for meals; and from 6 till 1 on Saturdays, with half-an-hour for breakfast. For six weeks before and after Christmas, from 7:30 to 5:30 in shops, but on buildings from 7:30 to 5, with only half an hour for dinner. When the work is two miles and under, from the centre of the town, the men are to walk in their own time; beyond that distance, walking will be allowed at the rate of three miles an hour beyond the first mile and a half. In this case, however, the men are to walk back in their own time, excepting on Saturdays, when the wages are not paid at the place of working. Lodgings at the rate of 2s. per week are to be allowed when the distance is too great for the men to return home. The wages are subjoined:—Carpenters, bricklayers, and plasterers, 6½d. per hour; masons, 7d.; setters, 7½d.; painters, 6d.; labourers, 4½d. In cases of dispute only two hours' notice is required to terminate the engagement. Trade disputes are to be determined by six masters and six of the men. On Thursday week the local Trades Council held a special meeting, at which the terms of the masters were unanimously condemned, but it was deemed advisable to refer the subject to the whole body of the workmen, who will shortly hold a meeting and decide.

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 28, 1873.

HONOUR TO WHOM HONOUR IS DUE.

A QUESTION of vital interest to architecture and architects has recently cropped up through the *Ross v. Roper* controversy. Architects think there is no art like architecture; Architecture, is in fact, in their opinion, the queen of arts, and Painting and Sculpture and Decoration are her attendant handmaids. We are not going to dispute this sovereignty, but we must ask architects to treat their art with becoming loyalty. It is well known, in fact it is notorious, that many men who appear before the world as architects are only so in name. They buy their designs (as they would a coat at their tailor's,) and claim them as their own. Many of them have done it so long and so persistently that they act and talk as if they had a right to do so. Practice has so enfeebled their conceptions of justice, that to broach the subject of giving honour to whom honour is due is resented as an insult. They say that when a man has entered into an arrangement with another to do a certain amount of art work, if the man doing the work is paid for it he ought to be satisfied. They also say that they are justified in palming off other men's work as their own, if they have paid other men for doing it. We will give an instance out of many other similar cases which have reached us during the last few weeks. A short time since there was a limited competition for a large asylum. As it was an important work, one of the architects selected (knowing that several able men were competing with him, and no doubt conscious of his own inability to win) made a definite arrangement with a young London architect (not Mr. Roper) to make the ground plan, elevation, sections, and perspective. *He did not touch a line of it himself, and was not the author of it in any sense.* The design was sent in under motto, and obtained one of the prizes, and it was a prize worth having. To the outside world, and even to a majority of the members of the profession, the architect whose name was published is considered to be the designer of the work, and treated as such. Unfortunately, however, for him, a few know it is not, and very likely more in the course of time will now know it; for other secrets besides murder will ooze out. We don't blame this man so much for employing another to do what he could not perform himself, as we do for his want of magnanimity, and for being content to strut about in borrowed plumes, and receive undeserved compliments. We do not envy him his sublimity of soul, neither shall we envy his feeling when he gets to know, or even to suspect, that the true facts of the case are known to some, at all events. We only hope, in fact we fully expect, that he will not commit another such a blunder. What he ought to have done when he obtained the prize and the credit, was to have associated the name of the real designer with his own. He would then have done a noteworthy and noble thing, and others in all probability would have emulated his spirit, and imitated his example. But what he did not do, others we know of are prepared to do, and hence it will be found that the *Ross v. Roper* controversy, painful as it must have been to Mr. Ross, will bear prolific fruit. The system which we have emphatically condemned has received a staggering blow. It will never again be able to recover its original strength. Some architects will in future act more wisely, simply from a correct disposition, and others will act more wisely from the fear of exposure. We wish distinctly to inform certain archi-

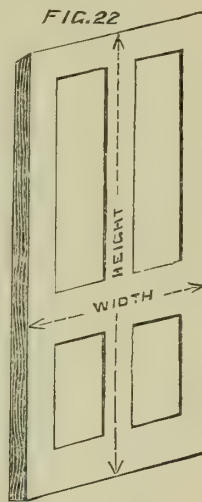
teets—and many are involved in the category—that the practice we are now exposing and condemning will in future be more and more exposed and condemned. We trust, therefore, they will act more generously and justly at once. They may rest assured that they will not be the losers, and they may feel equally confident that Architecture, which they profess to love, will be the gainer. Why should not Architecture have the power of summoning to its aid the most gifted, as well as literature or statesmanship, or the bar and bench? Take, for instance, one branch of literature—poetry. What would become of our poets if they merely sold their poems without the credit of authorship? Or if they composed their works and sold them to others to gain money and fame thereby? A penniless author may sell his poem for a mere song to a publisher. If the poem sells the publisher gets the proceeds, but the author gets the fame. Is architecture inferior to poetry? Not a jot. Then let it be treated with the same fairness. Give it a fair field and no favour, and it must, like other arts, win the world with its charms. What should we say of an author, or one whom the world takes to be an author, employing another man to write, say, a play, and to have the play performed at some popular theatre as his own, and to have his name proclaimed in all the newspapers as the author? Such a would-be author would evoke a universal hiss. Literature would guard her own interests by criticising, chaffing, and gibbeting the pretender. He would in fact receive such treatment as would deter him from attempting a repetition of the offence. Is architecture inferior to dramatic literature? Certainly not, in the estimation of most architects. Why is it, then, that a practice prevails in architectural circles that would be branded in literary circles? There must be some sufficient cause for it; but whatever may be the cause, the effect is alike disastrous to the honour of men and the interests of art. How can we expect architecture to occupy its rightful position in the world if architects, or even a goodly number of them, treat architecture as a mere marketable commodity—as if it were a lump of coal or a bunch of dog's-meat? If architects will not respect their art the world will not respect them; and the result will be that they, their art, and the world, will be the losers. Though what we have recently said may have rubbed against the grain of the sensibilities of certain men, we are glad to know that we are sustained by the good wishes of all the best architects of the kingdom. We only ask honour to whom honour is due, and ample recognition of essential service.

We would that the practice we complain of were confined to a limited number of architects. But, alas, it has penetrated into the domain of sculpture, and this is one reason why sculpture is at such a low ebb in England at the present time. We will relate an instance. There is a sculptor at present in the enjoyment of a lucrative professional practice, and even an envious reputation; in fact he is looked upon as one of the sculptors of this generation; but, astonishing to state, he never does any of the work with which his name is popularly associated. He is the friend of distinguished art-patrons, and he sits at Royal Academy banquets. He gets one man to make his models, and another to chisel them out of the marble. His studio is in close contiguity with his workshop, and when one of his rich art-patrons calls on him, he has some work which is in process of manufacture in the workshop, wheeled into his studio on a miniature tramway. When the art-patron is asked into the studio, Mr. So-and-so is apparently engaged on work, under the influence of an inspiration, when in reality he is only playing with the chisel and the marble in order to throw dust in the eyes of the art-patron. After a short interview the art-patron retires, and the work of art is trundled

back to the workshop for additional manipulation from the hands of the art-workman. This is no fiction, but a fact; and the same policy has been pursued by Mr. So-and-so for years past. Mr. So-and-so is looked upon by the world as an artist; we, however, and a few others who know to the contrary, regard him as a manufacturer. In the possible purification which may take place, let us hope that sculpture, as well as architecture, will reap advantage. At all events, this stirring of the waters will do some good, as we shall be enabled in the course of a short time to testify.

QUANTITIES.—VIII.

DOORS.—Measure the width by the height, stating the thickness of the framing and the number of the panels; also the mode of finishing, whether bead-butt, moulded, &c.; and if the panels are raised, or are completed differently to the ordinary, it must be so described, as it is necessary, as I before stated, that the description should be full and explicit. This will be the more apparent in the case of a Gothic entrance-door, for example, where the panels are filled in with V-jointed boarding. In all cases take the description from the specification, when working from one. Where the doors are double, and are hung folding, the width of each door must be taken to the extreme, including the rebate. If the doors are hung with rising butts, state so, as it will necessitate the head lining and the top rail of door being splayed, as shown in Fig. 22.



In measuring ledged doors, it will be necessary, in addition to the net thickness of the door, to state separately the number and sizes of the ledges, and to note whether the boarding is wrought, ploughed, tongued, and beaded, in which case they are designated as "Proper ledged doors," which renders any further description unnecessary. Should the boarding, however, be differently finished, it will be necessary to describe it as it is worked. Where the doors have circular heads, I think it best to pursue the course usually adopted, and to measure them as square, taking the full height and width, but specify them as "Doors with circular heads." Gothic heads, and heads with quadrant corners, are similarly measured, but each kept separate, and so described. A sketch is generally advisable in the two latter cases, as it greatly facilitates matters by the better exemplifying the true shape and character of what is intended. Sash doors are measured as above, and it is customary to measure with them the shutters, where these are provided, taking the length by the height, including the rebates, where any are provided, and describing the method of framing, whether bead-butt and square or otherwise. Where a rim is necessary for the support of shutter, measure it by the foot run on the outer edge, and describe it

as "Wrought, rebated, and moulded rim," or whatever it may be. After you have completed measuring the door, take the hinges, locks, bolts, and fastenings, giving the sizes and description in each case, so that one door may be completed before commencing a second; and the same with the lifting shutters, numbering the stubs and plates, shutter-lift, and thumb-screw fastening. Of course, in the case of entrance-doors, all the additional fastenings, as knocker, knob, door-chain, &c., would be taken off with the door.

Where a number of doors occur of the same size, it will not be necessary to repeat the dimension, but the number of times the item occurs should be placed to the left of the dimension, as stated in a previous number; but it is advisable not to confound the articles on one floor of a house with those on another, and consequently they should be kept separate, and yet be included in the one dimension. To explain this, supposing we have seven doors of a given dimension (say 3ft. by 7ft.) on the ground floor, and an equal number of the same size and description of door on each of the second and third floors, this could appear in the Dimension-book in either of the following ways (the total of the doors would be 21):—

21	3 0 7 0	A. 2in. deal four-panel square door.
317	3 0 7 0	Or B. 2in. deal four-panel square door.
7·7·7	3 0 7 0	Or C. 2in. deal four-panel square door.

Example A, I have already explained; in example B, the dash between the 3 and the 7 signifies that the latter figure occurs three times, and consequently denotes the multiplication of those numbers. In example C, the dots denote the addition of the numbers between which they are placed. Both the examples B and C frequently occur in taking off quantities, B being used where the same quantity is repeated, and C more usually where different numbers of the same article are to be added. In the example given, B would be employed; but supposing the number of these doors on the 1, 2, and 3-pair floors to be respectively 10, 5, and 6, we should employ the mode adopted in article C, that of B being of course inapplicable; and the example A not being advised except where the article is all on one floor, as previously stated.

In measuring the door frames, take the height of the door, and double it for the two sides, and include on each side the tenons into the head, and an additional two inches on each side for stubbing into the sill. Add to this the width of the door, and twice the thickness of the frame, and an additional six inches for the horns. The whole of these dimensions must be collected on "Waste," and the total brought forward and the scantling stated, with full description of the work. Wrought, rebated, and beaded frames are usually termed "proper door-cases." To give an illustration of the above method where the door is 3ft. 6in. by 7ft. 6in. and the scantling of frame 4in. by 4in.:

Height of door for one side . . .	7 6
ditto other side . . .	7 6
Add for two tenons . . .	8
ditto two stubs . . .	4
Width of door . . .	3 6
Two thicknesses of frame . . .	8
Extra width for horns . . .	6
	20 8
20 8	
4	
4	
	Fir proper door frame.

It will be seen from this that the measurement of door-frames is similar to the measurement of the timbers in the Carpenter's work, inasmuch as all tenons, &c., are added to the net dimensions. Many surveyors, for this reason, take it off and abstract and bill it with the Carpenter; but I think that as it is actual Joiners' work, being prepared at the bench, it is better to take it off with this trade, it being advisable always to affix the various items to the various trades by whom they are severally prepared. When the head is circular it must be kept separate, and described as "To circular head of door-frame." Where there is a transom, it is measured in with the door-frame (being, in fact, part of the frame), if it is similarly worked; if it is differently worked it must form a separate item, and is in this case better measured by the foot run. In either case, the tenons must be included in the measurement for the length.

Oak sills are measured and kept separate from the frames, and the description of the labour upon the same must be stated, whether wrought, weathered, framed, &c. In measuring them, take the length by the scantling, and bring all to the foot cube.

The following is the method of measuring jamb-linings (see Fig. 20 last week, p. 206). Twice the height of the door for the two sides, to which add the width of the door for the soffit, and add for the passings four times the thickness of the linings,—thus, supposing the jamb-linings to be 6in. wide and 1½in. thick (door 7ft. by 3ft.), collect on Waste

Height of door for one side . . .	7 0
Ditto other side . . .	7 0
Width for soffit . . .	3 0
Four times thickness (1½in.) for passings . . .	5
	17 5

17 5	8 9	1½in. deal double-rebated and double-beaded jamb-linings.
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To obtain the width of the jamb-linings add to the thickness of the partition the thickness of the door grounds on Waste—thus,

Partition . . .	4½
Two grounds . . .	1½
	6

It will be necessary to describe the nature of the work, whether single or double-rebated, beaded, &c., &c.; and where dove-tailed or other blockings are provided for hinges and lock, they must be numbered and described as "extra to." Where the linings are tongued to door-frames, they must be kept separate from the other linings, and described accordingly.

Framed door-grounds are measured as follows:—To the total of the jamb-linings add four times the width of the grounds for the passings, and state the thickness. Taking the example just given and presuming the grounds to be 4in. wide, we obtain

Jamb-linings . . .	17 5
Four times 4in. for passings . . .	1 4
	18 9

18 9	6 7	¾in. deal framed grounds.
------	-----	---------------------------

The labour must be described according to the nature of its execution.

Architrave mouldings are measured by the foot run, stating the girth and numbering all the mitres, and stating the girth of the mouldings, as shown in Fig. 21 (see last week).

DADOS.—Measure the dado by the foot superficial, taking the extreme length by the net height, and state the thickness. It will also require to be described, whether simply ploughed and tongued, wrought one side, or

whether framed in panels, &c., &c.; and if framed in panels, the nature of the framing. Also state the nature of the backings, and whether they are intended to be included in the one item. It is customary to measure base and surbase mouldings, where over 6in. girth, by the foot superficial—under that, by the foot run. State the nature of the moulding in each case, and girth it for the width, including the rebates. Number the mitres, housings, &c. The plain plinth would be measured by the foot superficial, taking the extreme dimensions for length and height, including tenons and housings, the mitres, housings, &c., being numbered as described to skirtings. Where the dado, &c., is circular, so describe the several items, and keep separate from the straight. Intersecting mitres should also be kept separate from the ordinary. Moulded plinths are measured the same as those described to the dado, taking the plain part firstly; the extreme length by the height, including housings, rebates, &c., the thickness and description being stated. Also state whether including backings; if not, the backing must be taken separately at per foot run, as described to skirtings. Girth the moulding for the width, taking the same length as to plinth—when over 6in. girth, measured by the foot superficial—under that, by the foot run. Number mitres, housings, &c., and if the work is circular, describe it as stated to dado.

Pilasters (Fig. 23) are measured by the foot superficial, collecting the round or girth of the pilaster for the width. Thus, if face be 10in. wide, and the returns 2in. each, the width would be taken at 14in. Take the height from floor to top of capping. Describe the nature of the work fully, and the thickness of the material, stating whether framed or otherwise.

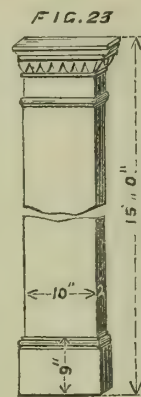
Take the mouldings to capping and necking and to plinth separately, by the foot run, numbering the mitres. The plinth would be measured in with the pilaster. It would therefore only be necessary to add for the

projection. The mouldings to panels of course would be included in the description, and not be separately measured.

Columns are measured by the foot superficial, taking the height by the girth, and stating the diameter. Give full description, stating whether glued up in narrow widths and closely blocked, or as the case may be; also whether the column is straight or diminishing. Measure the caps and bases separately, and state whether glued upright and blocked for turning, or whether glued parallel, or in thicknesses, &c. Measure the grooves as to necking by the foot lineal, also any fluting in like manner, numbering the stops. Any carving to caps would have to be taken separately, and the caps numbered according to size, stating the nature of the carving.

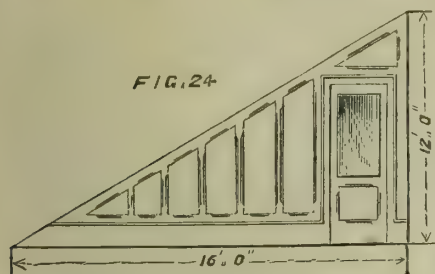
Note.—Some carvers take four times the diameter of the shaft of the column, measured under the necking, for the circumference of the cap. This method, in my opinion, is not satisfactory. It is better to give a sketch figuring the height and diameters.

Framed partitions are measured superficially, taking the length by the breadth, and stating the thickness. Give full description of the work, whether square, moulded one or both sides, &c., &c., and number all angle-irons for securing same, &c. The doors in same are measured in, and the dimensions of the door again taken separately, and described as "Extra labour to doors in do." Circular corners are measured by the foot run, and described as "Extra." Run the fillet round door, taking the dimension round outer edge, and describe it. Cupboard fronts are simi-



larly measured, the doors in same being also described as "Extra."

Spandrel framing (see Fig. 24) to stairs,



&c., is measured net, the length being taken by the full height, thus:—

$\frac{1}{2}$	16 · 0	96 · 0	1½ deal, wrought both sides, and stop-chamfered spandrel framing.
	12 · 0		

The thickness and description must be stated. Measure the doors in as described, to partitions, and afterwards charge the additional labour on the same as an "extra." Take all fastenings to doors at the time of measuring them.

SHOP FRONTS.—Measure the stall-board by the footlineal, stating scantlings and the nature of the labour on the same; also, transoms and any other timber, stating fully the method of finishing. The lining under stall-board, the show-board, and lining under, are measured superficially, stating the thickness and quality of the material and workmanship. Note any trimmings for basement lights, and make the deductions and additions where they occur. The shop-sash is also measured by the foot superficial, taking the extreme dimensions each way; state fully the nature of the work, and the thickness and quality of the stuff, how secured—whether guard-bead outside and shifting beads and brass screws and collars inside, or whatever way may be adopted. The measurement of doors would be the same as already described to other doors.

Take the fascia by the foot super., and also any linings to breastsummer, story-posts, &c.

The measurement of bracketing for cornice has already been described in the Carpenter.

It is also customary to measure with the Joiner any putty composition, including the fixing in wood framing, taking it at per foot run, stating width and nature of the mould, and whether straight or circular—all mitres being mitred.

Shop-shutters are measured by the foot superficial, taking the net dimensions of the whole surface for rebated shutters, and stating thickness and nature of the framing. Number all ironmongery as it occurs.

Patent iron or wood revolving shutters are also measured by the foot super. Take care, at the same time, to make a provision for attendance, in all trades, in assisting to fix the same, including cutting away stone or other work, and for additional movable casing, &c., as may be needful for access to gear.

[Next week I shall complete this trade.]

B. F.

THE SUPPLY OF TIMBER.

SOME time ago a notice was given in this journal of various Queensland woods, suitable for building and cabinet purposes. As the increased and increasing price of European timber will cause importers and consumers to consider where other supplies are to be found, a brief glance at a few of the woods in other colonies may be acceptable.

It will be remarked that, in noticing British Guiana timber, the prices (in the colony) are given in some instances. These prices must be only taken as some guide to what the cost per cargo would be, as the small quantities for colonial use brought to

the coast without the appliances for transit, sawing, &c., which capital embarked in an export trade would supply, are not to be taken as giving a correct idea of first cost. Still, the information is better than none, and it is all that can be had at present; and even the retail colonial price, under the above circumstances, is not without its value.

In New South Wales the following timber is to be found:—The Water Gum, a fine lofty tree, close-grained and elastic; average diameter, 30in. to 50in.; height, 100ft. to 150ft.; specific gravity, 1·001. Water in this and following instances being taken as 1·000. Breaking weight of a piece 5ft. long, 1¼in. square, 3967·2lb., with one foot interval between supports. Breaking weight in direction of fibre (dimension, 1in. square), 11020lbs.

"Mountain Ash," making good poles and shafts, and available for any purposes to which British or American ash is put. Diameter, 36in. to 60in.; height, 100ft. to 130ft.; specific gravity, 1·110.

"Black Butt" makes good timber for all sorts of house carpentry, and is excellent, durable wood, upwards of 30ft. in circumference in many instances. Diameter, 36in. to 72in.; average height, 100ft. to 200ft.; specific gravity, 0·891; breaking weight of piece, 5ft. by 1¼in., 4ft. between supports, 3,837·0lb.

"Woolley Butt," much prized for felloes, 36in. to 72in. in diameter, 100ft. to 150ft. in height. Breaking weight with transverse strain, 3,857·0lb. of a piece 15in. long by 1¼in. square, and 1ft. between supports; specific gravity, 1·005.

"Iron Bark," strong and durable, and equal to any imported into this market. Diameter, 24in. to 48in.; height, 80ft. to 100ft.; specific gravity, 1·016lb.; breaking weight of piece, 15in. by 1 7-8in., 1ft. between supports, 8,265·0lb.

"Mahogany Tree," a noble timber tree, well figured and durable, 30in. to 70in. in diameter, 60ft. to 130ft. in height; specific gravity, 0·952; breaking weight of a piece, 1ft. 2in. by 1¼in., 1ft. between supports, 7,559·7lb.; crushing strain in direction of fibre, 9,920·7lb.

British Guiana produces some fine timber trees, among which are to be found "Cabalalli," a heavy, close-grained wood, and can be had 12in. to 18in. square. Worms will not attack it, so that it is valuable for ship-building. Price in Guiana 1s. to 1s. 4d. per foot cube.

"Mora." This is the most majestic tree of the colony, rising to a height of 100ft. to 150ft., and is often found to have 60ft. without a branch. It is tough and close-grained, and makes very superior house and ship timber, and is superior to oak in its freedom from dry rot. This, as well as Greenheart, is one of the eight first class woods at Lloyd's for shipbuilding. It is plentiful on the upper Barima, and the river being navigable to vessels of twelve feet draught, the craft for its transport might load on the very spot where the trees were cut down. Price, 1s. to 1s. 6d. cube; breaking weight, with a transverse strain, of a piece 14in. long by 2in., a foot between supports, 9,697·1lbs.

"Snakewood," if it can be found in sufficient quantities, would be very popular here as a first-class furniture wood. It is white, and very hard, and is curiously variegated with black spots, and takes a splendid polish. But its price in the colony is 8d. per lb. Probably as a veneer wood it would be very useful.

"Houbaballi" is a light brownish wood, easily worked, and valuable for house and furniture purposes. It may be had 15in. to 20in. square, and 40ft. to 70ft. long. Unfortunately, it is often found hollow in the centre. Price, 1s. 6d. to 2s. cube.

"Bartaballi," a large-sized tree, very plentiful. It is white, and splits freely. It is good for staves, chairs, and the inside work

of houses. Breaking weight of a piece 14in. long by 1¼in. square, 1ft. between supports, 5289·6lbs.

"Purple Heart" is a handsome wood, and possesses great strength and durability, but it is scarce near the coast. Price, 1s. 6d. to 2s. cube.

"Greenheart" is known in this market, and the last quotation is £7. to £8. per ton, but the importation has about ceased. Bringing it over in small quantities makes it much more expensive than it otherwise would be. It is one of Lloyd's eight first-class ship-building wood. It is abundant within 100 miles of the coast, is 18in. to 24in. square, and may be had without a knot up to 60ft. or 70ft. It is a fine, even-grained, hard wood, and is very valuable for all purposes where great strength and durability are required. Specific gravity, 1·052; breaking weight, 11¼in. by 2in., 14528·0lbs., with 9¼in. between supports.

"Ducaliballi" resembles, and is probably identical with, Brazilian beef-wood. It averages 40ft. long by 20in. diameter, is a deep red, close-grained wood, and is more even and compact than mahogany. It takes a high polish. Price, 2s. 6d. to 3s.

"Wallaba," from Berbice river, is a deep, red, hard, and heavy wood, 30 to 40ft. long, 15 to 20in. square, and 1·035 specific gravity. It makes good staves, posts, and house frames. Price, 10d. to 1s. 6d. per foot.

"Crabwood" makes excellent furniture. It is light, takes a high polish, and is used for floors, partitions, and doors. Price, 1s. to 1s. 6d. cube.

"White Cedar" is a light aromatic wood, and makes excellent staves, and was used for making sugar-hogshead staves during the American war. Price, 1s. to 1s. 6d. cube. Specific gravity 0·771. Breaking weight of 14in. by 2in., one foot between supports, 7,163·0 lbs.

From Jamaica might be obtained "Ironwood," used for furniture and flooring; Cogwood, for mill-framing; Cedar for cabinet work and wainscoting; Broadleaf, for boards, shingles, and staves; Blue Mahoe, for furniture; Calabas, for carriage-building; and Timber Sweetwood, for boards, staves, and scantling.

British Columbia and Vancouver's Island contain forests of splendid timber, but little of it finds its way to the English market. A limited liability company was formed some time ago to import it to this country, but for some reason or other the affair was wound up. Private enterprise is more likely to succeed, and no doubt attention will in due time be turned to this colony, as a supply of first-class fir could be obtained, and finer masts cannot be found. The great want at present is cheap fir, for the United States are taking Canadian wood, and so enhancing the price, and the 1862 regulations of Russia have come too late to prevent her wood being too dear. When countries which depend very much on exporting their wood do not take the precaution of planting as they fell, the present high price of wood is only a matter of time. The careless manner in which splendid forests were destroyed in the United States is the cause of their competing with us at the present time in the Canadian markets, and with best bright pine deals at £22 to £24, a careful study of other sources of supply is an absolute necessity.

CLASSIC ORNAMENT AND THE ACANTHUS.

MR. GEORGE L. TAYLOR, in the Appendix to his autobiography, entitled "Classic Ornament at Rome," speaking of himself and his friend M. Cresy, says:—"In 1817 we went to Rome, with Desgodetz in hand, and he states that the *acanthus leaf* is the ornament in all the capitals, whereas we found none." He then gives a valuable collection of illustrations of the foliage ornament in that city, which are a republication of plates in the work entitled "The Anti-

quities of Rome," by those authors. Unfortunately, the description which accompanies these plates is not so full as we could have desired.

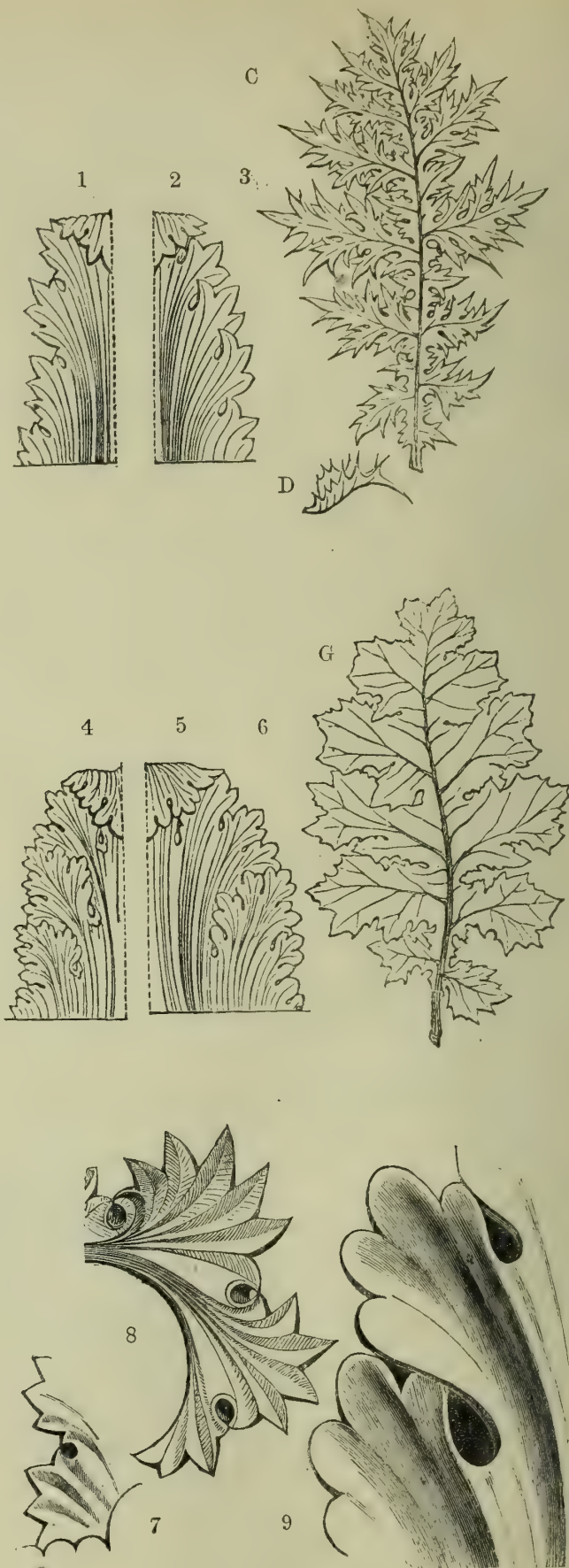
From the Forum of Augustus, there are given the three remaining columns of the Temple of Mars Ultor, with the foliage of their capitals (Plate 76), and then follow illustrations of that of the Temple of Dioscuri or Castor and Pollux and of the Pantheon. Of these examples Mr. Taylor says, "These are three of the most beautiful capitals left to us, and their respective styles and proportions can be compared by reference to the drawings, which speak for themselves. It will be seen whether Desgodetz was correct in saying that they were all composed of acanthus leaves."

Now we fear that many modern students, whose benefit Mr. Taylor says he has had in view in the composition of his work, are not competent to judge this for themselves, and a few words on the character of the acanthus plant and its foliage may not therefore prove out of place in our columns.

In the Glossary of Gwilt's "Encyclopædia," the notice given is as follows:—"Acanthus (Greek, *Ἀκανθός*, a spine) a spiny herbaceous plant found in various parts of the Levant. Its leaf is said by Vitruvius to have been the model on which the Grecian architects formed the leaves of the Corinthian capital." In the "Dictionary of Architecture" issued by the Architectural Publication Society, "Acanthus" is described as the name given to a leaf employed for ornament in Classic architecture, and it is remarked that "it is in general so conventional, that it would have been difficult to point out the source of this particular foliage, but for the tradition preserved by Vitruvius respecting its appropriation by Callimachus." Then the compiler of the article in that valuable work of research proceeds to give the following information with respect to the plant itself:—Dr. Sibthorp ("Flora Græca," &c.), although giving a plate of the *Acanthus mollis*, adds that the specimen was not gathered in Greece or Sicily, and in describing his example of the *Acanthus spinosus*, notes that it abounds in Northern Greece and the Archipelago. Certainly the artist must acknowledge that the general type of Greek ornament (see Fig. 1) has much affinity with the last-named plant (see Fig. 3) taken from Sibthorp, (Vol. VII., p. 10) while the *Acanthus mollis* (see Fig. 6) from a leaf gathered on the Palatine Hill, is evidently only reconcilable to Roman Art (see Figs. 4, from the arch of Septimius Severus; and 5, from the arch of the Goldsmiths, in Rome, which are taken from Messrs. Taylor and Cresy's work itself—"Antiquities of Rome," fol., Lond., 1822). The foliage from the Temple of Vesta (see Fig. 2) is a curious link furnished by the same authors, which stands on the line of separation observable between the two styles.

The Greek usage of the acanthus is admirable for its simplicity; but from the variations used in the schools of Roman and Italian art, not to mention Romanesque and Mediæval imitations, the acanthus foliage, besides losing resemblance to the natural types and the Greek pattern, is often described as resembling that of the olive, laurel, parsley, &c.

Since, then, there are two varieties of the plant, one common in Greece and the other in Italy, and Greek and Roman foliage correspond with them respectively, it would seem that Desgodetz might have been justified in his statement, while Mr. Taylor, having in his mind only that which appears distinctly to accord with the Greek derivation of the name—the spiny acanthus—may also be correct in calling attention to the practical fact that Roman ornament has but little resemblance to the traditional type which caught the eye of Callimachus, as it gracefully clothed with its leaves the (perhaps apocryphal) basket, and curled its edges under the tile supposed to have been placed upon the same, and which, whether the story be founded upon fiction or fact, is equally suggestive.



Mr. J. K. Colling, in his work on "Art Foliage," has an admirable chapter on the Acanthus, but to some of his conclusions we feel obliged to demur. He imagines, though he owns he cannot trace it, that the origin of this type came from the work of earlier Eastern nations, and considers the endeavour of such primitive people was always to copy nature closely, and not of set purpose to conventionalise it. The Greeks, however, he

says, worked upon the leaf earnestly, with their own peculiar and wonderful eye for the beautiful, and with an occasional reference to nature; and he thinks that they aimed more at the true spirit, and adopted certain principles in nature, rather than confined themselves to the servile imitation of any particular leaf or plant. He thinks their foliage resembles quite as nearly several other plants, and, giving an illustration of the *canthus*

mollis, points out that there is at least considerable dissimilarity from that example. But from what we have brought forward above, it was the *Acanthus spinosus*, so common in Greece, that was certainly the one imitated on buildings in that country, and its peculiar spiny character, with its sharply serrated outline, was not only distinctive of Greek work in ancient times, but indicated a derivation from Byzantium wherever it appears to have in any degree modified the sculptured foliage throughout Europe during the Middle Ages. As Mr. Colling is perfectly correct in saying that the acanthus foliage of the Classic has never been sufficiently studied, and, as seen in books, is very seldom correctly drawn, and has himself given several illustrations for the purpose of elucidating the point, we reproduce some of these in order to clear the ground for the remarks we have to make; and we are glad to be able to refer to the plates in Mr. Taylor's work as being among the few to which Mr. Colling's observations do not apply. Fig. 7 is taken from a stele at Athens, apparently of early workmanship. It is of much the same character as that upon the monument of Lysicrates (335 B.C.), but the lines more flowing and outline more spiky. Fig. 8 is part of the husk from which the scrolls on the roof of the monument spring. Then Mr. Colling says, if these examples, which present the type of the Greek acanthus foliage, be compared with the natural leaf of the *Acanthus mollis* (see Fig. 6, G), the likeness will not be found very striking. No; but if compared with that of the *Acanthus spinosus* (see Fig. 3, C), the verdict would be a different one. In the Greek examples the section of the leaves is also a point to be noticed. As it crops up again in the Byzantine, it, like the outline, is cut into sharp furrows and ridges, only not quite so prominently.

So much for the Greek acanthus. When we turn to Roman work, what do we find? Mr. Colling says, "The sharp foliage of the Greeks is never found in the Roman foliage," and so far he is undoubtedly correct, but when he proceeds to say, "What is called the acanthus leaf of the Romans is as different as possible from the acanthus of the Greeks, for in the Roman, all the lobes are rounded," we can hardly follow him. He gives as an illustration (Fig. 9), a portion of one of the leaves from the capital of Mars Ultor, at Rome, together with a portion from the capital of Jupiter Stator, at Rome, and these, he says, with the Greek, form two very distinct and separate types of what is called the Classic acanthus foliage. Now if the reader will turn back to Figs. 4 and 5, which are taken from Messrs. Taylor and Cresy's work, we do not find this excessively rounded edge, nor can we perceive it in any of the plates introduced into Mr. Taylor's recent volume. The outlines are pointed,—as pointed as in the natural leaf of the *Acanthus mollis*, and less sharply so than the Greek examples. Sundry worn specimens in museums may seem to resemble Mr. Colling's example and bear testimony to his theory, but not the genuine antique work. We do not, however, dispute the deductions that Mr. Colling draws, and which we think have led to the premises upon which he founded them, namely, that the Mediæval Gothic carvers seized upon and exaggerated, to the full extent shown by him, this comparative roundness of the outline of the Roman leaves.

Perhaps the distinctive difference between the Greek and Roman acanthus lies as much in the modelling of the surface, as in the outline. Of this, Mr. Colling says, "In the Roman the moulding of the surface of the leaf is extremely violent, the part in which the eye occurs, forming the main divisions of the leaf, being sometimes worked up almost like a pipe." This may be seen clearly by reference to Figs. 8 and 9, respectively, for while the sections across the individual leaflets in the Greek specimen are the reverse, and

divide each sharply into halves, the one in shadow and the other in light, there is an undisturbed breadth of surface as regards the whole group; whereas in the Roman specimen the individual leaflets have a soft section, and are barely distinguished from each other; the whole group is deeply concave, and the eye stem stands out in high relief so as to cast a broad shadow, which cuts up, as Mr. Colling says, "violently," the entire foliage.

In conclusion, turning to Mr. Taylor's plates of this class of ornament, which are all conveniently given one quarter the real size, we have first what he describes as being the boldest of all—the foliage of the capital of the Temple of Mars Ultor, where the leaflets are decidedly pointed by the meeting of two convex curves, without any double curvature, which is usual in most natural leaves at the extreme points. The central stem of the whole leaf, is, as it were, covered by a ribband which is conventional and unpleasing.

Next we have the capital of the Temple of Jupiter Stator at Rome, where each division of leaflets has a twist upwards, and the leaflets themselves are long and pointed, but with a convex curve on the lower side only, and a double curve on the upper, giving them a corresponding twist to that of the divisions, and a luxurious appearance very different from the Greek decision of lines and curves throughout. Mr. Taylor says they are the most elegant. Then we have the well-known Pantheon example, which seems to us a very typical Roman one; and of this Mr. Taylor remarks, "It is clear there is no acanthus in these," and truly if there be, it is not of the *spinosus* variety, and conventionalised out of all close affinity to either. That of Jupiter Tonans follows, and then that from the arch of Septimius Severus (Fig. 4) which, as Mr. Taylor remarks, is more like acanthus than any. In the capital of the Temple of Vesta the Greek manner of workmanship is observable, and in that of the Temple of Vesta at Tivoli we have an entirely distinct variety, which we doubt not some other natural one suggested.

Considering the remarkable effect that this Classic ornamentation has had over that of all subsequent ages, too great attention cannot be given to grasp its general character and master its specific detail, not only by those who would follow it closely in their own work, but by those who prefer the later developments of the type in the vigorous and able hands of the Romanesque, Byzantine, and Gothic carvers, or who would modify any or all of them for themselves. J. P. S.

HOW TO BUILD A NEW CATHEDRAL LIKE AN OLD ONE.

IT would perhaps be vain to speculate as to how far the precedents of the Lille, and Cork, and Edinburgh Cathedrals are to be considered indicative of a determination, in these scientific days, to go on building cathedrals as those most unscientific people of the dark ages did so persistently and so well. The times and men and ideas of the two eras are so different that it seems almost impossible to realise an adequate motive for a modern cathedral. What is it for particularly; and what can you do in it more than in a common good-sized parish church? Why, is not S. Paul's a problem impossible of solution—a magnificent idea thrown away and well-nigh lost? And Westminster Abbey a vast nest of unused and unusable nooks and corners and "tombs?" The very atmosphere of the world has changed since the old temple-building time of it. But without dwelling on this, for which the time has hardly yet come, may we not feel a little wonder at the modern means, views, and notions of a cathedral; and what it ought to be, and how big, and as to where the parish church ends and the cathedral begins? Take Westminster Abbey and S. Margaret's Church—they are close together—no one can mistake the one for the other; the one is a

church, the other a cathedral; but when we compare these ingenious designs with Westminster, or York, or S. Paul's, they positively dwindle in dimensions into mere toys. In plan and idea they are cathedrals; in size and use, they are mere large parish churches, and no more. Is it the times we live in, a want of wealth, or the not knowing exactly what to do; or what is it that puts—in spite of everything—a veto on cathedral-building? Why, we have a thousand times the means for the bringing into existence a cathedral of the very largest type more than they of the Middle Ages. More money, more material, more "plant," more experience, more of everything but what is first needed—a real use for the building when it is done. Let the thoughtful reader ponder on this for a while, for the subject is well worth it: it will guide to more than one useful and interesting result.

We are led to these thoughts on cathedral-building and designing from the fact of not a little personal experience in the way of cathedrals. We have designed cathedrals, and, to say the truth, for months together, almost lived in cathedrals. We were one of the competitors for the Lille Cathedral, and as that famous competition ended so disastrously for both those who were successful and those who were not, it may be useful, by way of guidance, to describe shortly our own way of work—so very different from this Edinburgh experience. We utterly failed, to begin with. We made all the drawings personally. We had in our mind's eye the biggest possible dimensions—truly cathedral in scale and magnitude and proportion. The "sanctuary" was taller, by the whole head and shoulders, than Westminster or York. We are afraid to say how many feet long it was from the altar end of the Lady chapel to the west doorway. We never for a moment thought of cost. The Lady chapel, without cathedral, would have almost absorbed the funds. In short, everything was wrong, as we now too plainly see, except one; and that was certainly right, and here is the lesson. It was this—that no one of our own great cathedrals, and none on the Continent, were ever begun and finished, except S. Paul's, in the lifetime of the man who saw the foundations laid. It always took generations to build a cathedral church. Cologne is even now in course of building; about half only of the west towers, without the spires, are done; and York was never finished, nor Westminster; nor, if we come to decoration, not one anywhere. But the more solid, substantial, plain, useful building took centuries, and not years, to complete. This was our unfortunate idea; and so we proposed to build a cathedral, even the one at Lille, but to aim, at first, only at the East End, and to construct a temporary nave and short transepts of timber. This perhaps really might have been accomplished, and a good and fair foundation laid for a cathedral in the large and true sense of the word. But we need hardly say how far this was from the temper of the age. It simply amounted to an impossibility. Such a notion of a cathedral cannot be realised, but the parish-church-cathedral, as at Edinburgh, can, and doubtless will be; but then it is not, and cannot be, a cathedral. Of the use to be made of it we say nothing, for it is a right-down hard puzzle, as Mr. Street eventually thought. Chapels would seem almost a necessity to the very idea of a cathedral; but where are they in Sir G. Scott's plan, and what is the solitary one for in Mr. Street's? We should like to know—will he tell us?

Again—and it may be useful to assistant-architects of Mr. Roper's type—we had another idea, a right-down good old idea too. We commend it to Mr. Burges. It was this: that an architect of the works (not a mere travelling architect) is not a sculptor, and that the work of filling the niches in a church wall is the proper business of a sculptor, after the architect has done his work. It was Setinus that built the "architectural" Par-

thenon; it was the sculptor Phidias who filled the square hollows of the blank wall with the "metopes." It was one man who built the Sistine, but Michael Angelo painted the ceiling of it. It is only now and then in the world's history that a man appears capable of the twofold work of building and stone-cutting. We therefore got "assistance" for the sculptured decoration, keeping ourselves well to the *per se* architecture. Both failed, it is true; but it was, as we take it, the true way of work, and the old-fashioned way—certainly not according to modernism. It is a lesson for the future out of the past. Surely there cannot be a greater mistake than to call small things by very big names, and to lead the world to suppose that a mighty cathedral, as at York, is going to spring into existence at Edinburgh, while all the while it is but a good-sized parish church. Let this idea comfort, if anything can, the *losers* in this last competition. It is a good lesson for all, for it shows in all sorts of ways how completely out of joint things architectural are. A small thing with a fine name, and with—for the sake of keeping to "precedent"—all sorts of inconveniences in the way of "reading" and sermon-reading—We might go on, and some might feel a little interested; but one thing more cannot be missed. Poor St. Paul's has had its "screen" taken down and converted into church porches, because it stood in the way of the "view." In Westminster, the organ is gone for the sake of *seeing* from one end of the cathedral to the other; but in more than one of these Edinburgh Cathedral designs, the old Middle-Age screen is actually again proposed to be built up! C. B. A.

ART AND ART EDUCATION.*

MR. G. HUSKISSON GUILLAUME'S papers in two recent numbers of the BUILDING NEWS have probably been read with interest by many who, however, like the present writer, may have been unable to agree in any way with his principles. I would state, as briefly as possible, in what I differ from him, and what ideas I have myself formed on the subject, after reading his papers. First, it were well if we understood clearly what we do and do not mean by this word Art; for, although just now it is in every one's mouth, there probably never was a time when it was more misunderstood and abused. In truth, that art which it is so much the fashion to pet and fondle in academies and high places, and which serves as a relief to the ennui of so many well-fed and respectable persons of both sexes, besides conferring more substantial advantages on those who use it as a bait to catch practices, forms but a small and unimportant part of the subject. It is with a much wider question than this that I would deal. I can in no way bring myself to look upon art as a means for relieving the ennui of any person, however respectable; it will be time enough to hold that view when the Game Laws are at an end and political matters have failed to be available for the purpose. Then we may perhaps be compelled to give more attention to lectures and conversazioni, and learn to look upon the interests of mankind as intimately connected with afternoon visits to the Academy or picture-galleries. Neither am I content to regard it as a gentlemanly pursuit whereby a man may accumulate praise and pudding. It is true it may, and at the present time does, actually serve both these purposes, and is in no worse case than religion by so doing; but it neither had its origin for their fulfilment, nor will it owe its future prosperity thereto.

I have been in the habit of looking on Art as a something intimately connected with the higher nature of man, and neither more nor less than the sister of his religion, and regarding the love of it, not as created and in-

dulged by him for an external purpose, but as springing from within him, without leave of his asked or given. Indeed, on minutely examining the matter, I can scarcely tell where Religion ends and Art begins, each of them being but a mode the mysterious nature of man takes of uttering itself and bodying itself forth to the perception of the senses. Poetry, music, painting, sculpture, architectural art, are all but different phases of the same emotion—the first of them, at once the most powerful and immaterial, and therefore the highest; but the rest serving in the same lofty cause, and intimately connected with each other. My present business, is of course, with what are commonly denominated the fine arts, but what I have to say will, I suspect, hold good in a more or less modified form of all. I propose to examine Mr. Guillaume's papers, and make notes of assent or dissent as I proceed. The first thing I find to object to is the supposition that it is the business of Art to be original: one would have thought that it was enough to be true, and that originality might be left to take care of itself. This hankering after originality is one of the great vices of the modern architectural public, and we have opportunity around to judge of the result. Doubtless it is in a somewhat higher sense than this common one that Mr. Guillaume uses the word; and I am well aware that genuine originality is worthy of all honour, but am satisfied that it is a quality which can no more be attained by struggling after it than intellectual power or force of character can be so attained: nay, that such diseased struggling can only end in confusion and disaster. Originality may be of either of two kinds—that of the idea to be expressed, and that of the form or manner of expressing it. Of the causes which control the former I have not much to say; the subject is too vast to be discussed here or by me. Of the latter I may remark that it is controlled and governed both by the idea to be expressed and by the material means at hand and convenient for that purpose. Thus, had our view of nature and of life undergone no changes since the times of the great masters of the past, we might, nevertheless, expect that our mode of expressing that view would have altered, inasmuch as we have different means to employ. On the other side, there would be no necessity for such a change, except where these means require it. With regard to the general study of the ancients (which is not in need of our commendation), my ideas are these—Nature truly is ever the same, but we and our knowledge of her are continually changing, so that to no one generation will she appear in all respects the same as to the preceding, although only by comparing distant periods can we see the nature of the change, or that there has been a change at all. Now, one of the numerous ways of seeing man's views of Nature in the past is to follow up the study of those who had read her well in their day. From them, we may learn both how Nature manifested herself, and how they regarded and realised her manifestations. And we must bear in mind that those whom we call the great masters are not chosen at random, or selected from one generation or age, but from the whole past, and represent the sum total of that portion of its intellect which took this art method of expressing itself. Of any one of ourselves, on the contrary, we may speak as chosen at haphazard from the present, and of only average intellect. Now precisely according to a man's power of intellect will be his depth of insight into Nature, and gift of adequately speaking what he sees there. What wonder that we love and study the gifted? They have shown us what, unaided, we could never have discovered; they have lent us their rays of light. Are we to refuse the offer and choose to grope about by the light of our own tallow candles, even at the risk of seeing nothing? But suppose that any given person be really equal to one of these masters, both in power

and opportunity; in this case he will see just as far as his predecessor, and not a hair's breadth further. If, on the other hand, we look upon the past as so much realised to us, and giving us a true and ready insight into fact up to a certain point, there is clearly much hope of further progress. So far the work is actually done, and our business is to take it up at the point which it has reached, and carry it as much further as we can. If it be objected that we have been here pleading for a genuine study of the spirit of the past, when what was attacked was the mere copying of its outward form, I have only to say that the mind which is content with this copyism, and which is unable to read in the book of Nature as interpreted by the hand of a master therein, would only fare worse if left to its own resources. Its duties are plainly enough of a mechanical kind; it may do honest work as what has been called a hodman, but in any sphere above that will utterly fail.

How many of those professors of whom Mr. Guillaume speaks so disrespectfully would come under this head, I am unable to say; nor is it a question I have the courage to face. With many of Mr. Guillaume's remarks on education I agree, and with the practical conclusions he comes to I heartily sympathise, but cannot assent to his general principles.

"Unnatural cramming" there is, and to spare. One meets with those suffering from it at every step, and under every possible form, from the bearded M.A. and victim of competitive examinations down to the young lady who has acquired fluent French at a boarding school, and is well up in "Mangnall's Questions." Our intense sympathy on this matter almost inclines us to overlook the old error of regarding man's mind as a collection of separate faculties, instead of an inseparable whole which will develop itself according to circumstances.

We come now to the beginning of the second paper (Jan. 3rd, p. 7); and remark that if (as is evidently the case) the statement of the order in which knowledge is acquired is intended to meet the case of the individual, it is proved untrue by observation. It was the sole method of procedure for the universal mind so long as thought proceeded on the inductive principle only; but directly man became an unconscious deductive philosopher another became possible. Facts known to the mind from observation became represented (whether consciously or unconsciously matters not) by signs and symbols, and from these again others were taught those facts, and knowledge of other facts was at length deduced. No doubt this is the method every child uses at first. What is stated a little further on would be startling enough if we had not often heard it before from those who should have known better—viz., that the arts flourish most amongst rude and untaught nations, or at any rate, in unscientific times. Macaulay takes this for granted of poetic art in his essay on Milton; and we have heard certain lecturing skin-deeps maintain the same thing. We can only wonder if those who profess such opinions have any real knowledge of what art really is. The idea is akin to that of those who look down with pitying contempt, or condescending patronage, on the early religion of man, regarding it as a thing which might be well enough for children, but was no longer needed by grown persons. It seems, too, a little inconsistent with the exhortations to study Nature for ourselves; for if it is true that art could only flourish in perfection under circumstances differing from the present and to which we cannot return, the only way to preserve that art would be to study and repeat the works of those periods in which it came to perfection. Such a view is, however, much as if we should hold the value of "Hamlet" as a work of art to depend on the appearance of the Ghost of the King, or the spirit of the early Jewish faith upon the fact that the scientific ignorance of the author of the book of Joshua allowed him to speak of

* [It is right to say that this contribution came to hand five or six weeks since.—ED.]

the sun as standing still. Did we not think art was of a much deeper and more perennial nature than this, we should trouble ourselves but little about it. Scientific and other inquiry may, and will for a time, divert many from its pursuit; but not the less is itself undying and eternal, for it is implanted in the deepest soul of man, and Time shall only weave a new and richer garment to clothe it. "The perfection of art," &c., "is possible only twice: first, when men intuitively look up to nature as their one guide; and, secondly, when they are guided by reason." Did Phidias then look up to Nature as his *one* guide? Did Shakespeare? Is a centaur *merely* a natural creation? Is an Ariel? That they are natural in the best sense is undeniable: that they are not also far more, few will maintain. The great poet, the great artist, have something within wherewith to mould, and, as it were, recreate what they receive from without; and that their creations be true to Nature is an essential requirement, but by no means the only one—indeed it is to be regarded as a thing of course, upon which a higher superstructure is to be built. We may, if we like, expand the term Nature to include all this, but it does not do so in its common sense. When Mr. Guillaume speaks of reason, we take it he means the understanding, or logical "faculties," and not reason in the sense in which the Transcendentalists use the term. With them, as we know, that word is employed to denote a power far higher than the logical, and from which, indeed, *all* Art and all Religion (if real and not a mere show) must have its rise. But how the perfection of art is to be attained by reason, in the ordinary loose sense of the word, we cannot at all see. This amounts to no less than a confusion of Art with Science, whose business is solely with the logical powers. That the art of a given period must be true to what science is known at the time we are aware; but this is only a *sine qua non*, and thing of course; just as we said above of its truth to external Nature: in fact, is included in the latter condition.

Again, we read that there are comparatively few in the architectural profession whom Nature has specially fitted for it. Heavens! what a pity Nature does not set up an office, gum-bottle, and packet of labels, so that such mistakes might not be made for the future! We should then be able to know our poets and cobblers at sight, and be saved much trouble. We do not, however, wish to be rude to Mr. Guillaume, although he treats the professors so disrespectfully, and will be content with saying in his own words, that we had supposed the "faculties" of man to be fundamental, and to have nothing in common with architecture or shoemakerdom. Much that follows may be passed over, for to answer it were only a repetition of what we have already said. One remark must be permitted us, on the manner in which the spirit and the form of art are confounded by many. The latter we may, to a considerable extent, cultivate and control—at any rate it is governed for the most part by material and visible causes; but the former depends on more subtle influences, and if we try to find them out we lose ourselves in the vast ocean of thought. Only here and there can we get a brief insight into their workings. Of what use is it to repeat the form of great examples of former times, if we have lost the spirit which produced them? Much, if we will recognise that they are *only* repetitions, and that we have lost that spirit. For it is by contemplation and love of the noble that we get to see our own shortcomings, and ultimately become ourselves nobler and better. The following passage, translated from Schiller by Carlyle, seems calculated to throw some light upon the matter:—"The artist, it is true, is the son of his age; but pity for him if he is its pupil, or even its favourite. . . . The matter of his works he will take from the present, but their form he will derive from

a nobler time; nay, from beyond all time, from the absolute unchanging unity of his own nature. . . . His matter caprice can dishonour, as she has ennobled it; but the chaste form is withdrawn from her mutations. The Roman of the first century had long bent the knee before his Cæsars, when the statues of Rome were still standing erect; the temples continued holy to the eye, when their gods had long been a laughing-stock; and the abominations of a Nero and a Commodus were silently rebuked by the style of the edifice which lent them its concealment. Man has lost his dignity, but Art has saved it, and preserved it for him in expressive marbles. Truth still lives in fiction, and from the copy the original will be restored." That the study of ancient examples will be of much use to the mere constructor we do not affirm, or that the student of the merely mechanical principles of harmony will get much help from Mozart or Haydn, construction and harmony, as sciences, having been brought to a further stage in more recent times. But to the artist and musician such study will be of the greatest use, if it lead him to imbibe somewhat of those masters' spirit, and not merely copy their form. With what materials former artists produced their results is quite a secondary consideration; our business in that respect is to understand the best way to use our own. To do this, we must of course be well acquainted with their nature, and the scientific laws which govern their application; matters in which the ignorance of many of our architects is pretty evident. The result is what we should expect from a man with strong feelings and power of thought, but who had never learned to speak grammatically. There is much talk about Art and Religion just now, and consequently much cant uttered. With many these are nothing but a respectable means of trifling away time, and are followed because the fashion tends that way. Yet there must be a groundwork of earnestness at the root of the matter, and although talk is in itself the sign of a disease, and would not be required in a perfect state; yet it would not be wise, even supposing it to be possible, to repress this sign, for Nature cures diseases by manifesting them. With regard to the way in which Art will be affected by that spread of so-called art-education which is undoubtedly taking place, much might be said. Considered as affecting the higher welfare of Art, we do not think it is of much importance. Superficial refinement will be largely increased—to the loss, perhaps, of manly character, and we shall have the ornaments on our teacups better drawn. These results are not to be neglected, but they are distinctly among the minor functions of Art. Much more might be done by putting great work within the reach of all: inspiration as expressed in words and sound is now within the reach of most, but inspiration as expressed in beautiful form and colour is still confined to the few; in the poorest cottages one finds a Bible, which suffers nothing from cheap covers, but of the middle and lower classes (save the inhabitants of the metropolis and a few of the larger towns), how many see, or have the chance of seeing, great works of plastic art? For the rest, the hope of the future, in art, as in all other respects, will largely depend on the men of genius who shall be sent. These we may obstruct or forward, but we cannot do without them or create them.

We are conscious of having regarded this art question rather as the ideal one it becomes in the hands of such men and when viewed under its higher aspects, than as the exceedingly practical one which it is for most of us.

In a future paper we propose to speak of architecture as a science and as connected with utility, and to make some observations on the opportunities afforded for its study as such.

W. S.

AUTHORSHIP OF DESIGNS.

MASTER artists of all ages have usually gathered round themselves a school or staff of pupils and assistants, who, drawing their inspirations from their employers, have materially aided them in the preparation of the works they have produced. Occasionally some one or two of these assistants, more favoured than the rest, have been able so far to seize upon and appropriate the particular manner of their patron, as to produce themselves works which have passed for his own.

The inequality of merit in many of the numerous paintings attributed to the great masters of the seventeenth and eighteenth centuries is most likely due to this circumstance; and whilst there are not a few which, although bearing all the characteristics of a particular artist, are supposed to be of doubtful authenticity, so, on the other hand, is it possible that there are many others accepted as genuine, on which the reputed artist has bestowed little more than his signature.

If this be true in regard to both painting and sculpture, so does it hold good in regard to architecture. It is not possible, in this or any other age, for an architect in large practice, either to execute himself a fifth part of the drawings that pass out of his office, or to do more, often, than to pass most of them in hasty review. But there is generally to be found in every such office some pupil or assistant who has so far profited by the opportunities that have been afforded him, and whose ability to apprehend and to realise the intention of his employer is such, that a very slight sketch, on the part of the latter, is so far sufficient to ensure the faithful realisation of the intended design, as to render its subsequent correction and modification a matter of small trouble to the principal.

But, although the working out of such a drawing or drawings may be said to be the act of the assistant, who will refuse to his employer the moral and equitable, as well as legal right to attach his name to them, and to call them his own? And who would not consider the initials even of the draughtsman, attached to such drawings, an impertinence?

The case, however, is widely different where, for example, an architect practising in a distant town, who has formed no such school, is in possession of no such staff of pupils and assistants, and whose ability and competency has not been evidenced by any designs that he has hitherto executed, sends for a metropolitan draughtsman, whom he has never seen before, who has been brought up at the feet of another Gamaliel, and who has, therefore, derived his inspiration from another source—and places the preparation of a complete set of competition designs unreservedly in his hands; nor ought such an architect to feel surprised, in the event of a successful result, if his authorship of the design be questioned, or that, through some indiscretion on the part of his hired assistant, or of the gratified friends of the latter, the truth should become known.

That what has happened in the case of one of the designs for Edinburgh Cathedral may have a beneficial effect in checking the tendency to employ hired assistance of this character in the preparation of competition designs, is much to be desired: but that such an accident should in any way disturb or affect the well-understood relations which have subsisted throughout all ages between masters and pupils, or between employers and permanent assistants, would be much to be regretted.

EDMUND SHARPE.

The Church of S. Nicholas, Warwick, was reopened on Thursday week, after restoration. The floor has been relaid, open seats substituted for pews, an ugly south gallery abolished, and a warming apparatus completed.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CHURCH, CLERGY-HOUSE, AND SCHOOLS OF
S. COLUMBA, KINGSLAND-ROAD.

We gave a double-page illustration of this church on January 19, last year, and we now give a double page of the exterior of Church, Clergy-house and Schools. For particulars see the number referred to. Our readers will remember that Mr. G. F. Roper, in his letter, page 171, in our impression for the 7th inst., said that he and Mr. Ross went and saw "various London churches." If we are correctly informed, the churches then visited were those erected from the designs and under the supervision of Mr. Brooks.

DESIGNS FOR FURNITURE AND DECORATIONS.

The designs illustrated consist of portions of the sides of two rooms, the upper one with decorations and furniture suitable for a drawing-room, the lower one designed for a dining-room.

The walls of the drawing-room are lined with a dado of oak panelling, the small panels being filled with hand-painted tiles; the cornice is of wood (moulded and carved), displaying the enriched construction of the ceiling, below which is painted a floriated border and a deep frieze, with a procession and explanatory legend; the remainder of the wall-space is powdered with ornament, serving to form a background for the framed pictures, furniture, &c.

Small mirrors are indicated below the pictures, and a frame for miniatures or medals. Against the wall some furniture is shown, consisting of a dwarf cabinet, and a cabinet for the display of small objects of interest, books, &c., and a what-not.

The dining-room is surrounded by wainscoting, having moulded and carved panels, and with a series of panels enriched with heraldry, flowers, and fruit, in proper colours. The painted decorations are hunting subjects, with borders carrying out the same idea. The lower part of the mantelpiece is constructed of marble, tiles, and firebrick, the five panels being filled with emblematic figures of the five senses. The upper part of the work, executed in oak to the ceiling, is adorned with heraldry.

The designs from which these two sides of a room are photo-lithographed were exhibited, in the Class of "Design," in the last International Exhibition, by Messrs. Cox & Sons, Southampton-street, Strand; artists, S. J. Nicholl and C. Rossiter. The portion of frieze shown represents the signs of the Zodiac, designed by J. Moyr Smith. Similar subjects, separated from each other by ornamental work, would be carried round the room. These signs of the Zodiac are now being painted on tiles for a flower-stand Messrs. Cox and Sons propose exhibiting in the forthcoming Exhibition.

"BUILDING NEWS" SCHOOL-PLANNING
COMPETITION.

We give this week the plan which obtained the third prize, the motto being "R. R. R." on a shield, and the author Mr. John Gibson, of 25, Offord-road, London. The plan which gained the second prize ought by right to have been given this week, but "R. R. R." on a shield was photo-lithographed first, so we give it first. "Nunquam Expes" will appear next. The following is the statement which followed Mr. Gibson's plan:—

The author of the accompanying design has endeavoured to make the drawings and statistical information contained on the sheet so far explanatory as to dispense with the necessity of a long report; the smallness of the scale, however, precluding the possibility of clearly delineating some portions of its construction, he proceeds to do so in these particulars:—

Arrangement.—The girls' and infants' schools have been arranged on the ground floor, and the boys' school over the girls; the several entrances, lavatories, and out-offices are separately and distinctly provided. Though not asked for in the conditions, a private room with w.c. has been provided for the principal teacher of the respective departments. The caretaker's residence has been arranged on the principal angle of the site, as being central, and commanding the best oversight of the whole block. A good playground has been provided; if compatible with the regulations for teaching and discipline, by the adoption of a time-table arrangement, this playground

might be used by all the departments of the school. The insertion of a doorway between the angles of girls' and infants' class-rooms, and another in wall of area leading to boys' out-offices, would effect this. Considering that in many towns no larger sites than the one designed upon in the present instance are obtainable, perhaps a deviation from the regular rules might, if thought desirable, be allowed.

Lighting.—The lighting has received due consideration, and the windows are so placed that none of the rooms or entrances will be found lacking in this particular.

Ventilation.—Ventilation to be effected by means of valves in floors communicating with the external air; by a portion of each window being fitted with a casement-hopper ventilator; by ventilators in ceilings and valves in walls communicating with flues formed in chimney-breasts.

Warming.—Each school-room is provided with two fireplaces, and each class-room with one; these to be constructed that the heat, as far as possible, may be economised, and where not admitted into rooms, to be drawn off into entrances, &c. A system of hot water could be arranged, constructing a chamber under the tower for the reception of the boiler, &c. Open fireplaces, as being less liable to get out of order, less productive of serious consequences if neglected, and being more generally recommended, have been adopted. Ash-bins to be sunk in play-ground, and communicating by shoots to the respective departments.

Cost.—The estimate on the sheet will be found correct, presenting a total of £5,915. 19s., and an average cost per head of £8. 9s., inclusive of drainage, &c., and school-fittings. The author does not think this amount would be exceeded, as he could mention several similar blocks of schools that are erecting at the present time at an average cost per head of from £8. 10s. to £10. 6s. 9d. per head.

Materials.—The building to be erected of bricks; grey or red stocks to be used for all facings; moulded and diaper bricks to be employed for jambs, arches, spandrels, wall-spaces, &c. The roofs to be covered with plain red tiles. Stone to be used for sills, copings, &c. All the timbers of best Baltic red fir, and of such scantlings as required by the School Board authorities. The arching of girls' schoolroom to be formed of concrete arches on wrought-iron girders. All the school and class-rooms to have dados 4ft. 6in. high formed of stock bricks walled in black mortar with fine joint. All the walls above this to be plastered. The walls in entrances, lavatories, &c., to be walled to receive colour wash. The water-closets, urinals, and wash-basins to be of Macfarlane's or Jennings's manufacture. The drainage to be constructed with glazed and socketed pipes, to be securely trapped at all surface grates, and ventilated by certain of the fallpipes, and by ventilation-pipes, where considered necessary. Each trap of w.c. to be fitted with ventilation-pipe carried up to roof.

LIGHT RAILWAYS AND TRAMROADS.*

THE probability is that all the railways have been constructed likely to be promoted in this country by outside speculators; still, a system of light railways and tramroads, opening up the more thinly-populated districts, is wanted and generally felt. How are these districts to be thus opened up? and how is a reasonable return to be obtained on the money expended? These questions Mr. Arthur C. Pain tries to answer. He points out that landowners must first get rid of the idea that the promoters of railways have unlimited cash in hand to meet exorbitant claims for the purchase of land, compensation for severance, and the construction of expensive and unnecessary accommodation works. Until landowners thus become awake to their own best interests nothing can be done. Their co-operation obtained, a single line of light railway, or a tramroad, might be laid down, following the surface of the ground, running close to the farmsteads, mills, quarries, lime-kilns, or brick-fields, with a siding into each for the special use of their owners. At each village or hamlet, or, indeed, at the crossing of any turnpike or main road, might be constructed a simple platform, with a shed for shelter, and a goods shed for general merchandise. On this line two or three trains a day might be run, and engine and pas-

senger carriages for the conveyance of the inhabitants; and the engine, when not thus engaged, might be employed in hauling trucks from point to point. If the traffic were very small indeed horse-power might be substituted for steam. Such a line as this would benefit landowner, traders, and agriculturists alike; would open up fresh fields of industry, and develop any existing mineral wealth.

The cost of a line of light railway suitable for such a district as above described, Mr. Pain estimates at from £1,000 to £5,000 per mile, exclusive of cost of land, compensation, and legal and engineering charges. The first-named sum will construct a tramroad on the 3ft. gauge, over level country without any streams of size to cross. The work would consist only of the permanent way of 20lb. rails, laid on Scotch fir sleepers with ballast 12in. thick. On such a line as this a higher rate of speed than six miles an hour can not be expected. For the sum of £5,000 per mile a similar line, but with heavier permanent way, might be constructed through a rough and hilly country.

Some useful hints are to be found in Mr. Pain's pamphlet on the promotion and finding of capital for companies intended to construct such railways, and the best means of obtaining legislative sanction for them.

EXETER AND NEIGHBOURHOOD.

AS previously announced in our columns, the Royal Archaeological Institute of Great Britain and Ireland will hold its next annual meeting at Exeter, commencing Tuesday, July 29, and ending Tuesday, Aug. 5. In view of this, the Institute has issued a circular pointing out the objects of interest in the locality, and giving a preliminary outline of the programme. Exeter, the circular remarks, has long had many claims on the Archaeological Institute as the place of its annual meeting, and it is believed that there will be a general feeling of satisfaction that a city of such great historic and antiquarian interest has been selected for the Annual Congress this year. Not only is the city of Exeter one of the most ancient in the kingdom, presenting, in its unique Cathedral, in the remains of its ancient fortifications, and the Castle of Rougemont, as well as in the Bishop's Palace; in its numerous and remarkable parish churches, its ecclesiastical and municipal records; its curious almshouses; and the examples of domestic architecture existing within its walls, objects of no ordinary interest, but the district of which it is the centre is more than usually attractive to all students of the past.

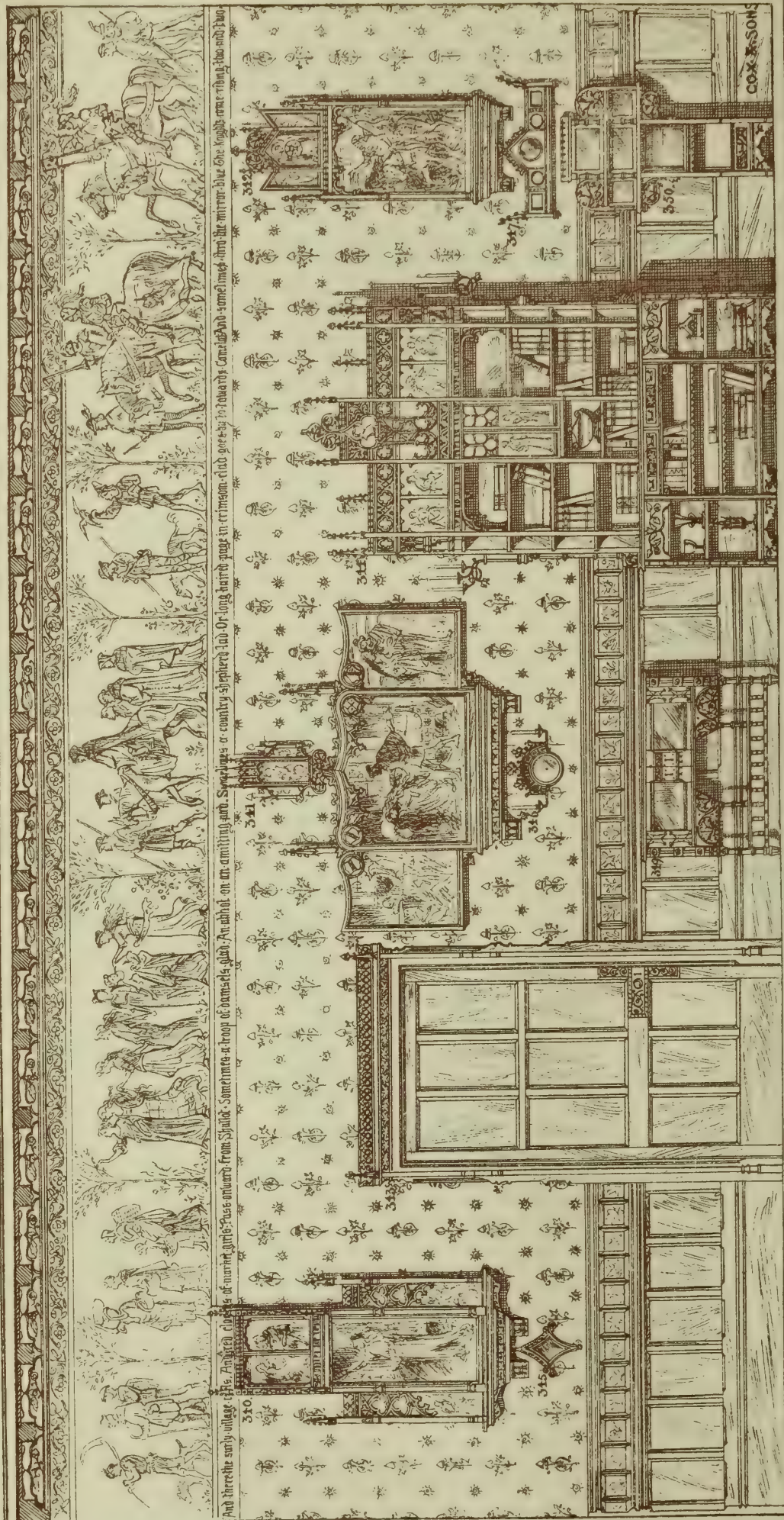
To name a few of the objects of high archaeological interest in which the county of Devon is so rich, and which will probably engage the attention of the visitors to the Exeter meeting, we have occupying a prominent place in the list, the numerous and primeval remains on Dartmoor, and elsewhere in the district, such as the stone circles, avenues, kistvaens, rock basins, and standing stones; the huts and "pounds," or walled cottages, scattered over both Devon and Cornwall; the evidences of the tribal divisions of the country in early times, the trackways of Dartmoor; the hill camps, so numerous throughout the two counties, such as Cadbury, Castle San Dinas, Henbury Fort, and many others; the singularly interesting cathedral of Exeter, with its store of decorated details; the churches of Crediton, Culmpton, Dartmouth, Halcombe, Ottery S. Mary Paignton, &c., with the rich woodwork screens common throughout the county of Devon. The remains of monastic foundations at Buckfast, Buckland, Tavistock, and Torre Abbey; the castles at Berry Pomeroy, Compton, Launceston, and Okehampton; and the fine specimens of domestic architecture at Bradfield, Bradley, Dartington, Holcombe Rogus, Wear Gifford, &c., as well as the old towns of Dartmouth, Plympton, Totnes, &c.; the caverns near Torquay and Brixham, which have yielded vestiges of human occupation at a very remote period; the sepulchral barrows near Sidmouth, &c.

A temporary museum will be formed in Exeter, and numerous excursions will be made to different places of archaeological interest. It is expected that Mr. G. T. Clark, Mr. J. H. Parker, Mr. E. A. Freeman, and Sir Gilbert Scott will take part in the proceedings.

A new Temperance Hall was opened at Lawrence Hill, near Bristol, on Monday. It is built of brick with stone facings, and will hold about 400 people. The cost was £400. Mr. K. Scump was the builder.

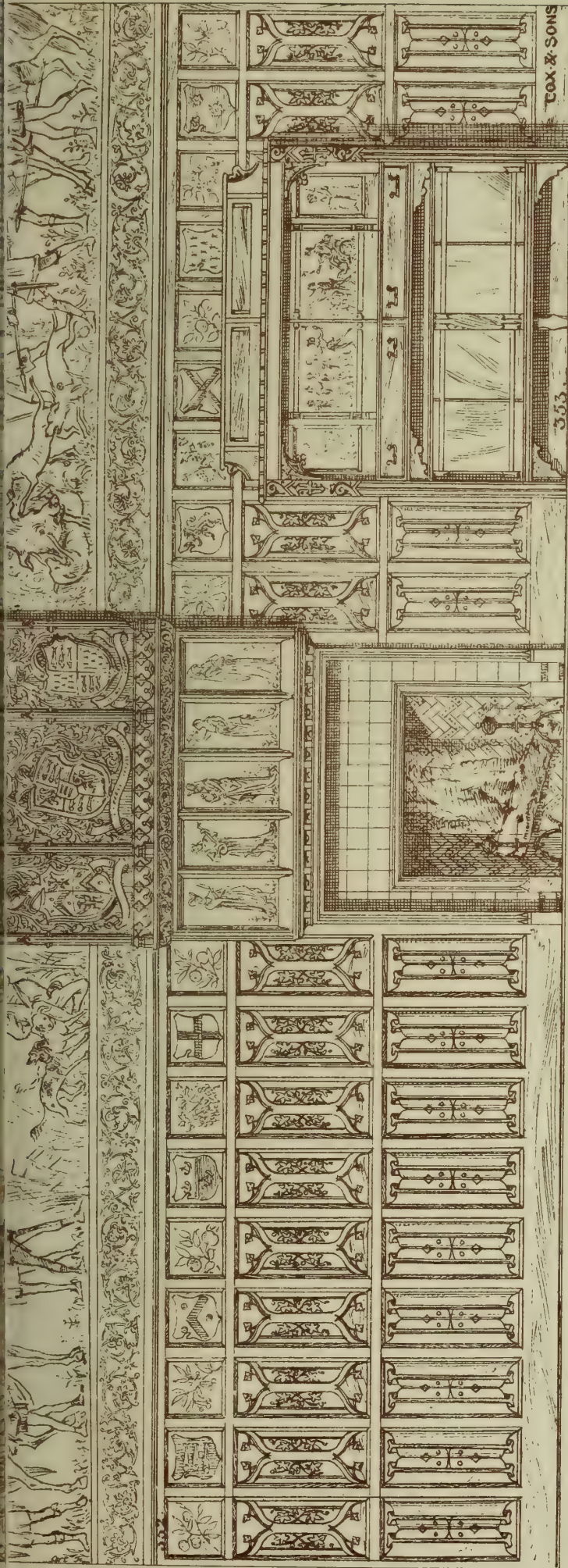
* "Light Railways and Tramroads." By ARTHUR C. PAIN. (Reprinted from the *Field*.)

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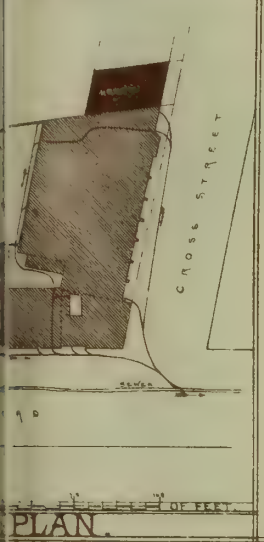
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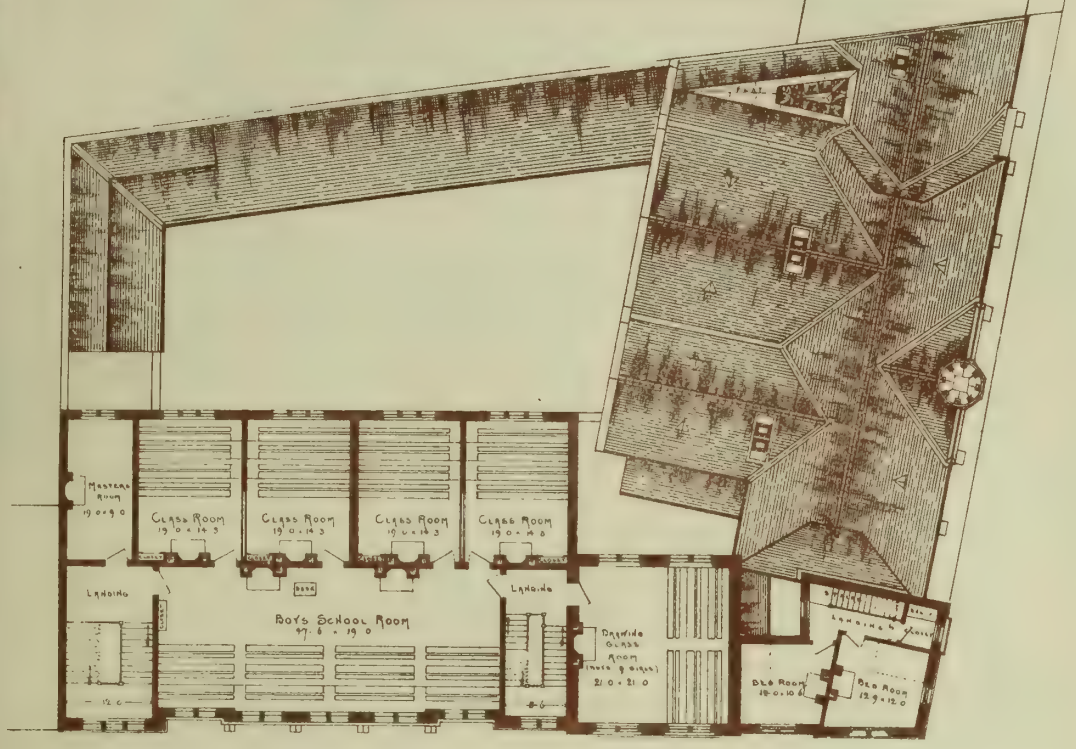
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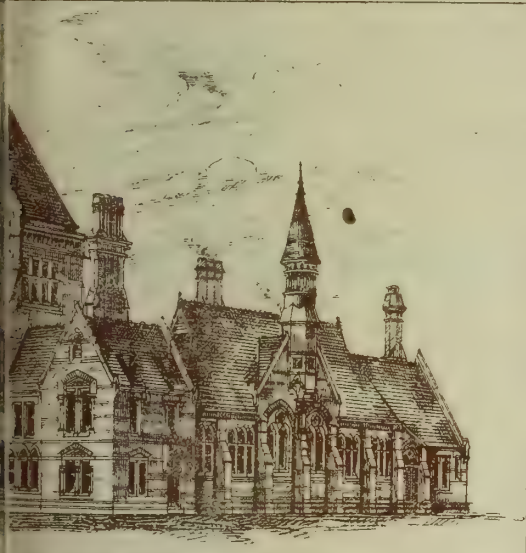
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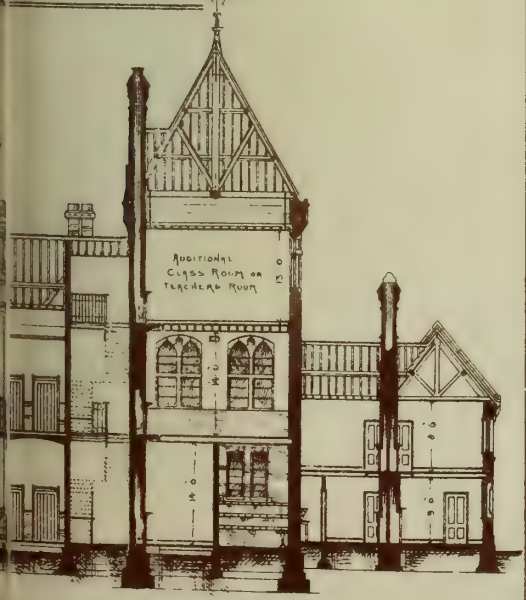
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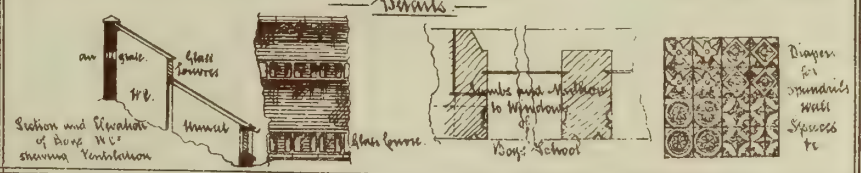
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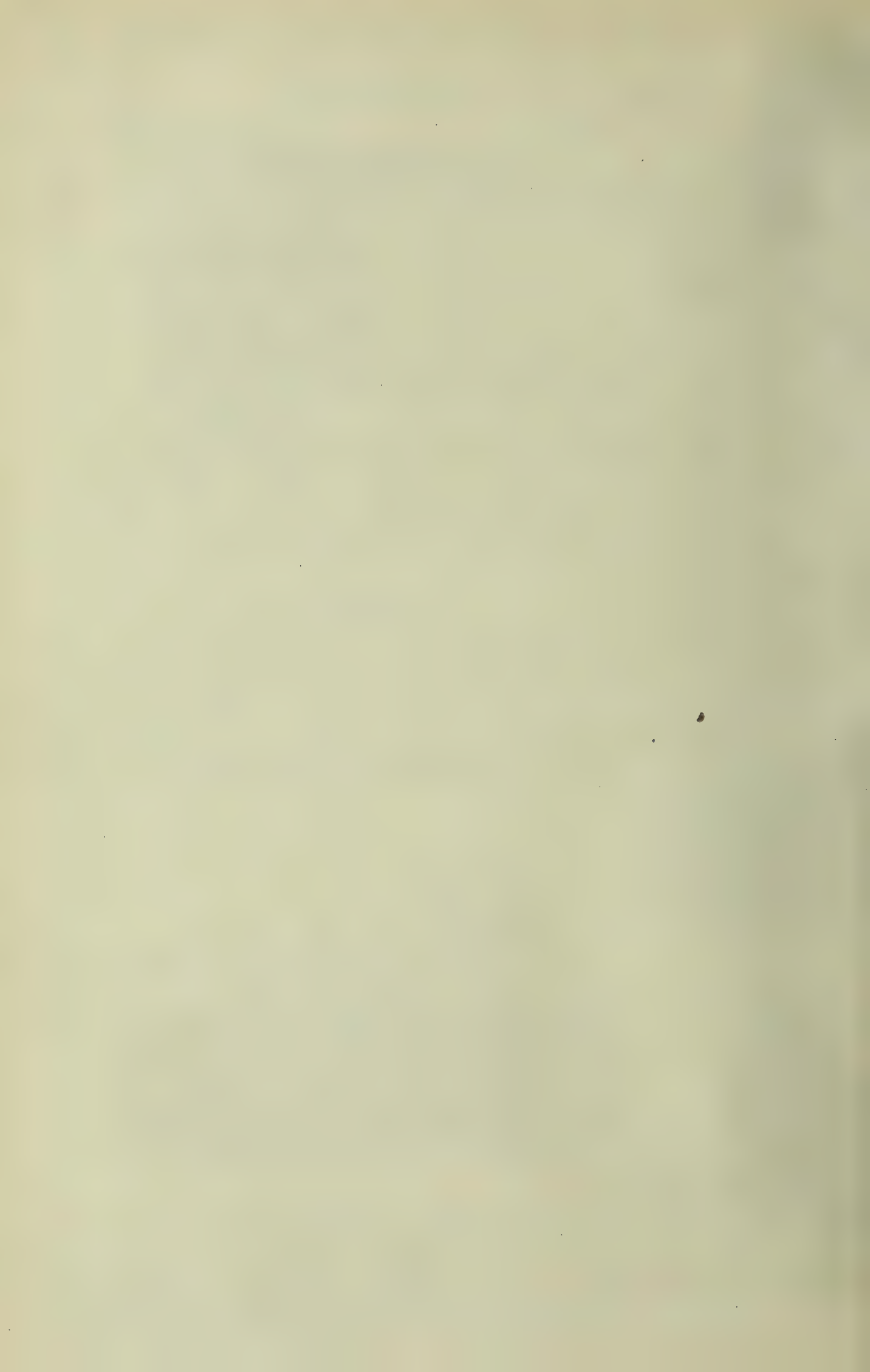
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Boys & Girls Schools Classrooms &c	72.0 x 43.0 x 10.0	=	123840.0	
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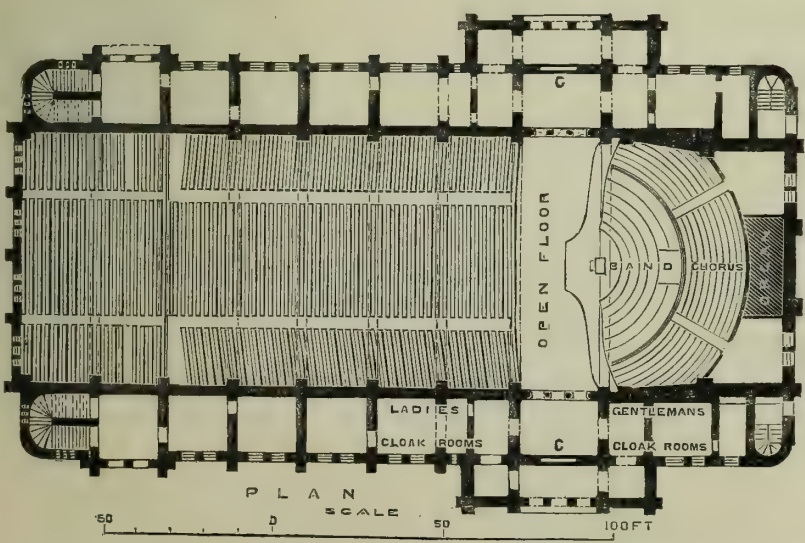
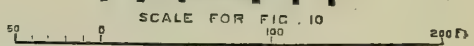
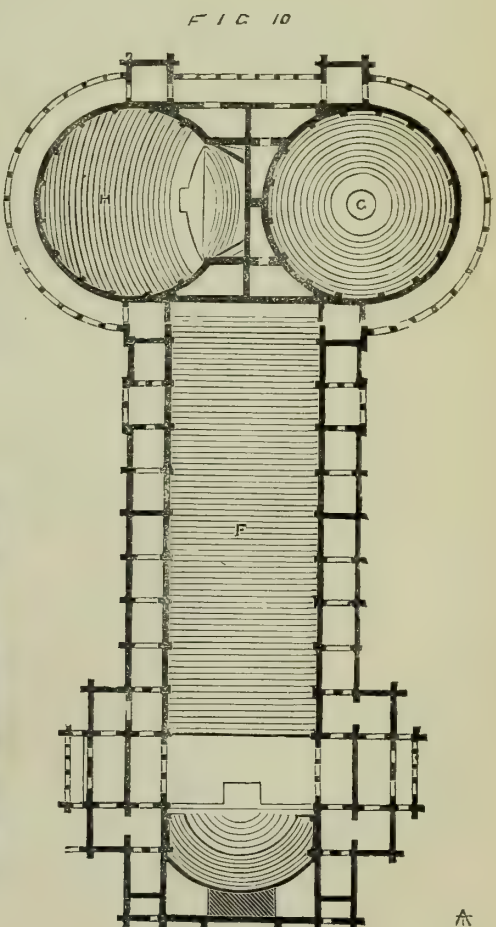
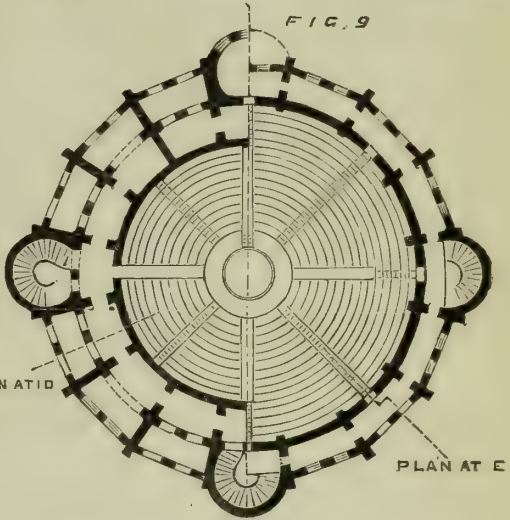
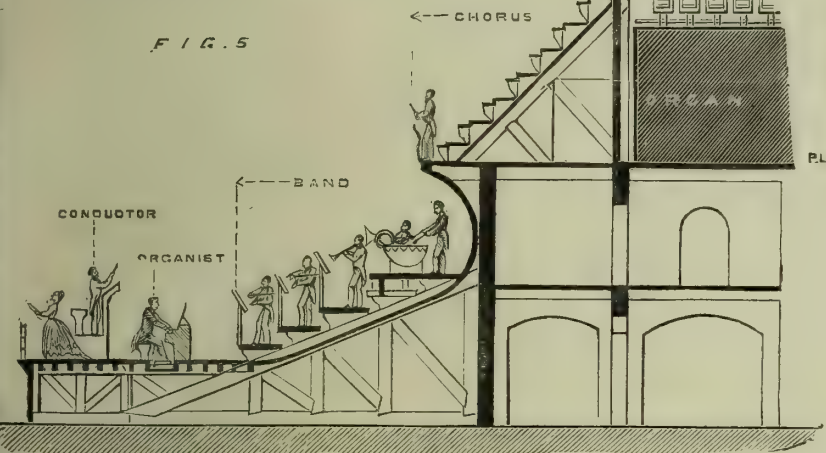
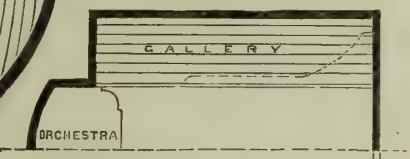
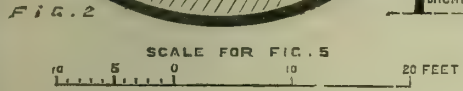
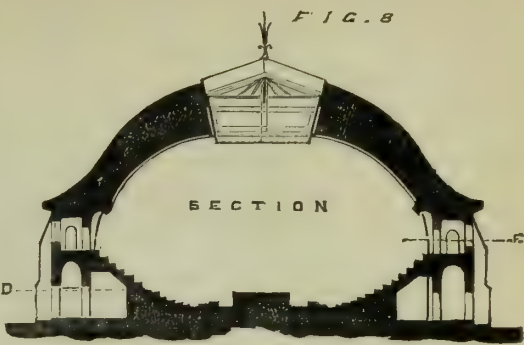
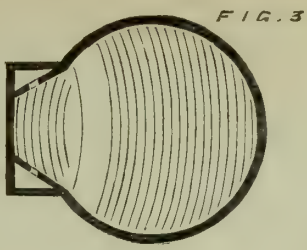
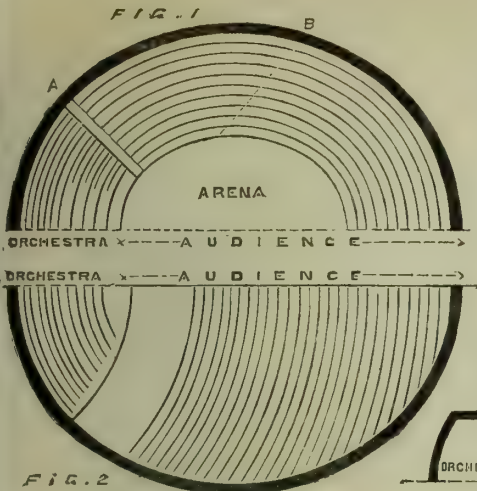
ELEVATION TO CROSS STREET



Details







ARCHITECTURE PRACTICALLY CONSIDERED IN RELATION TO MUSIC.*

MR. STATHAM, in commencing, said that thirty or forty years ago, Liverpool used to be the scene of triennial music festivals, held in a fearful building of the Batty Langley Gothic type, known as S. Luke's Church. Partly on religious, and partly on artistic grounds, it was resolved to build a hall suitable for the purpose, and which should, at the same time, be an embellishment to the town. A competition was instituted; a design was selected in which a young architect, of remarkable genius, had embodied his idea of the application of Greek architecture to modern wants; and the municipality of Liverpool obtained a public hall which, whatever criticism might be directed against its details, was, in general effect, one of the finest and most impressive interiors of which the Classic revival could boast, and which might claim the less desirable distinction of being, in all probability, the worst music-room in the world. S. George's Hall, the building referred to, was a notable instance of the want of relation between the architectural form of a structure and the purpose for which it was intended which had unfortunately characterised so many of the productions of both the Classic and Gothic revivals. In the case of buildings erected for music, there was less excuse for this discrepancy than in most other cases. The designer of a church or a town-hall might reasonably think that he could invent no better type than was furnished by some of the finest buildings erected for the same purpose by former generations, except so far as changes of custom might modify their arrangement in detail. But a building for musical purposes on a large scale was one of those things for which there was really no precedent, previous to the present architectural dispensation. Music was pre-eminently the modern art—the only form of high art which had, practically, taken its rise during the era of modern life, and the grandest results of which had been realised almost within our own generation in those choral and orchestral performances on a large scale, which were becoming year by year more frequent and frequented. In regard to buildings erected for such a purpose, therefore, architects had a special encouragement to disregard precedent—at all events in the plan and arrangement, which formed the basis of architectural treatment—and to take the problem on its own ground alone. With the modern architect rested the responsibility of supplying buildings which should give to this grand form of artistic entertainment the highest effect of which it was capable, and of placing those concerned in the best relative positions of hearing and being heard. A great deal had been said and written, and a great many experiments made, in regard to the question of acoustics, both as regarded the formation, conduction, and reflection of sound, and the materials which were favourable or unfavourable in these respects. The subject had been fully treated by Mr. T. Roger Smith, in his valuable little work on Acoustics, and in a paper read before the Institute in December, 1860. To Mr. Smith's conclusions Mr. Statham said he had nothing material to add, except by way of offering one or two further illustrations of their practical correctness. While, however, the subject had been much considered from an acoustic point of view, it had been hardly looked at sufficiently from a musical point of view—i.e., as to the best form, size, and arrangement of plan for different classes of musical performances. Since the building of S. George's Hall, no structure of the same class had attracted so much attention as the Albert Hall. The contrast between the two buildings was remarkable and suggestive. In Elmes's building (S. George's Hall) the real object of the structure, the performance of music, was almost ostentatiously and contemptuously disregarded. The Albert Hall, on the other hand, might be regarded as the most recent specimen of a building carefully and intentionally constructed in reference to the performances of music, on a large scale. The question as to what were the best buildings for musical performances divided itself into the two heads of acoustic effect and arrangement of plan. As to the former, three different results might be aimed at. There might be employed either materials which would damp all resonance and absorb all sound as soon as it struck the sides of the room, such as woollen stuffs, curtains, and

draperies; or materials which would give direct and sharp reflection of the sounds that impinged upon them, as stone, marble, polished cement, or plaster; or, lastly, materials which would neither sharply reflect nor absorb the sound, but (if the expression might be allowed) sympathise with it, adopt its vibrations, and strengthen and intensify its tone, without reflecting it back in such a marked or violent manner as to cause confusion or annoyance to the ear. The Liverpool Philharmonic Hall was a specimen of the first treatment. The room was full of curtains and upholstery, and what was heard there was heard distinctly and without disturbing influences; but it was a very dead room, very deficient in sonority. Mr. Statham thought the only case in which such a muffling of the room might be of service was the case of a very large hall intended mainly for organ performances, for the organ required scarcely any assistance from the room, while, on the other hand, its effect was more readily confused and impaired by reverberations than that of any other instrument. The second system, that of employing sharply reverberating surfaces, could not, in Mr. Statham's opinion, be otherwise than positively injurious to musical effect. In a small room it imparted a meanness and hardness to the *timbre* of the music; in a large room it produced echoes which went far to do away with music altogether. This might be observed in our cathedrals, where the organ music especially became, when at all loud, a maze of indistinguishable sounds rolling about the building. This was popularly supposed to be very fine, and so much nonsense had been written on the subject that it might be allowable to point out that effects of echo were not "music," but only a disturbance of music. Some time ago a correspondent of the BUILDING NEWS attempted to call to account the respected surveyor of S. Paul's Cathedral for having caused something to be done (Mr. Statham forgot what) which had interfered, or would interfere, with the echoing qualities of the building, and thereby, the writer said, spoiling the grand effect of the organ. The fact was that if Mr. Penrose could do away with the echo he would be doing the very best thing for the music. Music must be regarded in the light of a highly intricate and delicate language, every syllable of which ought to be distinctly heard; and to imagine that its effect was increased by echo was as reasonable as it would be to say, in reporting the speech of a distinguished orator, that "the effect of his eloquence was much enhanced by the fine echo of the building, which prolonged each syllable several seconds after it was spoken." The third system was, as before stated, that of employing resonant but not highly-reflective materials, and of these by far the best (and perhaps, for practical purposes, the only) material available was wood. This had been adopted in the Albert Hall, and, considering the size of the room, was decidedly successful, the degree of clearness with which a single voice could be heard in that building being attributable in no small degree to the resonant wood-lining of the Hall. S. George's Hall, Liverpool, afforded an example of a room constructed entirely of reflecting materials—marble, stone, tiles, and cement. This was a most trying room for a solo voice, but the contrast between the two halls was the most marked in regard to the organ, and here there was an unusually good opportunity for comparison, as S. George's Hall contained the only other organ in England of the same size as the Albert Hall organ, built by the same builder, and mostly played upon by the same player. In S. George's Hall the effect of loud organ music of at all an intricate description was an absolute chaos; all detail and clearness of form in the music was obliterated. In the Albert Hall, however, though the resonance was in excess of what was beneficial, it was by no means such as materially to interfere with the effect of the music, which, for the most part, was distinct and well defined in effect. This, it should be stated, was after the velarium was up; had it not been so, the result would doubtless have been less satisfactory, as the large concave surface of glass must have reflected the sound in a very detrimental manner. That the Albert Hall organ was not as disadvantageously circumstanced as the one in Liverpool was, according to General Scott, no fault of the organ-builder, who particularly recommended that the floor of the Albert Hall should be laid with tiles, and the walls finished with polished plaster. Fortunately for the effect of his own instrument, as well as for every other kind of musical performance in the Albert Hall, this

advice was not acted upon. Organ builders knew how to voice pipes, but beyond that their opinions were very little to be relied upon. Coming to the arrangement and planning of concert-rooms, so as to place performers and audience in the best possible relation to one another, Mr. Statham said this subject had received comparatively little attention, judging from the results. Most concert-rooms were a kind of enlargement and expansion of the old ball-room model, with a flat floor for dancing and promenading, and an orchestra for the players up above, out of the way. This plan was mostly adhered to, although in the case of theatres the necessity had long been recognised of placing the auditorium at such a slope and angle that all might see and hear what passed on the stage. The Albert Hall, however, was an innovation in this respect, as pointed out by the writer of the article on "The True School for Architects" in a recent number of *Fraser's Magazine*, although Mr. Statham could not go as far as the writer of that article in saying that "the Albert Hall has been constructed on the sound theory of the beauty and fitness"; for, as a matter of fact, the building was, in its general design, as much the result of precedent as any other music-room, and it was exactly in proportion as it was so that it was not successful as a music-hall. It was based avowedly on the form of the Roman amphitheatre,† as other music-halls were based (unavowedly) upon the English ball-room. General Scott had stated that "the general form of the amphitheatre was considered one of the fixed conditions of the problem." It was not desirable to go into such a problem with a fixed condition of that kind at the outset; and in the case of the Albert Hall the result had been an architectural and practical inconsistency. The building was really one in which an audience occupying a part of the hall was to hear music performed by an orchestra at one end of it. The conditions for the favourable placing of those who were to produce, and those who were to hear, the music, were so different that on the usual theoretic principles of architectural design, such a disposition would certainly appear to involve a totally distinct treatment of the two extremities of a building. A great deal had been said of late (not without reason) about the undue adherence to precedent shown in church-building, and the retention of the Mediæval form of church without sufficient consideration of its adaptation to modern requirements. But the adoption, in a building where an audience at one end were to hear music performed at the other, of a form which was specially designed originally for persons seated round the sides to witness a spectacle in the centre, was a far greater inconsistency than was involved in building a three-aisled church for modern worship. The objection was a practical as well as an æsthetic one. This arrangement of the seats brought a considerable portion of the audience into an altogether wrong position for hearing the music. That everybody could hear was perfectly true; the question was, What did they hear, and was it what they wanted to hear? The orchestra and a large part of the auditorium formed part of the same ellipse, only separated from each other by an arbitrary division, so placed as to mark off space for a sufficient number of performers. The result was that those portions of the audience within the space AB, marked off by the dotted lines on Fig. 1,† could form no adequate idea of the effect of the music, because they were at one side of it; indeed, on the seats nearly adjoining the orchestra the audience were seated nearly behind the singers—at all events, behind the direction in which the sound was impelled, and were hearing one side of the chorus close to them, while the other side was in the distance, at the opposite extremity of the orchestra. This was the inevitable result of applying to a building for music an arrangement originally intended for a spectacle. When, however, the amphitheatre form was adopted, the best arrangement for enabling an audience to hear an oratorio successfully would probably be that indicated in Fig. 2, where they were all brought in front of and facing the performers. For the largest class of musical performances—the execution of great works of combined choral and instrumental effect—it was

* See BUILDING NEWS, Dec. 13, 1872, Vol. XXIII., p. 457.

† See General Scott's Paper on the Albert Hall. BUILDING NEWS, Jan. 26, 1872, Vol. XXII., p. 74.

‡ The illustrations on p. 255 are reduced in scale from those accompanying Mr. STATHAM's paper in No. 6 of the "Sessional Papers" of the Royal Institute of British Architects, 1872-73.

* Abstract of paper read before the Royal Institute of British Architects, on 20th January last, by Mr. H. H. STATHAM, A.R.I.B.A., of Liverpool.

probable that neither the amphitheatrical nor the theatrical form would be found the most suitable. The form of the complete amphitheatre, though its symmetry and simplicity might seem to recommend it, had the serious disadvantage (when used on a large scale) that the sound, as produced in the orchestra, was not properly controlled or confined in the direction in which it was most wanted. A certain proportion must be observed between height and width; and the wide area of an elliptic amphitheatre required a lofty roof, and consequently a great space for the production of echo—a space into which the sound was launched, with nothing to confine it in the direction of the audience, so that a considerable portion flew off to the roof, and was either absorbed there (if absorbent materials were placed to retain it), and so wasted, or it was reflected back again, and became a source of serious disturbance. Something approaching to the theatre form was better, as the orchestra could then be confined under a lower roof and between side walls, and the sound be driven more forward. For a concert-room on a small scale for vocal performances, the form shown in Fig. 3 would probably prove a good one. If employed on a large scale, there was still the same objection of a necessarily lofty roof and a vast centre space, in which much sound was lost and dispersed, besides a degree of difficulty in getting all the audience sufficiently in front of and facing the music. Accommodation, too, in such a case, must be obtained by the use of successive tiers of galleries, which, except in the front row or two, could scarcely ever be so good for hearing as the uninterrupted area. On the whole, Mr. Statham believed that the requirements of the case were best met, and the difficulties best avoided, by the long form of room, rather than the theatre or amphitheatre form, and that conduction was a more direct and successful way of conveying the sound to the audience than radiation. The waste space and air in a room of this size might be made much less in proportion to the area than in the amphitheatre, as the amphitheatre could not be made to look otherwise than ill-proportioned unless its roof were placed at a considerable height from the floor; but for a rectangular room, a smaller proportion of height to width would be satisfactory enough, and the sound in its transit from the performers to the audience could be confined within more manageable limits. For the successful conduction of sound in this way through a long building it was essential that the sound, as produced in the orchestra, should be confined from spreading above or to one side of the performers, and should be reflected forward as strongly as possible; that the height of the auditorium, though greater than that of the orchestra, should not be such as to give room for any unnecessary loss or dispersion of sound, or to allow space for a disturbing echo from the roof; and that to the same end the roof should be nearly flat rather than circular, so as not to collect and focus any reflection of sound which might be inevitable. The orchestra should be constructed principally of wood, and the walls of the auditorium lined with wood; but the walls, as well as the ceiling, required to have their otherwise flat surfaces broken at intervals by projections, in order to avoid the conduction of sound along the walls, and break up any reflection from the ceiling; and careful provision must be made against a return echo from the end of the room. One of the principal advantages of the longitudinal room was that the audience all sat facing and directly opposite to the performers—not only a better position for hearing, but more comfortable in every way. A room with a flat floor, however, was always unsatisfactory for hearing, and Mr. Statham held that the seats should always rise as they receded from the orchestra, as at the back of a long flat-floored concert-hall the volume of sound was always over the heads of the audience. Figs. 6 and 7 show a room for concerts, oratorios, &c., capable of seating 4,000 persons, with a band and chorus of 600. The floor is shown ascending, not by a regular slope, but in a curve, on the principle called by Mr. Scott Russell the "isacoustic curve," the method of setting out which was fully explained and illustrated in Mr. Roger Smith's work on "Acoustics" (pp. 43 *et seq.*). In a room of such length, however, it was not possible to carry out the rise of the seats to the extent contemplated by Mr. Russell (raising the sight-line 1 ft. 6 in. for each seat), as this would soon bring the auditorium up to the ceiling. Mr. Statham had been content with a rise of 7 in. or

8 in. for each person. The tendency of this curve was to fall near the point of sound production, and to rise again further on: this brought the front rows of the auditory higher up in relation to the performers, so that the sound was not carried so far over their heads as would otherwise be the case. For performances on a large scale (which alone Mr. Statham was now considering), no person who wished to enjoy the music or to realise its true effect would ever choose to sit close up to the orchestra. As concert-rooms were generally arranged, the first ten or twelve rows of seats, if not more, were thrown away, so far as any real enjoyment of the music went. In connection with concert-rooms there was generally a considerable space in front of the audience end occupied by a large lobby or crush-room, serving mainly as a waiting-place in relieving the pressure of the crowd in going out or coming in. As will be seen by the diagram, Mr. Statham proposed the system of carrying the auditorium to the very back of the building and making the entrances to the principal portion of it at the sides, between the auditorium and the orchestra, and transforming the space usually occupied by the front seats (in which no one could hear with pleasure) into a vacant space which might act as a crush-room or *foyer* before or after the concert, and as a promenade for part of the audience during the intervals of the performances. If this space were laid with parquetry flooring on joists, with a hollow space underneath, it would not only make an effective entrance to a room, but act as a reflector and reinforcer of sound from the orchestra. This space might, with advantage, be wider than shown on the plan, in cases where economy of seat-room was not a primary consideration. That any of the audience leaving before the close of a performance would have to pass before the performers, might occur as an objection to the plan; but only the solo performers in front of the platform would be much disturbed by such an exodus, and by the arrangement of the aisles it would be seen that the audience need not pass near them at all. There should never be a centre aisle between the seats in a concert-room, as this placed the solo singer opposite an empty strip of floor. The possibility of draughts to the performers appeared a more serious objection to this placing of the entrance; but Mr. Statham thought it might be obviated by such an arrangement as indicated in the plan, making the lobbies to the ladies' and gentlemen's cloak-rooms the approach to the inner vestibule; and by keeping the inner vestibule well warmed, and with a sufficient outlet at the top, any draughts which might be drawn in, would be disposed of here, without finding their way into the concert-room. It would be easy, of course to provide large sliding doors at C, to be thrown back for a general exit, or in case of any sudden rush of people. This was only a question of ordinary planning, but in all cases of entrances to concert-halls, some such decisive means should be taken to shut out any access of cold air from without. In regard to the orchestra, the placing of the various performers, not only so as to be heard well by the audience, but so as not to incommode or interfere with each other, had been almost entirely overlooked in most cases. It was generally considered sufficient to make a tier of semicircular stages, one behind another, the band and chorus fitting themselves into their places in a kind of promiscuous manner, while the solo singers found room where they could in the narrow strip left in front of the band. That might have done very well in the days of smaller performances, and when the band was more used in conjunction with the chorus than now; but the modern band was much more powerful and brilliant than the old one, and was mostly used quite independently of the chorus, and in a different manner, so that the usual construction of the orchestra, which crowded the band and chorus together, was a double disadvantage, as the band was immediately backed, not by any sound-reflecting substance, but by the mass of the chorus, whose dress formed a body of sound-absorbing material; and on the other hand the singers were liable to be put out and disturbed by the noise of particular instruments close to them. The construction of the orchestra of the oratorio hall (shown in section in Fig. 6, and on an enlarged scale in Fig. 5), which Mr. Statham proposed as an improvement, was to inclose the band with a kind of wooden shell or sound-board bending round them in the rear, and coming under their feet to the front, the stages on which

they stood being carried by framing at intervals. The soundboard would be carried above the heads of the upper rank of the band, and bent forward over them to some extent; and then above and behind that and on the upper level would be ranged the chorus seats. By such means Mr. Statham expected that the sound of the band would be thrown forward into the room, while at the same time the sound, especially of the louder instruments, the brass and drums (which were always at the back), would be to a certain extent veiled from the singers, who would be able to hear their own voices better, and would hear the band as a consensual union of instruments. Such an arrangement of the orchestra in two tiers would be susceptible of very good decorative treatment. The orchestra shown in the illustration was planned for a band of about 80 performers—a good average number for the best class of bands. A band of this size would include about 32 or 34 violins, divided into first and second, and occupying the lower stage to left and right of conductor (who faced them); about 12 tenor violins placed in the middle of the same stage, between the firsts and seconds; and from 8 to 10 violoncellos, and nearly the same number of basses, which were usually divided, and placed half on each side, behind the violins. Then there were the quieter wind instruments—the wood instruments, almost always 8 in number, which should range in a row behind the tenor violins, or sometimes they were kept more to the left; at the back were placed the drums, and on each side of them the brass instruments. If the stages were made about 3 ft. wide, it would be found sufficient for the violins; the two back rows should be larger, to allow plenty of room for the larger stringed instruments. About 3 ft. longitudinally should be allowed for each violin, and about a foot more for the violoncellos; the basses must be reckoned as requiring nearly 5 ft. to each player. A platform the width of two stages should be left in the centre of the two top rows for the drums, which, for want of such a provision, were often very inconveniently placed. The wind-instrument players required little more than easy standing room longitudinally. The organ should be at the back of the whole, behind the chorus, and should, wherever possible, be spread out laterally behind the singers, rather than project forward among them in a square mass. The latter, although the almost universal arrangement, was bad, as it placed a part of the chorus on each side, in a recess where they were not well heard. The rest of the space behind the singers could be filled up with a wooden partition, like that behind the band, or it might be partially filled by carrying round some of the larger organ-pipes in a segment of a circle, which might add very much to the architectural effect. In the organ, height had to be provided for a pipe 32 ft. long, which was the longest used; but these large pipes might be placed below the level of the visible organ-case. The organist should always be placed below, in front of the whole orchestra, which, by the aid of the electric movement, was easily done. Lastly, the solo singers Mr. Statham would have advanced on a small projecting platform of their own, so as to be a little nearer the audience and further from the band. The auditorium of the hall he proposed was, he pointed out, not unlike that of Exeter Hall in general arrangement, but the seats there were not arranged on a curve, and the proportions of Exeter Hall were broader and shorter. Mr. Statham said he had never heard the effect of oratorio choruses on a large scale so clearly and satisfactorily as from the back of Exeter Hall, and he attributed this to the raised seats and to the position of the audience directly facing the performers; the ceiling was low, and it was a question of simple conduction of sound. He believed that rooms built on this principle, and with the best acoustic materials and arrangement, might be made much longer than they commonly were, without at all losing the effect of the music. In the sketch plan illustrated, the auditorium is 150 ft. long, exclusive of the space in front of the audience. Side galleries were most unsatisfactory places for hearing music. In one hall with which he was very familiar, there were long galleries at each side arranged in a slope, front to back, and which took about 1,000 of the audience. But in those galleries the part in which one could hear the effect of band and chorus fairly even, was just the portion marked off by dotted lines in Diagram 4; in all the rest of the gallery it was an unsatisfactory strain to hear. Large windows in

any position where they could reflect sound were undesirable, and lighting from the roof was generally bad on this account. On the whole, the windows were probably safest high up in the side walls; and concert-rooms being so much more used by night than by day, lighting was not the most important point. One practical difficulty in dealing with a hall on this plan was the utilisation of the space under the seats at the back, which was too large an area to be thrown away: in towns probably it would generally become an available source of revenue as shops; and where the site allowed of no approach at the side, the entrance, of course, would be here. Very large ideas had been afloat lately as to the number of persons who might be accommodated to hear music in one building; and a well-known writer on architecture had made it a charge against architects that they were content with getting three or four thousand people into a concert-room, whereas, if the buildings were properly arranged, four or five times that number might hear. This idea Mr. Statham believed to be a complete fallacy, and one which those who built such rooms should discourage. It was impossible by any acoustic expedients to secure that music should be intelligibly heard and effectively rendered in rooms beyond certain limits of size. He said *intelligibly* heard, because that, as before hinted, was really the point. No doubt 15,000 or 20,000 people might be grouped in such a way that they should all be within sound of the performers, and have a general notion of what was going on, but that was not hearing music. It did not in the least follow that because 500 performers produced a certain effect in a building of a certain size, that 2,000 would produce an equal effect in a building of four times the area; for two reasons. The organ could be in some degree adapted to an increased scale of building, because its sounds were produced purely by mechanism, and by a heavier pressure of wind they could be forced up to a proportionate strength. But in regard to other instruments and voices, increase of power could only be got by multiplying the numbers, and this was not the same thing at all. With increase of numbers came decrease of delicacy, accuracy, and precision. In the second place, 15,000 or 20,000 people could not be accommodated within hearing of music at all, except in a building having a great cubical capacity in proportion to its area—*i.e.*, a vast mass of air space between the performers and a great portion of the audience, and sound could not, by ordinary means, be forced through this space without a liability to be dispersed and disturbed in its passage. It might be possible to enable 10,000 people, or at all events 8,000, to hear 500 performers satisfactorily, but Mr. Statham did not believe it was possible to enable 20,000 to hear 1000, with the like result. So far, Mr. Statham had been considering the problem of buildings for large combined choral and instrumental performances only. A different class of performance, however, changed the conditions very much. In comparing vocal and instrumental concerts, it should be remembered that voices could be satisfactorily heard in front only, but the greater portion of instruments could be heard nearly equally well all round. For this reason a central position might become the best for the performers in a building intended for this class of music. With regard to "chamber music," consisting mostly of music for three, four or five stringed instruments, and such performances as those which had gained such celebrity under the title of "Monday Popular Concerts," it would be absurd to suppose that the same concert-rooms which were suitable for an oratorio performance could be suitable for this fine and delicate class of music. To treat chamber music so was as reasonable as it would be to place a statuette intended for a drawing-room in the centre of a large square. What was wanted in this case was a room where all the audience would be as near as possible to the performers, and where there should be as little waste air as possible. In this case the centre of the room was quite the most suitable place for the performers, and a circular building, with concentric ranges of seats, and a raised platform in the centre, would be probably the best form that could be employed. Figs. 8 and 9 represent a section of plan of such a room, the seats for the audience to be arranged on the isacoustic curve, the whole building kept low in comparison with its area, and roofed by a dome, with light iron or timber ribs,* and a central

light. The inner surface of the dome should be lined with wood panelling, as also the wall above the top row of seats. The central skylight would be the simplest and most natural method of lighting in a case of this kind; but to obviate the echo from a flat surface of glass, the inner skylight might be glazed as a congeries of small circular lights, with convex glass, the convex side downwards; this would effectually break up and disperse echo, and at night artificial light could be applied within and above the centre of each of these lights. In a building arranged on this plan, there would not be more than about thirty feet above the players at the highest point: the whole of the resonant surfaces, the roof and walls, would be equidistant from the players, and the sound would impinge on every point at the same moment; the building, as suggested here, would seat 2,000 people, of whom the furthest row would be within fifty feet of the players. In such a room Mr. Statham believed 2,000 people would be able to hear string quartett music with the effect which the composer intended. This was certainly not the case in S. James's Hall. It was possible that for instrumental music on a larger scale the central arrangement of the players might be found the best in some ways, as bringing a larger number within good hearing distance of the more delicate passages, though the arrangement and placing of the musicians in such a case was a matter of some little difficulty. This idea had been practically adopted for some time past at M. Pasdeloup's Sunday instrumental concerts in Paris, which were given in a building at other times used as a circus, the orchestra being placed in the centre. Mr. Statham next entered at some length into the question of the best positions and surroundings for organs, especially in churches. We may possibly quote his remarks on this subject on some future occasion. If the general conditions suggested herein as the best for concert-rooms were in the main correct, the prospect of the architectural designer seemed rather unpromising, and his relations with music likely to be among the least interesting to his artistic feelings. Interiors without flat floors, for instance, especially in the parallelogram form, seemed so much at variance with all notions of architectural effect, that one might understand that many persons would prefer to lose a part of the musical effect in order the better to realise the architectural effect. The undoubted fact, too, that a comparatively low-proportioned room was the best for music, was another stumbling-block to the enthusiastic architect, such rooms certainly not being in general the most architecturally effective. It would almost seem as if architecture and music, the two arts which in their metaphysical principles and effect on the mind most resembled each other, were physically in a state of opposition, and that one could not exist along with the other. But in regard to the principle of construction suggested, of course there would be many cases in which it would be considered undesirable to carry these out in their entirety, as necessarily unfitting a building for other purposes; and until the love of music had become more strongly and widely developed among us (though it was progressing rapidly) we could scarcely expect in a general way to see a set of buildings constructed and set apart on purpose for such performances, in the same way that the universal love of theatrical exhibition had specialised the class of buildings called theatres. In regard to the treatment of circular buildings there was a good deal of scope for effect in the internal design, with the aid of colour, without interfering in any way with the properties of the building as a music-room; and in rooms of this form the rising slope of the seats perhaps rather assisted than injured the architectural effect. It was in the external design that the tug of war would come in this case. In regard to the question of long rooms, the conditions were still more unsatisfactory; and the architect who should succeed in producing a satisfactory internal effect from a long, not very high room, with a sloping floor, might consider that he had done something to keep his name alive. The treatment of the building externally so as to indicate the internal construction might give scope for some piquant effects; internally it had seemed to Mr. Statham that the best chance for the architect would lie in treating separately and very plainly the lower portion of the walls between the highest and

well as for attaching the wood ceiling, though the practical problem of a low wide roof would be more difficult with timber.

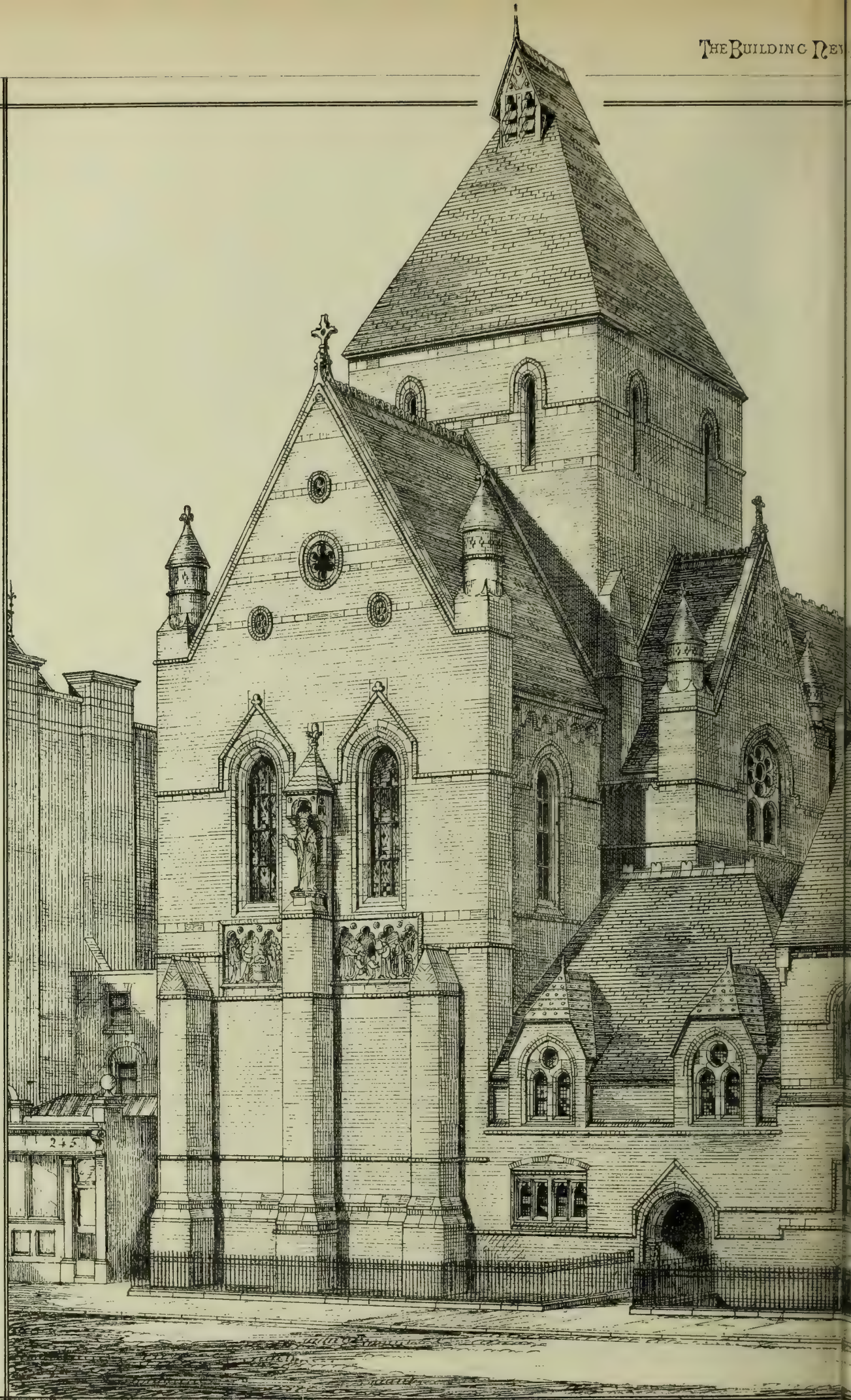
lowest level of seating, making that as it were the receptacle for the audience, then marking strongly as possible the horizontal lines at the highest level of the seating, and let the architectural composition proper commence above that line, or rather stand on the flanking walls the auditorium as a base. Such treatment would at least get rid of the appearance of the lower part of the architectural design being cut off by, or buried beneath, floor. But in general, in regard to this problem as well as all others in architecture, was not secret to be found in the most truthful, solid, durable treatment of the materials employed and the coincidence of design with construction. In general our places of amusement stood in need of this purifying gospel of architecture. Theatres and concert-rooms seemed to be too much considered as places where lighter and less legitimate forms of architectural embellishment might disport themselves. Decorations of concert-rooms in many cases seemed to range under two heads—*cupid's and pilaster*. If "music be the food of love," the cupid perhaps had a leg to stand on; but as to pilasters, "I cannot find it—'tis not in the box." In different essays and suggestions on this subject, however, we were constantly told that wall must be "broken up with pilasters" at certain points, to prevent echo, &c., and instances were given in which the breaking up had been successfully accomplished in existing buildings. Though Mr. Statham's own innate leanings were mainly in the Gothic direction, he confessed having more respect for that venerable feature, Classic pilaster, than to wish to see it used as acoustic padding. If it were desirable that wall surface should be broken up, what, in sense of genuine architectural treatment, that meant? Simply that the curtain walls between the main piers or buttresses were to set back from the interior face of the form. If the interior was best lined with wood, need be made like a huge painted band-box inlaid with applied (so called) architectural features. Rather, might we not use the wood visibly, confessedly as a lining between the point support, making the most of its natural texture and tint, contrasting various woods, making of parquetry or surface carving where means were allowed? So on through every acoustic and musical requirement of a building; there was surely reason why such things should be architecturally shams, any more than anything else. In regard to general architectural treatment external there would be room for specific character of sign and detail, in dealing with the various forms of building here supposed to be most suited to various forms of musical entertainment, when these were dealt with separately; more so if they were built in combination. It should happen again, either in London or elsewhere, that an opportunity occurred of erecting a great building as a centre for musical performances. Mr. Statham would wish to see not one immense chamber, but a combination of rooms suitable for the requirements of different classes of music, somewhat after the manner indicated in the plan, Fig. 10: a long hall holding 5,000 or 6,000 for oratorio performances and grand instrumental works; a room for smaller instrumental concerts, and a room for smaller vocal concerts, &c., each in its appropriate form and dimensions. Such an arrangement would be a tribute far more to the intelligent enjoyment of music by the public than the erection of one room, in which all things great and small, vocal and instrumental, had to take their chance being heard; and though such a building would necessarily be low in proportion, yet it might make the basis of a very fine architectural position.

MR. CHRISTIAN'S OPINION ON THE EDBURGH CATHEDRAL DESIGNS.

IT will be remembered that Mr. Ewan Christian was appointed to confer with and advise the Trustees on the respective merits of the various designs submitted for the proposed Edinburgh Cathedral. We cannot find room for Mr. Christian's descriptions of the designs, but we gladly give concluding observations, which are as follows.

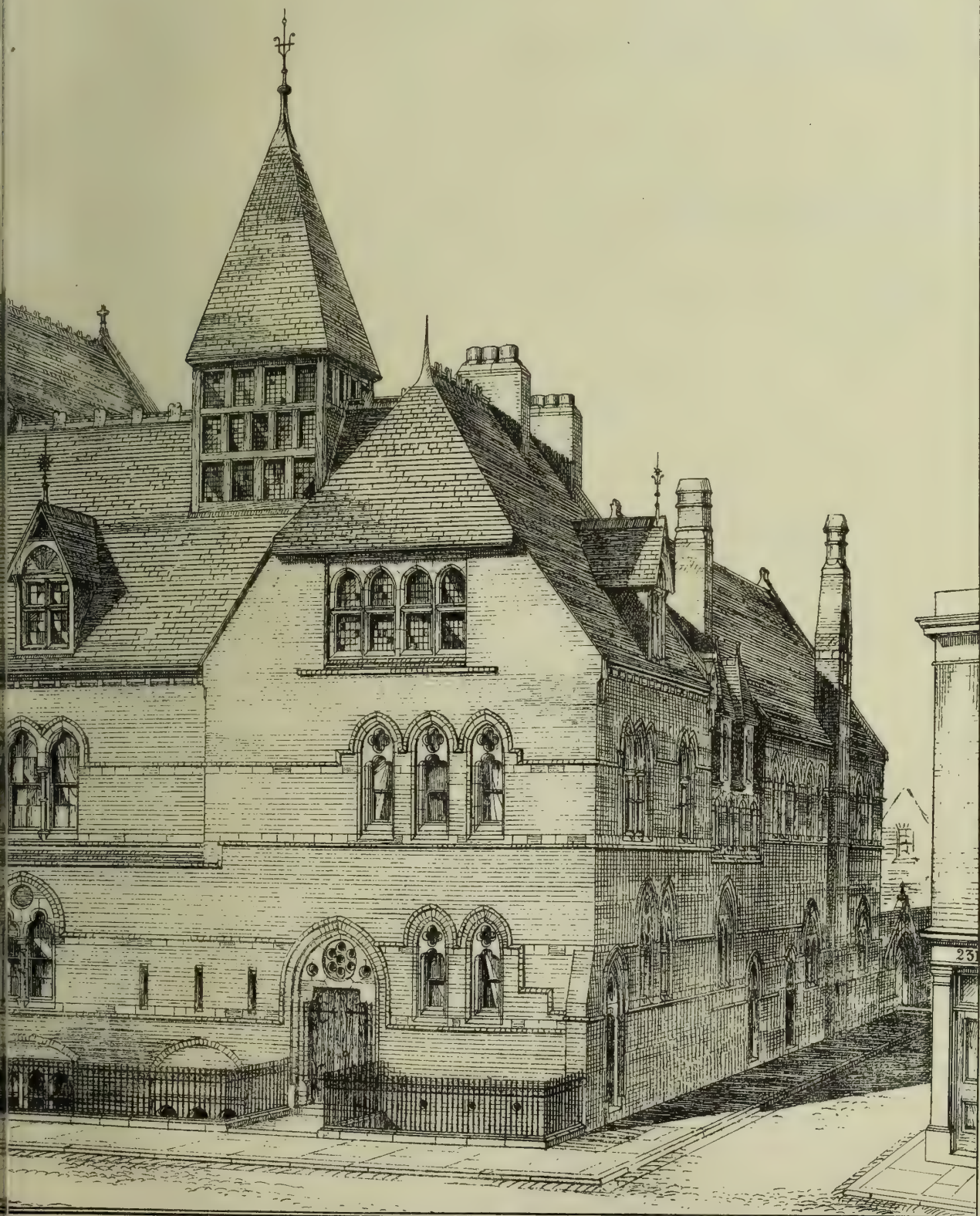
Having now, as briefly as practicable, described in detail the respective designs, it only remains for me to make a few general observations to state my own views as to the order of preference. In all such structures, and, indeed, in all foundations of all really good architecture, the arrangement of the ground-plan is a matter

* Timber would be preferable for acoustic reasons, as



: CHURCH : CLERGY : HOUSE : AND : SCHOOLS : OF : S. CLARE :

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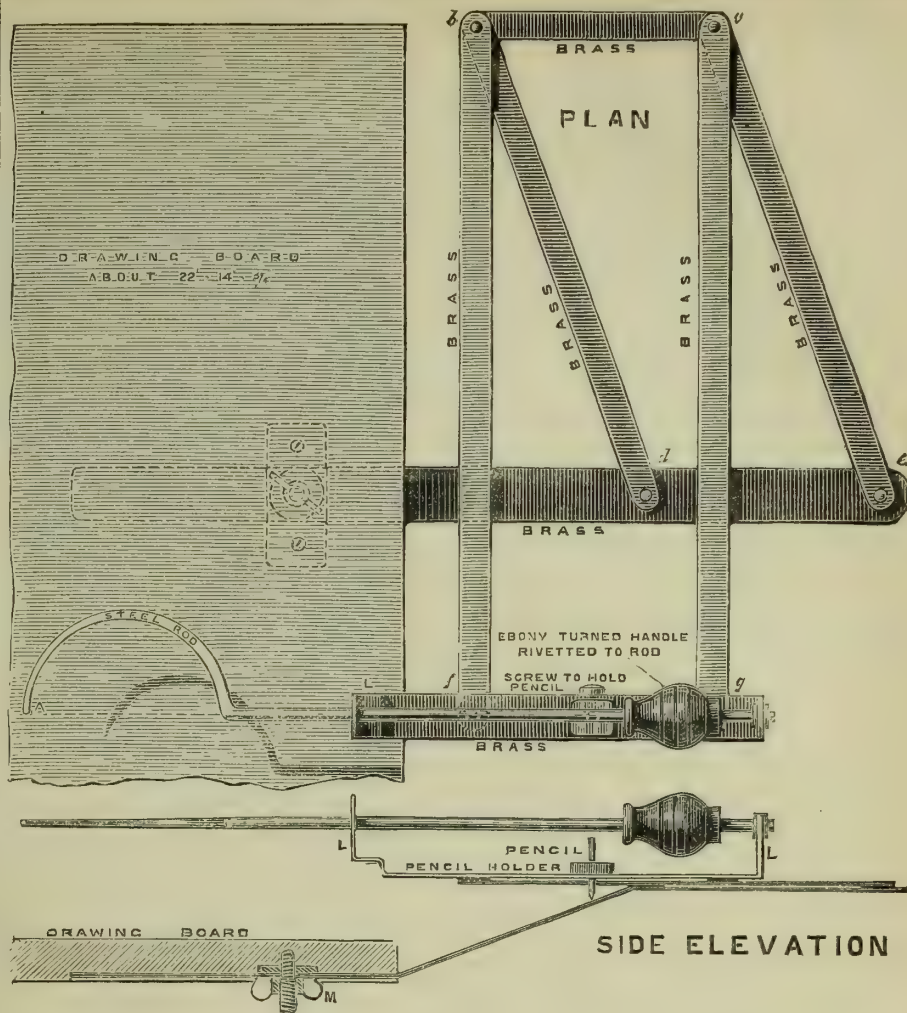
BA. KINGSLAND ROAD. JAMES BROOKS. ARCHITECT. ☼

very primary importance. In respect of this feature, I can have no hesitation in ascribing the first place to the design marked "✕ In hoc signo." I do not think it would be possible to design a better or more suitable arrangement than, for the purpose in view, is here shown. It is in every respect excellent. The plans of "Non ignota civitatis municeps," and "Fidelitas," though worked out on different principles to the last named, are both also in most respects good. The latter is much larger than the former, but neither appear to have been so expressly designed for congregational purposes as the first I have described. They may be considered, I think, as about equal in merit. The plan of "Auld Lang Syne" is a good one, but it is wanting in protection for the doorways, which in your climate must, I think, be a matter of necessity; and I think also it is inferior to the other already noticed, in matters of detail, such as the provisions for vestries and general communication. In respect of plan, however, each of the foregoing designs must be deemed superior to either of the remaining two.

In respect of solid goodness of construction, your instructions as to cost, and what is desirable in a cathedral structure, do to some extent clash. There can be no doubt, I think, but that a church vaulted throughout with stone is in many respects more desirable, more solid, and necessarily more substantial than one roofed only with wood. Within the present century there have been two fires which have destroyed wood groining in York Minster, and during my examination of the designs there has occurred at Canterbury another, which serves very strikingly to illustrate the protection afforded by stone. My own judgment, however, accords with that of the architects who have deemed it impracticable, within your limit of expenditure, to vault throughout the loftier and larger parts of the church, because it is not only the actual vault that has to be considered, but also the greater solidity of the walls, pillars, buttresses, &c.; still, as providing for vaulting throughout, the design of "Fidelitas" is in this particular the most valuable. The designs marked "Auld Lang Syne" and "✕ In hoc signo" provide stone vaulting for choir and transepts, and for the aisles; and the former for the chapter-house also; but in each of these the nave is groined in wood. The designs marked "Non ignota civitatis municeps" and "⊕" provide for stone vaulting only in the aisles, the loftier parts of the church being wholly covered with wood, and in the design "Essayez-moi," wood roofing is employed throughout.

In this particular, therefore, "Fidelitas" stands first; "✕ In hoc signo" and "Auld Lang Syne" are respectively equal, and inferior only in the nave; "Non ignota civitatis municeps" and "⊕" are also equal in respect of this point, though the latter is far below the former as regards the quality of the roof substituted; and "Essayez-moi" is in every respect the last.

As regards architectural character, "Fidelitas" and "Non ignota civitatis municeps" both are so beautiful in general design that I think, in respect of detail it would be hard to balance their respective merits; but as a composition, whilst there may be, and I think there is on the whole, partly for constructive reasons, and for general solidity, more dignity and cathedral-like character in the design marked "Fidelitas," yet there is not less beauty, whilst there is, perhaps, more general richness and picturesqueness of effect in that of "Non ignota civitatis municeps." Both the eastern and western fronts in the latter are richer, and to my mind more beautiful, than those of "Fidelitas," and the western front especially is throughout a most finished and beautiful composition. As regards interior, also, excepting in the point of stone vaulting, which, considering cost, I believe the author to be right in omitting, I must also say that in my judgment the design of "Non ignota civitatis municeps" is preferable to that of "Fidelitas." The design marked "✕ In hoc signo" is also one of great excellence in respect of detail, and although perhaps more severe in its general character than either of those first mentioned, yet it is wrought out in a bold and vigorous style, combined with much elegance, and would undoubtedly, if executed, produce externally a dignified and noble result, whilst the interior would be remarkably light and elegant. It is evident, from a careful examination of this design, that the architect has in several points felt himself straitened by the limits of the estimate, to which he has rightfully endeavoured to conform. As regards "Auld Lang Syne," the



THE CYMAGRAPH.

observations already made in my detailed report will sufficiently show my views as to general character; and I think I need add nothing further on this point, except to say that if you desire to select the best design of those submitted, your choice must be limited to one of these four.

As to plan, there can, I think, be no doubt whatever; as to construction, all are good; and although, as to architectural character, there may be room for difference of opinion, yet in my own judgment the design of "Non ignota civitatis municeps" for general elegance would bear away the palm.

On the subject of cost, as regards the selection of a design, the observations at the commencement of this report will, I think, sufficiently explain my views; but on the pages which follow you will see in figures the general result of comparison of areas and cubical bulk, and approximate estimates of proportionate costliness deduced therefrom. You will observe in the valuation prices, in respect of the church, a somewhat considerable variation in the multiplying figures. This result per foot cube has been arrived at by carefully detailed calculation, according to quantities of the cost of a corresponding portion of the building in each design, made on one uniform basis as to materials and labour, with such differences only as regards the latter as careful consideration of work to be done may have in each case dictated.

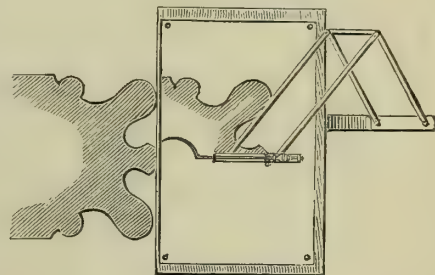
The striking difference between the work of "Fidelitas" and others, in this particular, cannot fail to be noticed; but it chiefly lies in the great solidity of walls, the massive flying buttresses, and the stone vaulting throughout, on which, for the main building, none of the other competitors have ventured.

In conclusion, I would say that, having as I believe faithfully given you in the foregoing pages the result of much and very careful examination of the designs submitted to your consideration, I trust that you may be guided to a sound and just decision respecting them. The opportunity is an important one, and the subject demands at your hands the greatest possible care and impartiality in forming your final judgment.—I have the honour to be, gentlemen, your faithful servant,

EWAN CHRISTIAN.

IN order to answer the many queries which have been asked from time to time, with reference to the Cymagraph, we give the accompanying engraving, which is a working drawing of the instrument, about third full size.

The Cymagraph was originally invented by Professor Willis, in 1837, who then read a description of it before the Institute of British Architects; it has, however, since then been improved upon by Mr. Edmund Sharpe and others, and is now used as shown in our illustration. Although any practical optician or mathematical instrument maker can easily make the Cymagraph, it is necessary that the several parts should be adjusted with great nicety. The following are the chief points to be observed in its construction:—It is absolutely indispensable that the point of the hook at A should be in the centre of the rod, also that the frames B, C, D, E, F, and



G, be exact parallelograms, with well-made movable joints, the holes in the support L L to be just large enough for the rod to turn round in. When in use, the Cymagraph is fixed to a small drawing-board, which should be made of as light a material as possible, as sometimes it is necessary to hold it with one's body in rather curious postures, as when standing on the top of a ladder, in order to take the profile of an arch mould. The instrument is secured to the board by means of the thumb-screw fastener, as shown at M.

To use the Cymagraph, place the edge of the drawing-board firmly against two or more promi-

nent members of the moulding about to be taken, and then traverse its profile with the point of the hook, at the same time pressing the pencil on to the board, to which a piece of drawing-paper has already been secured, as shown in the annexed woodcut. Should the moulding be too large to be drawn with the cymagraph in one position, mark the point last taken by some letter, move the board, and commence at that point so marked, repeating the operation until the whole moulding is drawn.

When not in use, the Cymagraph will shut up into a very small compass, and can be carried in a box 1ft. 6in. long, 3in. wide, and 4in. deep.

MAURICE B. ADAMS.

ARCHITECTURAL ASSOCIATION.

ON Friday evening last the members of the Architectural Association held their annual soirée, which was numerously attended, a most enjoyable evening being spent. The entertainments were of a theatrical character—"Two o'clock in the Morning" and "The Goose with the Golden Eggs" being introduced. The various parts were well played, especially that of Mr. Newpenny in the former, and those of Messrs. Turby and Flickster in the latter. All the characters, both male and female, were sustained by members of the Association, and probably of a "dramatic class." The playbill was headed by a quaintly drawn hieroglyphic, in which the late architectural utterances of the *Quarterly Review* were prophetically treated. The enjoyment of the evening was greatly enhanced by some well executed instrumental and vocal music. Refreshments of a light character were provided, and, we need scarcely say, were thoroughly appreciated. Exhibited on the walls were some sketches, submitted by members of the lately-formed "Decoration Class," which although bearing necessarily marks of the 'prentice hand, were of considerable merit, and evidenced a skill on the part of their authors which, if directed by a competent teacher, is calculated to achieve great things. Three title-page designs for the Association "Sketch Book" were also exhibited. That for which the prize has been awarded by Mr. Burges is of good design and very well drawn.

Prior to entering on the amusements of the evening, a short time was devoted to business. The minutes of the previous meeting having been read and confirmed, Messrs. J. W. Connor, M. Howard, C. V. Hunter, A. Wright, and H. Walker, A.R.I.B.A., were elected members.

FIGURE SCULPTURE IN THE ARCHITECTURAL MUSEUM.

MR. J. F. REDFERN on Saturday afternoon last gave the first of a series of three lectures on Figure Sculpture, principally in reference to that of which casts are to be seen in the Architectural Museum. This course of lectures is in continuation of the instructive series of "Saturday Afternoons for Art Workmen," which was inaugurated by Mr. Brindley's recent lectures on the architectural stone carvings in the Museum, reported in recent issues of the BUILDING NEWS. We are glad to learn that Mr. Thomas Peard (of the firm of Hart, Son, Peard and Co.) has promised two addresses "On the Art of Producing Artistic Iron Work," which will be delivered after Mr. Redfern has completed his course on Figure Sculpture. Mr. Redfern's first lecture was on Antique Sculpture, and, as there are very few casts from the Antique in the Museum—a defect which it is to be hoped may be remedied as soon as the funds of the Museum may permit—was illustrated by a number of outline drawings. We intend, by the permission of the lecturer, to reproduce these by photo-lithography, and therefore defer our report of the lecture until next week.

A new railway-station is being erected near Lewisham by the South Eastern Railway Co., from designs by Mr. Brady, the Company's engineer.

The footpaths of Westminster Bridge are being paved with asphalt by the Limmer Asphalt Company, the tiles with which the paths have been paved having become so worn as to retain the rain-water in innumerable puddles. We have on several occasions pointed out the unsuitability of such tiles for pavements over which, as at Westminster Bridge, there was a large traffic, and it is to be hoped that asphalt will answer the purpose more satisfactorily.

SCHOOLS OF ART.

BELFAST.—The annual meeting of the subscribers to the Belfast Government School of Art was held on Monday, under the presidency of Sir Charles Lanyon. The report shows a steady progress by the students during the past year. More than 2,000 drawings were sent up for the National Competition in London. Of these 23 received third-grade prizes, which are considered equivalent to the former local medals; 20 of the most advanced works were again selected for the highest competition, in which one national book prize and two national bronze medals were taken for designs; besides which, four pupils were appointed to the honourable position of free students.

BIRMINGHAM SOCIETY OF ARTS AND SCHOOL OF DESIGN.—The annual meeting of this institution was held on Wednesday week; the Marquis of Hertford, the president of the society, occupied the chair. The success of the school during the year has been considerable. There has been an increase of 95 students during the past year over 1871. The increased accommodation and space obtained from the museum rooms of the Queen's College has proved very valuable, and the facilities given by it in conducting some of the superior classes have resulted in a great improvement in the work, which nothing else could have supplied. The experimental classes of costume, commenced last year, have been successful, and the committee expect that they will still further develop themselves. The head master, Mr. Rainbach, continues to superintend the various studies with his accustomed zeal and intelligence. The committee regret that the state of the funds threatens most materially to cramp their efforts to increase and develop the usefulness and extension of the school, and even oblige them to contract its operations. The debt of the school, which in 1871 was £373, had increased at the close of last year to £441. The school took a higher place in the national competition of Art Schools, at South Kensington, in May last, than it had done in any previous year. One gold, two silver, and six bronze medals, and nine book prizes (about one-tenth of the whole number of prizes offered for competition among 115 schools, comprising 22,000 students) were carried off by the Birmingham School. The annual examination in drawing and perspective was also held in May last, when 362 students presented themselves for examination, and 217 were successful, 51 obtaining prizes for excellence. The ordinary school-work of 466 "artizan" students was also forwarded to South Kensington for inspection, and 24 third-grade prizes were given for excellent work. One student, Mr. Sidney Currie, obtained a national scholarship of the value of £52, tenable for two years, at South Kensington. Mr. Currie was the tenth student of the school who had obtained this distinction. The annual statement of accounts showed that the income had not been nearly sufficient to meet the expenditure. Among the items of income were the following:—Student's fees, £1,022; subscriptions, £196. 12s. 11d.; receipts from exhibition, £3. 8s. 6d.; Science and Art Department—payable on results, science and art, £504. 9s. 8d.; less moiety of 28 free scholarships paid in advance (£42), £462. 9s. 8d. The expenditure had been £1,893. 18s. 7d., and the total ordinary income, £1,708. 11s. 1d.; leaving a deficiency of £185. 7s. 6d. Besides this there was a deficiency of £96. 18s. 7d. on the new room account, and a deficiency of £157. 18s. 7d. on general account, making a total indebtedness of £441. 4s. 8d.

COMPETITIONS.

THE NEW CHESTER WORKHOUSE.—The Building Committee last week inspected the plans and rejected 17 of them, and this action was approved of at a special meeting of the board, when a motion was also passed to enable the Building Committee to call in all needful assistance, professional or otherwise, to enable them to report finally to the board which plan was best adapted for the purposes contemplated; and, further, to satisfy themselves that the building could be erected for £30,000. At a meeting of the Board of Guardians, held on Saturday, resolutions were read which had been carried at a meeting of the Building Committee, in which the clerk was instructed to write requesting the Local Government Board to allow their architect to examine the plans and report thereon to the committee, or—should there be an objection to that course—

that the Local Government Board should recommend some other competent architect. Another resolution passed in committee was, that Mr. Brookshire, master of the Chorlton union workhouse, be requested to attend and advise the committee in regard to the plans before them.

LLANELLY SCHOOL BOARD.—At a meeting of this Board, held a short time since, drawings prepared by Messrs. Alexander and Henman, architects, of Stockton and Middlesbro', and Mr. E. Sugden, of Bristol, were chosen from a number sent in in competition for their proposed school at Brynmawr.

ABERDARE SCHOOL BOARD.—On the 20th inst., this Board met to finally decide respecting the plans sent in in competition for their schools. The designs prepared by Messrs. Alexander and Henman, architects, of Stockton and Middlesbro', and Mr. E. Sugden of Bristol, were selected, and these gentlemen have received instructions to proceed at once with the working drawings.

PARLIAMENTARY NOTES.

TRAMWAYS PROVISIONAL ORDERS BILL.—Mr. A. Peel, on the 20th inst., moved for leave to bring in a Bill for confirming certain provisional orders made by the Board of Trade under the Tramways Act, 1850 (for the construction of the London Street Tramways—Caledonian-road Extension), London Street Tramways (Extensions), London Street Tramways (S. Pancras Lines), Metropolitan Street Tramway (Extensions), Pimlico, Peckham, and Greenwich Street Tramways (Extensions), South-Western Suburban Tramways, and West London Tramways, and also a Bill for confirming certain provisional orders made by the Board of Trade under the Tramways Act, 1870, for the construction of the Common Road Conveyance Tramway, Kew and Richmond Tramway, Southall, Ealing, and Shepherd's Bush Tramway, Tottenham and Edmonton Tramway, and Uxbridge and Southall and Ealing and Brentford Tramway. These orders, he stated, had been granted some two years ago, but had been suspended, in order that the whole subject might be investigated by a select committee. The Bills were in strict accordance with the recommendations of that committee, but with regard to the first Bill, which dealt with three tramways within the metropolitan boundaries, he should propose after it was read a second time that it should be referred to a select committee. The motion was agreed to.

DIGEST OF SANITARY STATUTES.—Sir C. Adderley, on Tuesday, asked the President of the Local Government Board whether the digest of sanitary statutes which he had prepared in two codes, urban and rural, was so complete as to render any legislation during the present session, in the way of collecting and consolidating the existing statutes, unnecessary and inexpedient, whatever might be advisable in the way of amending them.—Mr. Stansfeld did not know that it was expedient or necessary to consolidate what were called the Sanitary Acts this session of Parliament; he did not think it expedient, because it was a task which might be attempted, but which could not be practically accomplished. He would state in two or three words to the House the nature of the digest which had been prepared, and which would be useful for the time being, and until a more convenient opportunity of consolidating the Acts had arisen. The various sanitary Acts had been all taken to pieces and rearranged under practical headings, so that any man without a knowledge of the law could discover what the law was. The various sections of the Act were then placed under these headings, and redundant phraseology was withdrawn. They had to deal in a digest with the law as it stood, and he thought the time had not come for consolidating it.—Sir C. Adderley: When will the digest be ready? Mr. Stansfeld: It is in the hands of the Queen's printers.

The Church of Walton-on-the-Naze is being restored and enlarged at a cost of £1,300. Messrs. Saunders and Son, of Dedham, are the contractors.

The foundation-stone of a new Episcopal chapel and schools was laid at Westwood, South Devon, on the 15th inst. The chapel is to be of the Early Decorated style, and to accommodate 100 persons. It is being built of Killerton stone with Bath stone dressings, and the work is being carried out by Messrs. Diggins (Diggins and Vicary) and Smith, of Exeter, under the superintendence of Mr. Ashworth, the architect.

Building Intelligence.

CHURCHES AND CHAPELS.

BROADCLYST.—On Saturday week the corner-stone of a new Episcopal chapel was laid at Westwood, one of the hamlets of the large parish of Broadclyst. The buildings are Early Decorated in style, the walls being constructed of Killerton stone, with Bath stone dressings. This Killerton stone is a curious variety of building material, dark coloured, honey-combed, of volcanic origin, rather soft when taken from its ancient oven, but hardens to great power of endurance when exposed to the common elements. The nave is 39½ ft. in length by 21½ ft. In the north transept is a vestry 9 ft. by 7½ ft. The chancel is 21½ ft. in length by 14½ ft. in breadth. The seats will be open, accommodation being provided for 110 persons. The architect is Mr. Edward Ashworth, of Dix's Field, Exeter. The builders are Messrs. Diggins and Smith, also of Exeter, the carving being by Mr. Harry Hems, of the same city.

EATON HASTINGS.—The parish church of Eaton Hastings, Oxon, has been reopened, after restoration under the supervision of Mr. Champion, of Guildford-street, London, Mr. Wheeler, of Farringdon, being the contractor. During the progress of the works a beautiful Early English arcade was found blocked up with plaster on the south side; this has been opened out, and the windows reinserted in the wall. The curious late fourteenth century doorway on the south side of the nave has been carefully restored, and a new oak door supplies the place of the old one. The works carried out consist in opening out the old roof; reseating the nave, the centre passage of which is laid with Godwin's plain tiles; and new glazing the windows. The fine Jacobean pulpit has been lowered, and a heating apparatus placed in the church. The chief works on the exterior are a new bell-cot of stone, new gable cross, and copings with stone ridge.

LEITH.—The church of St. James the Less, at Leith, has been richly decorated throughout with mural painting, consisting of scrolls, diapers, &c., and the arading of chancel with figures introduced in the blank spaces between windows. These figures include S. James the Less, S. Peter, S. Paul, S. Columba, S. Ninian (Bishop), S. Margaret of Scotland (holding the Pix), S. Mark, and S. Luke. The organ pipes are richly coloured, and the case embellished with figures of angels bearing musical instruments painted on the panels, with the plain wood surface for background. The decoration of the church has recently been completed by the insertion of a handsome reredos in veined and white alabaster, coloured marbles, mosaic, and white statuary marble. The central group, in white marble, represents the Ascension of Our Lord. The colouring was carried out by Messrs. Ballantine, of Edinburgh, and the reredos by Mr. Earp, of London, the whole from the designs and under the superintendence of Mr. E. F. C. Clarke, architect, of London. We hope soon to give a view of the chancel, showing the painting and reredos.

LONGTON.—Dresden Church, Longton, Staffordshire, built from plans by Sir G. G. Scott in 1853, and enlarged according to a provision in the original plans, in 1863, has again been enlarged, and was reopened on Sunday last. The accommodation for worshippers was originally 272, it was increased to 452 in 1863, and it has now been further increased to 670. This last increase has been made by lengthening the entire fabric westwards, by which the architectural appearance of the church has been improved. A porch has been added, and many internal improvements made. The floor of the entire building has been boarded, and the centre aisle paved with Minton's encaustic tiles. The total cost of enlargement and improvements will amount to more than £1,000. The architect is Mr. Lynam, of Stoke, and the builders Messrs. Inskip, of Longton.

SCHOOLS,

BROADCLYST.—The corner-stone of new schools for the hamlet of Westwood, Broadclyst, was laid on Saturday week. The schoolroom will be 27 ft. by 18 ft., with a kitchen and parlour for the mistress's dwelling and all necessary offices. The style is Early Decorated, the materials used being Killerton stone, with Bath stone dressings. Accommodation is provided for sixty children, many of whom will be mere infants, the school

being a "dame's-school." Mr. Edward Ashworth, of Exeter, is the architect, and Messrs. Diggins and Smith are the builders.

HULL.—On Monday the foundation-stone of the first school erected by the Hull School Board was laid. The school is to accommodate 250 boys, 250 girls, and 260 infants. The contract has been let to Mr. W. Barrett for £4,407. 18s., and the site cost £1,722. 2s. 10d.

MANCHESTER.—At the meeting of the Manchester School Board, on Monday, it was resolved that certain architects selected by the Sites Committee should be requested to furnish plans for a two-story building for 1,000 children on a plot of land in Every-street, Ancoats, and another for 560 children on land in Vine-street; that £30 should be given for the second best, and £20 for the third best design in each case; and that the authors of the approved design should be selected to carry out the works under the instructions of the Sites Committee, the cost of the buildings respectively to be limited to £4 per head.

STAMFORD.—New schools in connection with S. John's Parish, Stamford, have just been completed. Messrs. Richardson were the architects, and Messrs. Halliday were the contractors. The exterior generally has a neat and substantial appearance. The gable elevation facing the main street contains a large four-light window and an ornamental date-stone (1872), and is surmounted by a finial. The walls are of rubble-work; the dressings are of Clipsham and Casterton stone; and the roof is of Collyweston slate, with red Staffordshire fancy ridges.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance.

Subscribers receiving their copies direct from the office are requested to observe that the last number of the term for which their Subscription is paid, will be forwarded to them in a coloured wrapper, as an intimation that a fresh remittance is necessary, if it be desired to continue the Subscription.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED—W. T. F.—C. B. A.—J. J.—E. W. P.—J. H. C.—W. B.—G. F. R.—Draughtsman.—J. P. S.—E. J.—G. W. B.—W. E.—C. H. W.—E. W. P.—T. R. S.—S. W. T.—A Bricklayer.—J. W. S.—American Subscriber.

"BUILDING NEWS" CHURCH-PLANNING COMPETITION.—We have received several letters in reference to this competition, which we will endeavour to answer next week.

J. G. R.—The Manchester School Grate, referred to in Mr. Barber's paper, is manufactured by the patentees, Messrs. Shillito and Shorland, of Manchester. See advertisement pages.

A. LANE.—9, Conduit-street, Regent-street, W.C. EXPERIENCED DRAUGHTSMAN.—A mere comment. Why not have sent to the journals who are content to pick up the tail of controversies?

WILLIAM CAVELEY (Birmingham).—Your letter adds nothing of importance to the controversy. See our answers to correspondents last week. We take exception to Mr. Ross's conduct, not because he employed Mr. Roper and sent in the designs as his own—as hundreds of others have done the same thing without criticism or reproof. They have, in fact, only adopted an inherited policy. Mr. Ross subjected himself to blame when he so emphatically denied having received essential assistance, and it is in this particular where we are at issue with him. We hope next week to settle the controversy, and to justify our attitude in the matter by an incontrovertible appeal to facts.

Correspondence.

THE EDINBURGH COMPETITION AND SHAM ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—I cannot help thinking that Mr. Ross has been rather hardly dealt by in this matter. I know nothing of Mr. Ross, but am of opinion that it is quite possible he may be an accomplished architect, and yet not feel himself able to grasp satisfactorily so divine a subject as a cathedral without calling in extraneous aid. If such were the case, in seeking assistance he would naturally look for the best that could be obtained; and whatever credit may be due to others, I think, in common fairness, they were bound to secrecy. If an architect is to work out himself every line and detail to be acknowledged the real author of any work he has matured in his own mind, then, I say, any assistance he obtains is reduced to that of mere copyism, to which few artists would attach much value. But there are many cases which have come under my own observation during a long period as an assistant, which differ widely from the above. I allude to those who, having no art qualification whatever, employ permanent assistants at beggarly salaries, and habitually make a practice of taking the entire credit, and pocketing the profits of their brain-work—not in minor matters, but in the real working of designs and details of the most important buildings. As to "sketches," an intelligible sketch is a thing unknown in such offices; all that is given being simply a scrawl indicating—often very imperfectly—form, dimensions, &c., nothing more. But the evils of this system do not end here, for one of the chief characteristics of the sham architect is his studious endeavour to keep down those more gifted, though less fortunate and crafty than himself. I am pleased to find you have had the courage to ventilate this subject. Doubtless you have given great offence in many quarters by so doing, but I am hopeful that it may do some good, if it be only that of raising a few struggling men of ability in the profession, who have been too long the tools and drudges of others; who have hitherto been robbed of the due share of reward for their labours by those who are not unfrequently looked upon by the outside world as "authorities in art matters"—"men of pure motives" and "strictly conscientious," but who do not hesitate to pursue such unworthy practices, so long as there appears no probability of their being found out.—I am, Sir, &c.

R.

A TRADE SECRET.

SIR,—I received the inclosed (directed to me) this morning. Would you kindly oblige me by putting it *in extenso* in your next number, should your space permit.—I am, Sir, &c.,

W. BURGESS.

15, Buckingham-street, Strand, Feb. 21, 1873.

"Carpet Warehouse, W."

(Private)

"T. S. & Son, Carpet Manufacturers and Importers, allow 7½ per cent. commission upon all recommendations. Patterns lent on show. Plans and estimates free. Established nearly a century."

[We have omitted the name of the firm from the circular, as we see no fun in giving them a gratuitous advertisement.—Ed.]

THE INSTITUTE MEETINGS.

SIR,—Two letters have recently appeared in the BUILDING NEWS—one drawing attention to the time occasionally occupied by discussion of what may be called extraneous subjects at evening meetings of the Institute, before the paper which members assemble to hear can be read; the other, complaining that the papers are not always read in the order originally announced in our prospectus.

With respect to the first letter, allow me to explain that it has long been customary, on the recommendation of a member, to permit the announcement and brief description of any novelty in the way of building appliances or materials, before the paper itself is read, in order to leave the rest of the evening free for discussion. The debate which arose the other night on the merits of a certain drain-trap was quite exceptional and unexpected.

To prevent the recurrence of such delay, the Council have, however, now decided that in future

the consideration of such matters shall be deferred until the close of the evening; and in order to ensure the Chair being taken punctually at eight o'clock, the Council, on more than one recent occasion, have met—and whenever the nature of their business requires it, will continue to meet—two hours beforehand, instead of at seven.

With respect to the second letter, I can only say that the utmost pains are taken to ensure adherence to the original prospectus of our Sessional Papers; but as their authors are, as a rule, professional men, it not unfrequently happens that important business engagements prevent them from preparing their papers by the day promised, and this necessarily involves, from time to time, a remodelling of our prospectus, the publication of which (probably for the reasons above mentioned) has only been attempted within the last few years.—I am, sir, &c.

CHARLES L. EASTLAKE, Sec. R.I.B.A.

ON THE HEATING OF PUBLIC BUILDINGS, &c.

SIR,—In your report of my paper, read in my absence before the R.I.B.A., there is one mistake which I desire to have corrected. The paper is by J. Barber, not T. Barber, and I am a mechanical engineer, not civil engineer.

With reference to the discussion, my absence is to be regretted, as had I been there I could no doubt have disposed of the queries proposed.

My paper, to be crammed into one evening's lecture, must necessarily be very limited in its field, and therefore very much respecting heating apparatus had to be omitted, and especially the old Roman hypocausts. My chief reason for omitting the latter was, because, in my opinion, they are inapplicable at the present time. The "Union Jack" circuit of flues would be soon choked with soot, and be very expensive and inconvenient to clean, for we must remember that these hypocaust furnaces were fired with wood and peat, and not coal, as nowadays. This is a point hinted at in my lecture, viz., "those who expect to arrange their heating apparatus successfully by copying faithfully what has been accomplished elsewhere, deserve to find a failure, unless they first contrive that all the accompanying arrangements are equally assimilated." If we can find wood fuel ready to hand in large quantities, then try the Silchester hypocaust, and you will doubtless be successful. I also very much regret having no space to treat on ventilation. I am aware that they are inseparable, inasmuch as you cannot have one successful unless the other is efficient also, but I hope at some future date to prepare diagrams, &c., and treat on ventilation as a continuation of the paper on heating. As to heating by hot air, that I certainly alluded to, being under the head of Gill stoves, placed in vaults or cellars below the building. There are many other plans of hot air heating, all being the same in principle, though perhaps very different in execution.

In conclusion, I shall be very happy to atone for my enforced absence last Monday by answering any questions by letter your readers may choose to address to me.—I am, &c.,

JNO. BARBER,

35, Cromer-terrace, Leeds, Feb. 24, 1873.

FITTING UP BATHS.

SIR,—Your correspondent "G. B." is mistaken in supposing that your other correspondents "ignore expansion altogether," for on turning back to page 112, he will find that Mr. Watkins has had it in view when he elevated his expansion pipe K about 2ft. or so above the cistern. On turning to p. 141, he will also find the expansion pipe in my sketch elevated above the cistern, so that in these cases the hot water would not overflow into cold cistern A, unless when the water boiled. In my style, in practice, however, even suppose the water should boil up at an odd time, it would not mix with the water in cold cistern, simply because I should bend the mouth of the pipe down into the overflow of cistern. Were the cold cistern A situated in garret near roof, the expansion pipe K might be carried out to roof outside. The only fault, therefore, in my sketch at p. 141 is one of omission, in not showing the expansion pipe K as being either bent down into cistern overflow—or "standing-waste" as it is sometimes called—or else carried through roof. I left that to be understood. When, however, referring particularly to me, "G. B." goes on to say, "the hot-water cistern being supplied direct from the cold-water cistern," I immediately call a halt, as in the sketches by "H. K., Mr. Watkins, and myself, we are not treating of hot-water cisterns, but of close cylinders or intermediate tanks; and in my case at least, at p. 141, the close cylinder B is not "supplied direct from the cold-water cistern," but instead, the water from cold cistern first flows into the boiler C, and when the boiler is full, then, and not till then, does the water

rise up into close cylinder B. "G. B." must learn, therefore, to be more careful in his remarks, and also to be able to distinguish between things that differ; for a close-pressure cylinder, and a hot-water cistern such as he has depicted at p. 202, are two different things, each requiring to be treated in its own way; and in regard to the hot-water cistern shown at p. 202, it is all right so far, only "G. B." by carrying up his hot flow pipe I to the very top of the hot water in hot cistern B prevents the water in said hot cistern from getting properly heated, as it would do were his hot flow pipe only carried up, say to the height of a third of the depth of water in hot cistern. No doubt by this means he gets his hot water direct from the boiler, but his supply of hot water to boiler is curtailed, and his fuel wasted—the latter no slight objection in these times of high-priced coal. If "G. B." does not know a better and more economical plan of getting the hot water direct from the boiler, I leave the author of the articles on "Plumbing" to afford him the necessary information: I may also observe that unless there was something special in the case at p. 202, "G. B." does not require three cisterns, as his hot one could be placed alongside the large cold one. In a country house the small cold cistern might be supplied from the large cold one, but in a town where there is a constant high-pressure supply the small cold cistern might be supplied direct from the main supply pipe.—I am, Sir, &c.,

W. P. BUCHAN.

Glasgow, 15th February, 1873.

MARBLES.

SIR,—I think that the interesting and instructive "Notes on Stonework," which have recently appeared in the BUILDING NEWS, must have been read with profit throughout, at least, the Home Empire. [Of this I am sure, that in Devonshire they have excited attention among men of business, so, as it may be of use to some of your innumerable readers, I am led to make a remark or two in connection with a paragraph in "Notes No. IV.," which has been the subject of comment here. It says:—"Mr. Hull states that from Barton's quarries, near Ilppelen, blocks of 18ft. square are now sent to London. It will easily be seen that this is a mistake, and means 18 square feet, &c., &c. Now, likely enough this should be 18 square feet, but as I have to visit occasionally the Devonshire Marble Quarries, Oreston, near Plymouth, worked by the Messrs. Goad and Co., I can vouch for the fact that blocks of variegated marble, of the best quality, and of very great magnitude, are being constantly quarried by them, and that it would not be difficult for them to supply stones of 18 feet square. Quite recently they turned out a variegated block, sound and perfect, 30 feet long, 18 feet by 10 feet; and I think that last summer I saw some splendid columns, some 14 feet high, polishing at their Steam Marble Polishing Works, for the Home and Colonial Offices, London; and, on remarking on their size, was told that they could have been supplied with ease 20 feet long, or more, if required. A splendid polished baptistry, weighing 15 tons when finished, in one stone, was recently sent from these same works to S. John's Church, Torquay.—I am, Sir, &c.,

SOUTH DEVON.

Intercommunication.

QUESTIONS.

[2797].—Durability of Stone.—Could the writer of the articles on Stonework, or any of your readers, give other tests, to prove the durability of building-stone than that given in last article?—STONEMASON.

[2798].—Warming Rooms in Roofs.—Required the best and cheapest manner of improving the warmth of rooms in roof. Plain tiles are to be used, and there is a difficulty about the pins if felt and boarding are used. I have thought of lathing between the battens, and bedding the tiles on with lime and hair, or the underside might be plastered after tiles are hung. Perhaps some of the readers of the BUILDING NEWS will give an opinion.—S. K. T.

[2799].—Geometrical Drawings.—Can any correspondent of the BUILDING NEWS, versed in the theory of geometrical drawing, say if a semicircular-headed opening on a cant is shown as a semicircle struck from a higher point, or as a portion of an ellipse, with proof?—M. R.

[2800].—Weare's Patent Night Stools.—Can any of your readers inform me where I can obtain Weare's patent sealed night stools? The Poor Law Board advise me to specify them for tramp wards. They give Mr. Weare's address as Wolverhampton, but he has left there some years, and I can hear nothing of him; so I should be much obliged by any information respecting him.—T. W. C.

[2801].—Ornaments of the Profession.—With whom did those ornaments of the profession, Messrs. Street, Burges, Godwin (E. W.), and Shaw (R. N.), severally serve their articles?—AIDE-TOI.

[2802].—Ridge Cresting.—I write to express my great gratification at the recent enlargement of the BUILDING NEWS. I have long thought it the best architectural weekly, and I feel sure that your subscription list will soon prove this to be the general sentiment. Permit me to ask some reader, through your Intercommunication, for a detailed description of a ridge cresting, often illustrated in your paper, but, so far as I know, not used in this country—such as, for example, that on the ridge of Chorley Townhall, by Woodzell and Colclutt (BUILDING NEWS, Jan. 17, 1873), or on ridge of Whitgift Hospital School (Jan. 24th)—material, dimensions, mode of con-

struction and application?—REV. FRANCIS GOODWIN Hartford, Ct, U.S.A.

[2803].—Duties, &c., of Clerk of Works.—Being engaged as clerk of works, I have to superintend the erection of various buildings say about 40 miles distant from each other; also prepare general working drawings, and take out the quantities to let the works to contractors. I find there is quite enough to do to superintend in a proper manner the erection of the several buildings and, check the extra work, without preparing drawings and taking out quantities. Can any of the readers of this valuable paper define the duties of clerk of works, also average salary?—PRACTICAL.

REPLIES.

[2779].—Distance.—I thank "Ex" and "Llanely" for their answers to my questions, though I still fail to see why the results given by the two section lines should not agree. The surface of the arch must be a straight line, as seen from the plan. As I conclude the results given by the two sections must be different, I shall be obliged by either of the above correspondents favouring me with a reason for it.—H. B.

WATER SUPPLY AND SANITARY MATTERS

THE BOARD OF TRADE WATER REGULATIONS.—The Hackney District Board of Works has joined in the protest raised by nearly all the local boards of the metropolis against the rules issued by the Board of Trade for regulating the long talked of, but apparently never to be obtained, constant supply of water for London. At the meeting of the board on Friday week, a resolution was passed condemning the resolutions as vexatious and impracticable, and calling upon the Metropolitan Board of Works to take steps for getting them repealed. The Board had previously resolved to ask the Government to amend the Act under which the regulations were issued.

PEMBERTON.—The newly-constituted Local Board for the district of Pemberton, near Wigan, has taken prompt steps to improve its sanitary condition. The district is composed of several important hamlets, with a collective population of about 12,000. On the motion of the Chairman, Mr. W. T. L. Watkin, the board has unanimously resolved to instruct its engineer, Mr. H. Williams, C.E., of Wigan, to report upon the sanitary condition of the district, and to prepare a system of sewerage, and report upon the most advantageous manner of disposing of the sewage. A committee will also be formed to deal with the question of water supply.

THE NATIVE GUANO COMPANY AND THE BOARD OF WORKS.—The following report from the Works and General Committee was adopted at the meeting of the Metropolitan Board of Works on Friday week:—"Your committee beg to report that they have considered the resolution of the board of the 31st ult., referring it to them to make arrangements with the Native Guano Company for the removal of their works from the Crossness Pumping Station. Your committee have conferred with the solicitor on this matter, and there appears to be no reason why the board should not, if it so determined, cause the supply of sewage to be stopped and resume possession of the land now occupied by the company. With regard to stopping the supply of sewage, this, your committee think, should be done at once, and they recommend that it be discontinued on and after Monday next. The removal of the works, materials, &c., will of course be a matter requiring some longer time, but this your committee consider might reasonably be expected to be done by the 30th April next, which is the day they recommend the board to fix. The solicitor has prepared and laid before your committee a form of notice to the company to the foregoing effect, and your committee now beg to submit this form, and recommend that it be approved and, when signed by the clerk on behalf of the board, be forwarded to the company."

HANLEY.—Mr. J. T. Harrison, C.E., of the Local Government Board, held an inquiry at Hanley, on Wednesday week, in reference to the application of the Town Council for authority to borrow £13,000 for sewerage works in the borough. The enquiry having been formally opened, the Town Clerk explained that the works for which the sanction of the Local Government Board was now sought were part of the main drainage of the borough, and, as far as they went, were complete in themselves. The estimate exceeded £13,000, but the surveyor was of opinion that certain portions of the works in existence could be made use of, which, with the sale of materials and other things, would make £13,000 amply sufficient. They did not shut their eyes to the fact that they must deal with the sewage, but, as a young borough, they had not thought it incumbent upon them to make costly experiments, though they had carefully watched the systems adopted elsewhere, in the hope of finding one that would be satisfactory. The Inspector intimated that he should require from the Council an undertaking that they would do what was required for the purification of the sewage. The Surveyor said the estimated cost of the sewerage of the whole of the borough was £23,000. The Inspector carefully looked over the plans and specifications, and made minute inquiries in reference to the proposed works. He said the gradients were very good, and the specifications had been very carefully and thoughtfully prepared. The Town Clerk asked the Inspector to support the application of the Council that the loan should be granted at 3½ per cent. interest, and Mr. Harrison said it was a very proper case for allowing

a low rate of interest. He also said that as far as he could see, the scheme appeared to have been carefully gone into.

KINGSTOWN.—The sewerage of Kingstown has lately been actively considered by the Township Commissioners of that place. In a town numbering nearly 18,000 persons, several important terraces have no sewers; and the majority of houses which possess those conveniences have them in such an imperfectly trapped condition that the return gases evolved are most obnoxious to health. Besides this, the main sewerage of the township is brought by pipes into the sea only for a short distance, the result being that, when the tide is out, the effluvia from the decomposed sewage is unending to those residing in the locality. The present chairman of the township is now promoting a Bill in Parliament to carry out the designs of Mr. Palles, by which it is proposed to carry the sewerage of Kingstown, and if necessary the adjoining townships of Blackrock and Dalkey, into deep and continuously running water, at a place called Sandy Cove Point, between one and two miles from Kingstown, where a tidal current is found of sufficient force to carry the sewerage matter out to sea. The estimated cost is £28,000.

LAND AND BUILDING SOCIETIES.

ARTISANS', LABOURERS', AND GENERAL DWELLINGS COMPANY.—The Artisans', Labourers', and General Dwellings Company have, on their past year's operations, realised a dividend of 6 per cent., less income-tax. They are about to plant a suburban colony on the Shaftesbury-park estate, Wandsworth-road. Besides school-rooms, baths, and wash-houses, it will be furnished with a lecture-hall and co-operative store. Six hundred applications have already been received for houses.

TIVERTON LAND AND BUILDING SOCIETY.—The first annual meeting of the members of this Society was held on Monday week. A satisfactory report of the directors was read. There are three blocks of houses in construction, one of which is nearly finished, and the directors have had several applications from parties to rent them. The statement of accounts showed that up to Christmas last the income of the Company had been £2,746, and the expenditure £2,956. The assets are £3,846 up to the same date, and the liabilities £3,805 2s. 6d., leaving a balance of £40 17s. 6d. in favour of the Company.

PEOPLE'S CO-OPERATIVE BENEFIT BUILDING SOCIETY.—The twenty-fifth annual meeting of this society was held on the 20th inst., at Deptford. From the annual report, it appears that the cash receipts during the year were as follows:—Members subscriptions and B shares, £17,127. 11s. 2d.; sales of forfeited properties, £1,313; bank for deposits, £6,611. 13s. 11d.; fines, fees, &c., £39. 6s., making a total of £25,091. 11s. 1d. A loan of £1,000 from bankers and the cash balance of 1871 (£1,117. 17s. 2d.) make up the total on the debit side of the balance-sheet to £27,209. 8s. 3d. £12,351 have been advanced during the year to borrowing members, who have also had £162. 18s. 11d., their accumulated subscriptions, returned to them, to assist in completing their purchases. Since the commencement of the society, £162,630 has been advanced for the purchase of 1,001 houses. The investors' capital has reached £21,909, an increase since last year of £1,800. After providing for every liability, there was a realised profit on the year's operations of £618. 7s. 7d. The directors recommended that a bonus of two per cent. be declared on all shares two years old and upwards. The report was adopted.

TEMPERANCE PERMANENT LAND AND BUILDING SOCIETY.—The nineteenth annual meeting of this society was held on the 26th inst. The repayments on advances during the year, according to the report, amounted to £153,000. The sums received in the deposit department amounted to £43,000. The amount received for interest and premiums on advances was £52,000. The sums repaid to members was £77,000, and to depositors, £30,000. The sum advanced on houses was £105,000, thus increasing the total amount advanced on houses, since the formation of the society, to £1,840,000. The directors have apportioned profit at the rate of 5½ per cent. per annum on the subscriptions at the credit of shares in force; and have also apportioned profit on uncompleted shares withdrawn during the year (in addition to the profit on withdrawal) at the rate of 4 per cent. per annum for the portion of the year expired prior to the receipt of the notice of withdrawal, and out of the balance of profit a sum of £6,300 was placed to the credit of the properties in possession.

THE PEABODY TRUST.—The Special Dwellings Committee of the Charity Organisation Society held its second meeting on Wednesday week, Marquis of Westminster in the chair. Mr. R. Vigers, surveyor to the Peabody Trust, stated that the trustees had provided accommodation for about 1,200 families, and would soon have provided for a much larger number. They had endeavoured to secure sites as near the busy part of the town as possible. They had secured three very suitable sites to the south of the river—Pott's vinegar factory, a site near Broadwall, Blackfriars, and the site of the old Magdalen Hospital. By going a little way from the crowded neighbourhoods they were able to secure playgrounds for the children. They they had at all their houses. They had much difficulty in getting sites. The owners of many suitable plots could not sell the freehold. They had lately put up some

concrete buildings in Bermondsey, at a cost of only £47 a room. The trustees admitted no one as a tenant who was earning more than 21s. a week, but some of their tenants bettered themselves, and they could not turn them out on account of their getting to earn a few shillings more. The average rent was 1s. 10d. per room, and the average profit about 2 per cent. The buildings were very highly rated. In one property the rates and taxes, exclusive of gas and water, amounted to £1. 0s. 10d. per room for the year; and the charge for water was in some cases 6s. 1d. per room. The trustees would be glad to get suitable blocks of old houses to renovate, but had not yet succeeded in finding them. Lord Shaftesbury expressed his conviction that there was no hope of materially improving London except on the commercial principle. It had been abundantly shown that there was no unwillingness on the part of the working classes to live in improved dwellings, and that they gained morally, socially, and financially by the change. The question now was, how to effect the required improvements on a sufficiently large scale. He thought this might be done in great measure by adapting old houses, and he believed that this might be done with financial success. A sub-committee was appointed, on the motion of Mr. U. J. Kay-Shuttleworth, M.P., to consider various suggestions and advise the committee as to the best mode of dealing with the various branches of the subject.

LEGAL INTELLIGENCE.

THE DUTCH WATERWORKS COMPANY.—This company was ordered on Friday week to be wound up compulsorily. It was formed for the purpose of supplying the town of Flushing and the city of Middleburg with water. £12,000 only of the capital has been subscribed, and remained intact, not a penny having been drawn out by any of the directors—a remarkable instance of self-denial; but as about £64,000 more was required by the company to carry out the undertaking, they had resolved not to proceed further with it.

THE BUILDERS' TRADE CIRCULAR COMPANY.—This company was on Friday week ordered to be wound up compulsorily.

A DISPUTED CONTRACT.—**HILL v. THE GUARDIANS OF POPULAR UNION.**—This was an action to recover a sum of £7,756 by a contractor under a certificate given by the architect of the works. The defendants sought to set up that some of the work included in the certificate had not been performed, and other portions of it still remained to be completed, and that a part of the work which had been certified for had not been performed under written orders, as required by the contract. The plaintiff's answer was that all extras had been referred to arbitration, and that the certificate of the architect having been obtained for work performed, the plaintiff was entitled to be paid under it. Mr. Prentice contended that if an architect gave a certificate within the limits of his jurisdiction it was binding, but if he went beyond the limits of his jurisdiction it was not. The case occupied the whole day, and in the end a verdict was entered for the plaintiff for the full amount, the defendants having leave to move the Court above on certain points of law.

AN ARCHITECT'S CLAIM FOR COMMISSION.—At the Leeds Court on Monday week, the case of Wilkinson v. Simpson was tried. The plaintiff was Mr. J. P. Wilkinson, of the late firm of Taylor and Wilkinson, architects; and the defendant Mrs. Sarah Simpson, administratrix of the late Mr. George Simpson, accountant. The action was to recover £34. 13s. 4d., the balance of an account amounting to £54. 13s. 4d., for work and labour done. In 1864 Mr. Wilkinson bought some land in Willow-terrace-road, between Tonbridge-street and Hillary-street. The late Mr. Simpson bought a portion of that land, and employed Messrs. Taylor and Wilkinson to advertise for tenders for building three houses. The tenders were sent to Mr. Simpson, and the work was let. The contractors in 1866 proceeded to build, and in due time were paid upwards of £1,360. Upon that amount the plaintiff claimed a commission of four per cent., which would amount to £54. 13s. 4d., and Mr. Simpson, before his death, paid Taylor and Wilkinson £20. Mr. Wilkinson said the partnership between himself and Mr. Taylor had been dissolved, and he had bought his partner's share of the debts due to the firm. Four per cent. was one per cent. less than the usual architect's commission for plans, specifications, and superintendence. The tenders were received by him, but sent unopened to Mr. Simpson. He denied that he ever said the contracts between Mr. Simpson and the builder were in writing. He said the tender was the only contract. When a tender was accepted that was the contract. The contractors were John Hargreaves, £317 for bricklaying; Gelderd and Watson, £241 for masonry; Woffinden and Fox, £441 for joiner's work; Ainsley, £140; John Barren, painter, £28. 5s.; Smith, slater, £22; for iron palisades, £40; and the marble mason, £48. In December, 1866, the last architect's certificate was given. Some alterations were made by one architect in April, 1867. His Honor, in giving judgment, said the facts were not free from considerable doubt. He believed, however, there had been a rescinded contract, and rescinded before breach in his opinion, and afterwards there was no substantial renewing of the contract. He therefore gave a verdict for the defendant.

IN RE E. W. PUGN.—The debtor, Edward Welby Pugn, was described as of the Grange, Ramsgate; of

111, Victoria-street, Westminster; and of Holden-terrace, Belgravia, architect, builder, and warehouseman. He recently filed a petition for liquidation by arrangement, the unsecured debts being returned at £28,161, and assets £58,470, an amount of £132,873 being covered by securities. At the first meeting of creditors a resolution was passed for a liquidation by arrangement, and a trustee was appointed. Mr. Treherne applied on Tuesday, before Mr. Registrar Keene, that the resolution should be registered. In this case a question had arisen as to the stamp-duty payable upon the registration. On the one hand, it was suggested that duty was payable upon the amount of assets returned by the debtor in his statement, and on the other hand it was contended that the actual value of the assets being £9,000 only, payment of duty upon that sum would be sufficient. His Honour held that duty must be paid upon the amount of assets returned in the accounts, and, subject to that, allowed registration.

Our Office Table.

THE SOCIETY OF PAINTERS IN WATER-COLOURS.

—Mr. Gladstone has been elected the first honorary member of this society. It will be remembered that the right hon. gentleman recently advised her Majesty to confer on the President (now Sir John Gilbert) the honour of knighthood, as a public recognition of the peculiarly national branch of the fine arts which the society has cultivated from the period of its foundation in 1804. With a deep sense of the importance of the service thus rendered to water-colour painting by the First Minister of the Crown, the society passed a special resolution to confer upon a limited number of eminent personages the distinction of honorary membership, and offered to Mr. Gladstone the first fruits of the new regulation, which the Premier has done the society the honour to accept in a personal interview with its officers. Subsequently, Sir Richard Wallace, M.P., Mr. Prescott Hewett, M. Madou, President of the Royal Belgian Society of Painters in Water-colours, and Professor Ruskin were elected; all gentlemen who are well known to have exerted remarkable influence in the promotion and spread of a knowledge and taste for the fine arts.

FRESCO AND MURAL DECORATION.—The Committee of the Council of Education intend to award a number of prizes for the best-executed copies of any existing examples of fresco and mural decoration still existing in the three kingdoms, in connection with our old ecclesiastical or other buildings. The information desiderated, to be furnished along with the copies, is to the following effect:—The name of the church, or other old building, on the walls of which the painting exists; the name of the town, county; whether in tempora, fresco, or oil; the size; the name of the artist (if known), or probable name; date of the work, or probable date; and the name of any printed work containing descriptions of the above. Circulars will be immediately issued by the head masters of the different schools of art in connection with South Kensington, giving particulars of the competitions, and asking for the return of all the available information that can be obtained on the subject. It may be stated here that in respect to Ireland, very scant examples of fresco and wall-painting in any form at present exist; and Scotland is not much better off. Some fine examples exist in England, and almost every year, owing to the number of church restorations that are taking place, some valuable "finds" take place where the walls and stonework of the churches are bared of the white-wash and plaster coating they have been subjected to by the Vandal improvers of the sixteenth and seventeenth centuries.

REMOVAL OF THE ROYAL ACADEMY.

—The London correspondent of the *Northampton Mercury* is "informed on reliable authority" that efforts are being made in the highest quarters to procure the removal of the Royal Academy from Burlington House to the Royal Albert Hall. The idea is said to meet with the warm approval of the Queen, and it is favoured by other members of the Royal Family, more especially by the Duke of Edinburgh, with whom a gentleman representing the committee of the Academy had a long interview on Monday week. It was pointed out to the Duke, at the Albert Hall itself, that the building is totally inapplicable to the purpose for which it is sought to be used, and that it does not contain any of the offices and other conveniences at present to be found at Burlington House. It is stated that the

Duke of Edinburgh wished the next Academy Exhibition to be held at the Albert Hall. At present the matter remains *statu quo*.

THE HOTEL DE VILLE AT PARIS.—The designs for the new Hôtel de Ville have been exhibited in part of the vast Palais d'Industrie. One gentleman, according to a correspondent of the *Globe*, has struck out a new path in a "nineteenth-century style," apparently composed of a wholesale slaughter of all other styles that have had the misfortune to precede this. The mass is a maze of Corinthian porticos and all other conceivable classifications; the upper part is a gigantic series of pyramidal spires and domes, crowned each by one monster statue. This designer seems to have drawn much of his inspiration from the hideous spire of our own St. George's, Bloomsbury; but another, M. Crépînet, has come to London for suggestions with far better result, and has produced a very effective building indeed, by replacing the clock turret of the old Hôtel de Ville by a grand clock tower, much after the manner (Renaissance detail taking the place of Gothic) of that at Westminster, and nearly 400ft. high. More than half the inside is simply space, and at least 60ft. of tower has no other use than as a pedestal to the clock above, unless, indeed, the whole is to be devoted to the weights like a gigantic "old clock on the stairs." Paris has hardly money for such expensive vagaries at present, but would obtain a fine straight contrast to her many swelling domes if she adopted M. Crépînet's design.

TRUSWELL AND HOLDEN'S NEW HEATING APPARATUS.—The patent for a new heating apparatus was sealed on the 20th instant by Messrs. Truswell Brothers and Holden, of Sheffield, and it is, we believe, the intention of the patentees to compete for one or more of the prizes offered in connection with apparatus for warming and ventilation, by the Society of Arts. The patentees claim for the apparatus special advantages, inasmuch as they have a large heating surface, and the apparatus is constructed so as to exhaust all the heat in the pipes through which the air passes, instead of allowing it to go unexhausted up the chimney. The apparatus consists of a number of cast-iron pipes (round or oval) placed in tiers, layers, or rows one above another, with space sufficient between each to allow of the heat to pass. These pipes are fitted into socket plates with expansion joints, so that the apparatus may be got up to any heat without injury from expansion or contraction, the arrangement being such as to insure the fire passing under or over the whole of the pipes. Those pipes nearest the fire are of thicker metal and wider in diameter than those further removed from the fire, and the pipes are also very carefully shielded by a fire-brick arch, which extends the whole length of the furnace, thus preventing the air from becoming burned or unnaturally dry. There is no danger of escape from smoke or carbonic acid gas, as the ends of the pipes are covered with a specially prepared composition; the hot air is therefore perfectly pure, which is a very great desideratum in artificial heating, and can be breathed for any length of time without injurious effect. The apparatus is encased in brick; the cold air passes into the pipes by means of flues or apertures in the brickwork, and then goes into the hot air flue, from which it travels into the building to be heated. The patentees are about perfecting the same principle to be applied to open fireplaces, by means of which waste heat in grate fires may be utilised.

THE "HYDE PARK PAVILIONS."—It will be remembered that on "Thanksgiving Day," now a year ago, the Metropolitan Board of Works erected some large pavilions or platforms in Hyde Park, from which the members of the Board and of the various London vestries and their friends might view the royal procession. The cost of these works (some £3,000 or £4,000) was defrayed out of the metropolitan rates, and the matter attracted attention in Parliament. We referred to the subject at the time, and expressed the hope that the members of the Board and their friends would not be allowed to indulge the exuberance of their loyalty at the public expense. We are therefore glad to see that the persons who occupied the seats (or some of them) will have to pay the cost of their erection, for the amount of their cost was disallowed at the annual audit of the accounts of the Metropolitan Board of Works, held on Monday last at

the office in Spring Gardens. A deputation from the ratepayers, consisting of Lord Abingdon, Lord Frederick Fitzroy, Major Lyon, Mr. Grenville Berkeley, and others, appealed against the charge levied on the metropolis for the pavilions, and after consideration of the appeal, and on referring to the Act of Parliament, the auditor came to the conclusion that the Act passed for the cleansing, improving, and drainage of the metropolis contained no clause which sanctioned the erection of pavilions for the use of the Board. In the accounts there also appeared a charge for a dinner given by the members of the Board of Works to themselves on the same occasion, but this was withdrawn.

SCAFFOLD ACCIDENTS AT BARNSTAPLE.—A scaffold accident (stated to be the fourth of its kind since the building was commenced) occurred on the 19th inst. at the new Prison Works, Barnstaple, whereby four men who were standing on a scaffold about 20ft. high were precipitated to the ground. One man had his arm broken, and the rest were seriously injured. The contractor himself (Mr. Brown, of Barnstaple), was seriously injured some time ago from a fall from the scaffolding on the works. The building is picturesque in design, red brick being the principal material used. The architects are Messrs. Gould & Son, of Barnstaple, the Borough Surveyors.

CHIPS.

In our report of the proceedings of the Royal Institute of British Architects in last week's impression, we stated in reference to the competition for the Pugin Travelling Studentship, that honourable mention had been made of the drawings submitted by Mr. "James Garrard." We should have said Mr. "Thomas Garratt."

From the top of the tower of Winkleigh Church, Devon, no less than twenty-four parish churches may be counted. This prospect is surpassed, however, by that from a spot in Norfolk, not far from North Walsham, where, from the leads of a village vicarage, it is said to be possible on a clear day to distinguish (though not an easy matter to count) no less than fifty-two church towers!

Mr. Boehm's statue of the Queen has been removed from the Albert Hall, and placed in the new State entrance at Windsor Castle. It is said to weigh seven tons.

To many who remember the charming facility of the late Mr. Thomas Allom's pencil in depicting architectural subjects, it may be of interest to know that some of his pictures, drawings, and sketches are to be offered to the public at Messrs. Christie, Manson, and Wood's on Friday, March 14th.

There is said to be some prospect of a forthcoming cheap edition of Mr. Ruskin's works.

The death is announced of Mrs. Anastasia Dolby, who was in early life embroideress to the Queen, and whose works on "Church Embroidery, Ancient and Modern," and "Church Vestments: their Origin, Use, and Ornament," are books of standard authority. Mrs. Dolby, who was the wife of Mr. Edwin Dolby, the water-colour painter, died in her 48th year.

A meeting of the Biblical Archaeology Society will be held on Tuesday next, when a paper will be read "On the Synchronism of Assyria and Babylonia," translated from the Cuneiform Inscriptions, by the Rev. A. H. Sayce, M.A.

The Annual General Meeting of the Architects' Benevolent Society will be held in the Rooms of the Royal Institute of British Architects on Wednesday, the 12th inst., at three o'clock precisely.

The Central Fire Brigade Station at Glasgow is to be enlarged and altogether remodelled, and dwelling accommodation provided for the firemen.

A new bridge is to be erected over the Seine at Paris, at a cost of over £120,000. The part of the bridge which is to span the larger arm of the Seine is to consist of three cast-iron arches of 42 metres span each, and the other of one arch of 64 metres span.

At a meeting of the Council of the Royal Botanical Society on Saturday last, estimates were agreed to for building a new and extensive range of houses for preserving the rapidly-increasing collection of economic plants possessed by the Society, and for generally improving this important department.

The business of Mr. Charles Denham, of Halifax, quarry owner and stone merchant at Halifax, Bradford, Goole, &c., has been privately formed into a limited company; the clerks, foremen, &c., having a priority in the allotment of the shares. It is also intended, as far as possible, to give the workmen who are not shareholders more interest in the success of the company by dividing amongst them a yearly bonus out of the profits. The capital of the company is £60,000, in 12,000 shares of £5 each, with £3 paid.

Trade News.

WAGES MOVEMENT.

AIRDRIE.—At an adjourned conference held between employers and employed in Airdrie, N.B., it has been unanimously agreed by the employers to advance the present rate of wages from 6½d. to 7d. per hour, and the country wages advanced from 3s. to 4s. per week.

TENDERS.

BATH.—For erection of S. Paul's Church.

Emery	£3,878	10	0
Loug	3,872	0	0
Hunt	3,832	17	7
Morgan and Lovell	3,760	0	0
Mullings	3,500	0	0
Rideout	3,395	0	0
Long	3,278	0	0
Bladwell (accepted)	3,240	0	0

CITY.—For the erection of two warehouses in Queen Victoria-street, City. Mr. Alexander Peebles, architect. Quantities supplied.

		Add if Portland stone is used	Gross.
J. Bland	£1,0168.	£669 0 0	£10,837
J. Morsman	9,610.	670 0 0	10,280
C. Fish	9,200.	639 0 0	9,839
Moreland and Co.	9,077.	775 14 0	9,852
G. Myers	9,010.	579 0 0	9,589
B. E. Nightingale	8,940.	595 0 0	9,535
Longmire & Burge	8,900.	573 0 0	9,473
Wicks, Bangs, & Co.	8,873.	580 0 0	9,453
Woodward	8,822.	763 0 0	9,585
Scrivener and White	8,820.	580 0 0	9,400
T. Ennor	8,775.	686 0 0	9,461
Ramsay	8,743.	569 0 0	9,312
T. Morter	8,668.	545 0 0	9,213
Mortor accepted, including stone.			

CLAPHAM.—For forming and making-up of roads and laying in pipe sewer to same, Clapham-park estate. Mr. W. R. Lacey, surveyor, Clapham, S.W.

R. Neal	£1,695	19	2
C. Chappell	1,400	0	0
W. Elsdon	1,315	0	0
W. Wigmore	1,250	0	0

COLCHESTER.—New boiler-shop to Messrs. Davey, Packman, and Co.'s ironworks, bricks, tiles, and lime provided. Mr. G. Gard Pye, architect.

Saunders and Son	£345	0	0
Everitt and Son	344	10	0

CORK.—For new floors, re-pewing, &c., the Wesleyan Church, Patrick-street, Cork. Mr. Robert Walker, 17, South Mall, Cork, architect. Quantities not supplied.

R. M'Swiny	£930	0	0
F. Jackson	790	0	0
C. W. Atkins (accepted)	754	0	0

PAINTING, VARNISHING, AND POLISHING.

Rogers	£190	0	0
Bible	152	0	0
Dixon (accepted)	121	10	0

WARMING AND VENTILATING.

Perrott and Sons (accepted)	£140	0	0
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DOVER.—For building a new bank at Dover for the London and County Banking Company. Mr. Fred. Chancellor, architect. Quantities by Mr. Sidney Young.

Rider and Son, Southwark	£4,794	0	0
Dove Bros., Islington	4,145	0	0
Stiff, Dover	4,124	0	0
Hill and Son, Islington	4,048	0	0
Denne, Walmer	3,898	0	0
Adecock and Rees, Dover	3,853	10	0
Cooke and Green, London	3,793	0	0
Wilson, Canterbury	3,732	0	0

ESSEX.—For building new schools at Mayland, Essex. Mr. Fred. Chancellor, architect. No quantities supplied.

Stammers, Southminster	£975	0	0
Saunders, Maldon	965	0	0
Gozzett, Woodham Walter	825	0	0

FINCHLEY.—For six houses, with shops, on the Torrington-gardens estate. Mr. M. C. W. Horne, architect.

Walton	£5,229	0	0
Gilmour	4,980	0	0
Carter	4,920	0	0
Thompson and Smith	4,877	0	0
Wagner	4,784	0	0
Cooper	4,775	0	0
Niblett and Son	4,580	0	0

GPSY HILL.—For the construction of roads and sewers on the Ashburnham-park estate. Mr. H. A. Alexander, architect and surveyor.

Jones	£669	10	0
Harris	598	0	0
Cockell	590	0	0
Hubbard	585	8	0
Jackson	570	0	0
Pizzey	567	0	0
Clarke	556	0	0
Finch	540	0	0
Wilson and Fairry	486	7	6
Bysh (accepted)	475	0	0

HAMMERSMITH.—For re-building the premises Nos. 13 and 15, King-street, Hammersmith, for Mr. Charles Brown. Quantities supplied by Messrs. Welch and Atkinson.

Macey	£3,527	0	0
Braithwaite	3,450	0	0
Hill and Sons	3,370	0	0
Perry Brothers	3,300	0	0
Colls and Sons	3,214	0	0
Turner and Sons	3,163	0	0
Dowds	3,160	0	0
Pritchard	3,147	0	0
Chamberlain	3,047	0	0
Adamson and Sons (accepted)	2,994	0	0

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 7, 1873.

A CRUSADE AGAINST COWLS.

THE miserable skylines of London streets must strike foreigners and visitors from the country, as they reach the Metropolis by one of the high-level railways which creep round and about the wretched suburbs in close proximity to the chimney-pots—and what chimney-pots! What foul demon of darkness could have invented those myriad-twisting, crooked, ungainly pipes and many-lidded caps,* like old Jew clothesmen's head-gear, and corkscrew squeaking cowls which, like a foul brood of night-birds of ill omen, have settled upon the chimney-stacks of London? Are they the restless ghosts of household gods struggling to escape from confinement within the dwellings of the inhabitants? or are they the seven worse companions of the ousted imp coming back to take up abode with him in each house after it has been once swept and garnished? Alas! they portend not only past and future evil, but sad present misery to the inhabitants as well. Each ugly terminal testifies to a woeful tale of domestic distress—to fruitless efforts of at least one housewife to keep the Bishop out of the messes of pottage for her infants, and to make palatable for her wearied spouse, after his labour, his frugal meal. How many angry feminine exclamations such as "Drat the smoky chimney!" with explosions of worse expletives from masculine martyrs, have not been registered among the idle words of which an account has hereafter to be rendered, before recourse was at last had of contributing another to this ghastly aerial array of tall-boys and cowls! Think of the wrangling that must have ensued between landlords and tenants, and between the quacks who undertake to correct such evils on the principle of "No cure no pay," and their frenzied victims when the futility of these costly as well as grimy contrivances has been demonstrated by experience, and they have been left as permanent scarecrows, out of sheer desperation at incurring any further expense.

If the aggregate of sin, however, of which they have been the cause be beyond human power to calculate, it is within the bounds of possibility to arrive at some idea of the pecuniary cost that they have entailed. There are few buildings which have not as many as there are residents in them; but we should be safe at least in assuming the proportion of one to every three persons, taking business premises into account; or, in round numbers, a million of such abortions exist in the metropolis, erected at an outlay of not less—including carriage and labour—than a pound apiece. Thus a million sterling, or thereabouts, must have been invested in these detestable eyesores, which chronicle the wretched discomfort in which we live, and our helpless unscientific ignorance as to how to escape from it. For, be it noted again, as it has been often noted in these and other pages before, that the evil for which these things are supposed to be a remedy is as easily curable without them as it is hopelessly incurable by them. The refusal of the smoke to go up the chimney is as beneficent a natural warning as pain is to the body of the existence of disease. If we suffer from the latter we wisely consult a medical professional man, to endeavour to ascertain the cause, and by removal to gain relief. To palliate pain and leave the disease to run its course, has but death as an ultimate issue. So the smoking chimney but indicates want of proper supply

of the vital element—fresh air—for combustion by ourselves as well as by our fires; and to coax the smoke away by one of these round-about ways, even if successful in removing that nuisance, leaves the far more serious matter alone. In nine cases out of ten, chimneys smoke simply because of want of air, and cease to do so on the opening of a window or door. The insertion of a large air-brick in the outer wall, and taking the fresh air thence to a point where it can enter the room without causing an unpleasant draught, would therefore cure 99 smoky chimneys out of 100. There are, however, down-draughts in gusty weather, which have to be guarded against; also the chance of the smoke from one chimney being blown or drawn down another.

To obviate the first of these dangers the contraction of the flue at the top by a simple terra-cotta cap, such as that of Mr. Billing's invention, will suffice. It is nearly invisible, and by its concave form the action of the wind is made to assist in the desired end; and for the latter, vertically placed slabs as divisions, rising upon and above the rest of the top of the chimney-stack, are all that are needed; and these may be made ornamental, and in their simplest form are inoffensive. For the cap, "Webber's smoke exhauster" seems even more calculated to insure the purpose desired, and it is equally out of sight. To a cap of metal of nearly the same shape as Mr. Billing's, which closes up the top of the flue, is attached a length of pipe, which is suspended down the flue, and which is heated by the warm air rising around it, and so quickens the draught at the point of egress, where it is generally liable to become cooled by contact with the outer air.

The only further provision which, as a general rule, it is necessary to advise to be made, is, that the throat of the flue be also contracted below, just above the fireplace. The flue is then larger in section throughout than it is at the points of ingress and egress of the smoke, and thus any sudden rush of air, as from gusts of wind causing down-draughts, meets a rarefied body of air as a cushion to resist its violence.

Attention to the above few simple and cheap expedients it would be desirable should, together with the abolition of all ugly cowls and pots, be enforced by public authority in the interest of the health, comfort, and taste of the community. In these days it is enough that we should ask our neighbours not to annoy us and poison themselves. In olden days it was otherwise, and men strove to give pleasure to those around them and managed to serve themselves beneficially as well.

Throughout the middle ages, and, indeed, to a comparatively late period, as long as the traditions of Mediæval work survived in this country, although the details had been modified, remarkable attention was paid to the features of flues and chimney-stacks. A noble example exists at Grosmont Castle, in Monmouthshire, and another similar one at S. Briavel's Castle, in Gloucestershire, decorated with the Horn of the Warden of the Forest of Dean, in which it was situated. These are of stone, and excellent examples in that material. Later, as at Hampton Court Palace and elsewhere, brickwork was elaborately wrought for the purpose, and the chimney-stacks were exquisite works of art. To the commonest cottages, also, such as those in the old villages in Kent and the Isle of Thanet, the chimney-stack was an ornamental, as well as a useful appendage. It is only in the vernacular modern building that it has been neglected or abused as we have described.

The essential points of difference between the two systems lie in a nutshell. The old chimneys superseded the ancient louvres over the centres of the common hall in which the family life was passed. They were designed for wood fires and were placed so constantly in outer walls because they were attached to

constructions of timber, obviously for safety's sake; they were made, therefore, large enough to stand independently, almost like towers. Modern fireplaces, on the contrary, are more numerous, and coal, instead of wood, being the fuel, they need smaller flues, but these may be clustered together. They should be grouped in inside walls for economy of heat, since the timber construction has fallen into disuse, and then, with the provisions and precautions we have suggested, we may wage a crusade against cowls, and dispense with all objectionable terminals. In time, perhaps, we may go a step further, and make chimney-stacks as ornamental as they now are disfiguring in all English towns, as well as the metropolis. J. P. S.

THE CYMAGRAPH.

THE value of the Cymagraph, and the accuracy of its product, the "Cymagram," depend so entirely upon (1) its mode of construction, and (2) the manner of its use, that a few words of further explanation from one who has perhaps made more use of it than any one else now living, may not only be acceptable to those who, having seen the drawing and description which you published of it last week, may be disposed to try it, but may also prevent the possibility of disappointment and failure arising from want of attention, either on the part of the maker or the user, to what are essential conditions of success.

The drawing referred to represents quite correctly the principle of Professor Willis's invention, which is so identically that of the Pentagraph—applied with considerable ingenuity in a novel manner—as to require no further explanation. The relative positions, also, of the hooked rod, its handle, and the drawing-board, are correctly given. It is not only true that the point of the hook should be in the same straight line as the centre of the rod, and remain so in whatever direction the rod be turned, but also that it should be, and always remain, in the same vertical plane with the point of the tracing pencil, the pencil itself being very tightly screwed into its correct position in this plane, as the slightest movement of the pencil in its socket creates a distortion in the Cymagram.

The most important matter to attend to, however, is the construction and adjustment of the movable arms, each pair of which should be of exactly equal length, and perfectly inflexible; on this account I prefer steel to brass. The joints of these frames should be so made, that whilst permitting the free movement of the arms in every direction, without effort, by the finger and thumb of the draughtsman on the handle of the rod, there shall not be the slightest movement of the rivet in its socket, a variation which will produce inevitable untruthfulness in the profile, especially in transcribing delicate mouldings, such as those of the Geometrical period.

When attached to the drawing-board, care ought to be taken to see that the point of the rod traverses the board at an exactly equal distance over its entire surface; otherwise the point of the pencil will press harder, and traverse with more difficulty, in some parts than in others, and possibly in this way create distortion. The remedy for this fault is to be found in the inclined arm or elbow by which the instrument is attached to the board, and which may be bent upwards, or downwards, or sideways, until the desired result is obtained.

I have found, by long experience, that metallic pencils and Harwood's prepared paper are the best to use, the former preserving their points longer than the hardest lead pencil. It is, however, absolutely necessary in this case to do what indeed is in any case desirable, namely, to pass over the first outline thus made, with a lead pencil, as well for the purpose of correcting by the eye any

* Some of these monstrosities were illustrated in the BUILDING NEWS for Feb. 9, 1872, Vol. XXII, p. 115.

irregularities which decay of the stone or want of care in dressing the moulding may have occasioned, as for the purpose of strengthening and confirming the outline; the metallic lines being liable to weaken with age, and even ultimately to disappear altogether. I have cymagrams made with metallic pencils 25 years ago, of which not a trace remains at the present time, except the numbers, which indicated the points of junction of their several parts, and which were made with a lead pencil.

I have found light countersunk spring clasps, such as those used in Professor Willis's original apparatus, more convenient for fixing the paper to the board than brass pins, which, in an awkward situation, are difficult to fix and to unfix.

As regards size, the dimensions given by your correspondent are much too great, both as regards the instrument itself, and the surface of the drawing-board. As regards the latter, the size which I now have made for myself and my friends, and have used for many years, after numerous experiments, namely—12in. by 9 $\frac{3}{4}$ in.—presents only one-third of the surface of that given in Mr. Adams's drawing of last week; whilst the length of each of the four parallel arms of the cymagraph is only 7in. from rivet to rivet. A larger apparatus, besides being very unwieldy and extremely difficult to use in elevated situations, is frequently, in the case of arched mouldings, absolutely inapplicable and useless. The condition of obtaining a correct cymagram of an arch-moulding being that the plane of the drawing-board shall be exactly parallel to that of the bed of the stone where the moulding is taken, and, at the same time, at right angles to the tangent of the arch at that point, it is frequently very difficult, if not impossible, to apply a large board to the mouldings of a door-arch, for example, so as to obtain the necessary continuity and overlapping of the successive cymagrams, and to realise the above conditions.

Nor is there any disadvantage arising from the use of the smaller board: the largest series of arch-mouldings—such, for example, as that of the west doorway of Elgin Cathedral, covering a surface of no less than 9ft.—I have found as correctly taken with the small board that I use as those of the smallest piscina. Moreover, it is dangerous to attempt to take in more mouldings at one transfer than can be accomplished with a board of the above dimensions; in the case of arched mouldings, distortion of the profiles, either at one end of the cymagram or the other, is an almost certain result. I need not enlarge on the saving in point of time, or on the greater ease and comfort to the operator in the use of the smaller apparatus. Another disadvantage of the larger instrument is the liability of the longer arms to bend and to become unsteady, unless made exceedingly strong and cumbersome. The box which incloses my cymagraph is only 11 $\frac{1}{2}$ in. long, 2 $\frac{1}{2}$ in. broad, and 2in. deep.

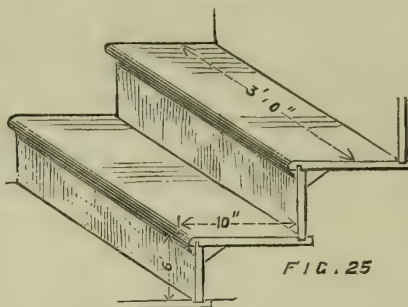
The Cymagraph is a most fallacious instrument in the hands of an ignorant or careless operator; nothing is more easy than to produce distorted cymagrams. It is only necessary to incline the instrument a little out of the true plane to do this; and this rule applies as well to horizontal and to vertical as to arched mouldings. It is scarcely possible, in a communication like the present, to convey all the instructions that are necessary to insure the correct transference, from stone to paper, of these interesting and characteristic details of Gothic Architecture by means of this valuable little instrument. Half an hour's personal instruction will do more in this respect than pages of directions; and this I hope to have an opportunity of affording ere long, either at the rooms in Conduit-street, or at the ensuing excursion of the Architectural Association, and of explaining at the same time the simplest and most

expeditious mode of tracing, setting up, mounting, and labelling the original cymagrams, so as to convert them into authentic and presentable architectural diagrams.

EDMUND SHARPE.

QUANTITIES.—IX.

STAIRCASES.—Take firstly the length of the tread, including the housings into strings, for the one dimension, by the height of riser *plus* the width of tread for the other—the extreme dimensions being taken in each case. This will give the dimension for one tread and riser, which will have to be multiplied by the number of such steps. Presuming we have 10 fliers three feet long, as sketch

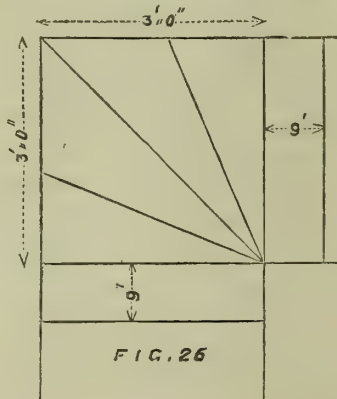


(Fig. 25), they would appear in the Dimension-book thus:—

		“Waste,”	in.
		Width of tread	10
		Height of riser	6
			1'4
10	3'0	1 $\frac{1}{4}$ in. deal treads with	
	1'4	moulded nosings, and	
		lin. deal risers upon	
		strong fir carriages,	
		and glued, blocked,	
		and bracketed.	

State the thickness of the tread and riser as shown in the example given, and also how the nosing to tread is to be finished, whether rounded or moulded; also, if it is to be re-turned. It is advisable to give the sizes and number of the carriages under stairs, where stated in the specification; but this is very seldom done, they being in great measure left to the option of the builders.

Where the steps are mitred to string it is necessary to state so, and also whether the treads are glued and blocked. If the risers are tongued at each edge, measure the grooving and tongueing by the foot run; also specify if the winders are feather-tongued. Where the bottom step is finished differently to the



others, as a curtailed or bull-nosed step, it will have to be kept separate, and numbered according to the description. The nosing, where run on the floor, as to the top step, must be taken and described as “—feet run of deal moulded nosing on floor to form upper step.” The riser in this case would be measured in with the stairs.

In measuring the winders it is customary to take the entire space occupied by them,

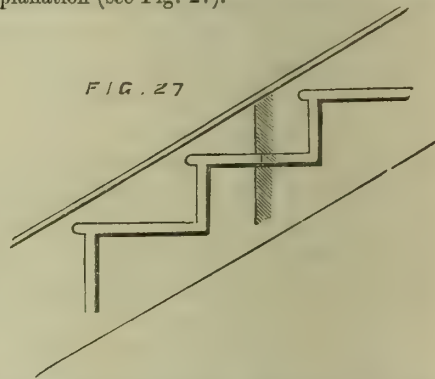
whether quarter or otherwise, adding to the width an additional inch for the projection of every nosing, and collecting the heights of the several risers. Thus:—

Tread	3'0
Housings	2
2 Nosings	2
	3'4
	3'0
Housings	2
1 Nosing	1
	3'3

3'4	10'10	Treads and risers as before, in winders.
3'3		

Number the housings to treads and risers, keeping those to winders separate from those to fliers. Brackets are also numbered and described according to the nature of the work, keeping the circular to winders separate from the straight. Also, number and describe the curtain end to bottom step as before stated, and also the dovetailed sinkings for balusters, where they occur.

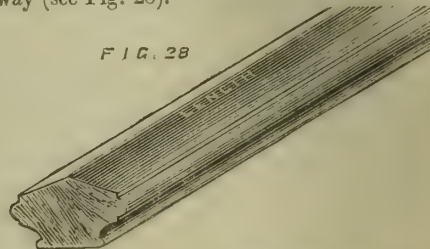
As some of my readers may not understand what is meant by a “housing,” I have thought it desirable to give a sketch in explanation (see Fig. 27).



Measure the *strings*, taking the extreme length, including all housings, &c., by the width, the latter generally being assumed to be 12in. State the thickness of the material and give full description, whether plain wall string, rebated and beaded outer string, sunk or moulded do., and if mitred to risers, &c. Also specify if wreathed, how wreath is formed, whether solid or in thicknesses, &c. All ramps are included in the one dimension, but afterwards they are numbered as “extra to ramps in the moulded wall-string,” or as the case may be. Also number all the housings, angles, and ends, stating whether splayed or returned, and the description of the string.

Measure linings to *well-holes* by the foot superficial, describing the thickness of the material and the quality of the labour upon the same.

Take the length of the *handrail* along the centre of the top of the rail, keeping the portions that are ramped, wreathed, and scrolled, each separate from the straight. The level portions, where circular, must be also kept distinct. Describe the nature of the handrail, whether moulded or otherwise, giving sketch if moulded; and also the material, whether solid or veneered, and if French-polished; and give the size, being the largest dimension each way (see Fig. 28).

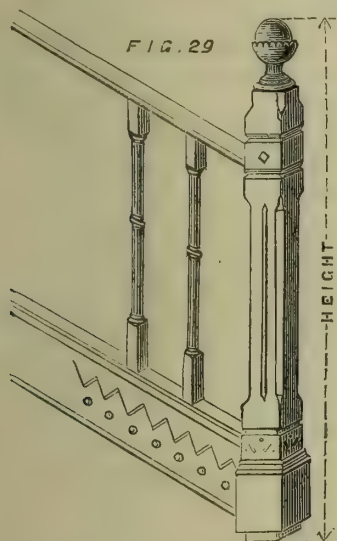


Take the labour to fitting and fixing the iron core at per foot run, describing whether

straight or circular; also the sinking for same in a similar manner. Take the mitred and turned caps on newels at per number; also number the screw-nut and joint to caps, handrail screws, and fixing, &c. Where the openings to well-holes are small, it is customary to give the width of it, as the diminished width increases the cost of preparing the circular portions of the handrail inclosing the same. The limit of width is generally understood to be about 16in., all below this being so described.

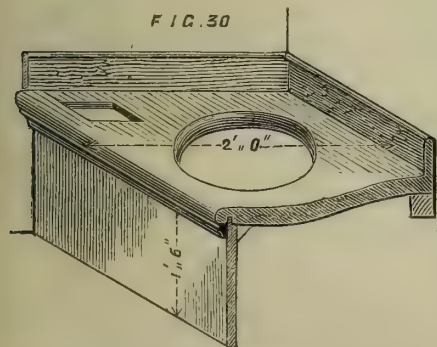
In measuring newels, take the total length, including the tenon, and give the full scantling of same, measured where the dimensions are the greatest. Fully describe the labour on the same, and the turnings, if any. Iron newels are measured in the same manner as the foregoing, and billed with the Smith, the labour in fixing being, however, billed with the Joiner, and also the labour and material in preparing mould for casting.

Balusters are also measured by the foot run, including the tenons. It will be necessary in describing them to state the size, if nailed at both or either end, or if dovetailed. When the balusters are turned to pattern, as sketch for example (Fig. 29), it is best to number



them, stating the height and size, and give a full description of the same, with mode of fixing, as before. Iron balusters can be measured by either of these ways, as they are billed at per weight. Ornamental iron balusters, however, must be taken at per number, and it is customary to fix a p. c. (prime cost) price to them. Where they are not intended to be selected from a pattern-book, but to be executed from special design in cast iron, take labour and material in preparation of mould for the same. In all cases where of iron, take labour for fixing at per number.

CLOSET FITTINGS.—Take firstly the seat and riser, measuring the extreme depth of the seat, and adding to this, on waste, the height of the riser. (See Fig. 30.) This will give



one dimension, and the extreme length will form the other, and the item would be de-

scribed as "Inch (deal) seat and riser, and fir bearers"—according to thickness. The flap and frame is measured the length by the width, and described, the thickness being stated. Take the skirting round seat at per foot run, stating dimensions and description, and whether moulded or otherwise, numbering the mitred angles and returned ends. Take a running dimension of the nosing on the seat, and state whether moulded or otherwise. Number the hole cut and dished in seat, the hole cut and beaded for handle, also the paper-box, if provided, stating description, and take the ironmongery as it occurs.

KITCHEN DRESSERS, plate-racks, &c., are generally numbered, and the full description from specification quoted with the p. c. (prime cost) if stated. *Sinks*: these are also numbered, with size stated, and description.

Preface to Table VI.—Having concluded the description of the various articles in joiner's work *seriatim*, I should like to preface the table of admeasurement with a word or two. Firstly, as to the order in which I have arranged the various descriptions of labour and material. Of course, where such a multifarious list of articles appears, as in this trade, differences of arrangement are sure to exist. The course I have adopted is to keep as much as possible the different description of labour with the various articles to which they refer. Thus, commence with the floors, and abstract and bill all labours appertaining to the floors before commencing the skirtings. The same with the skirtings. Then take sashes and frames, doors, linings, shutters, staircases, water-closets, &c., &c., keeping them all separate, as shown in the table. Many surveyors do not follow this course, but prefer to arrange them all according to their thickness, without reference to what they refer, commencing the list with those of the least thickness, and proceeding in this way to that of the greatest thickness. These different thicknesses are again arranged according to the quality of the work, that of the least value being placed first. With all due deference to those who follow this course, I think that I have proposed to be the best, and therefore recommend its adoption.

This table is not intended to include every description of labour in the trade. In articles like the present this would be inadvisable, and indeed impracticable. I have, however, given sufficient to enable the reader fully to understand the text of the articles, and the method of measurement, and the order of taking out, abstracting and billing them. I have also made them as diversified as possible, as will be seen on reference to it. The whole of the various items are presumed in the present case to be in deal, for the sake of making the table as short as possible. Where the work is in oak or mahogany it should be kept separate from the deal, and brought into bill after the whole of the deal has been abstracted. Where both oak and mahogany appear, it is customary to give the oak precedence. French-polishing, where described in the specification, must also be included in the description in the Bill of the Joiner's work.

The ironmongery is kept separate from the woodwork, as shown in Table VI., which will be given next week.

THE FIGURE AND COLOUR OF WOOD.

THE figure of wood depends more upon the particular mixings and directions of the fibres, than upon any difference of colour. If a tree were found formed of merely circular rings, like the section of an orange, filled with layers of peel instead of pulp, the horizontal section would exhibit circles; the vertical, parallel straight lines; and the oblique section, parts of ovals; but few, if any, trees are to be found either exactly perpendicular or straight; and therefore, although the three natural sections have a general disposition to the figures described, every little bend and twist in the tree disturbs the regularity of the

fibre, and adds to the variety and ornamentation of the wood. A perpendicular cut through the heart of the tree is the hardest and most diversified, because in it occurs the most profuse mixture and density of the fibre, the first and the last in point of age being presented in the same plank, but the density and diversity lessen as the board is cut further away from the axis.

Curls are formed by the confused filling in of the space between the forks of the branches. The beautiful figure thus induced causes a log, say of mahogany, to be valuable in proportion to the number of curls it contains. There is great competition at public auctions for such logs, and prices which seem astonishing are sometimes given for a log known by judges to contain several fine curls. Occasionally some disappointment may be experienced when the log is opened, but not often. The curl generally shows itself on the outside, where it can be seen, and there is always the possibility of there being interior ones as well, which do not show on the surface.

Figure is also produced as follows:—The germs of the primary branches are set at an early period of the growth of the parent stem, and thus give rise to knots. But many fail to penetrate to the exterior, and are covered over by the more vigorous deposition of the annual rings. Each branch is a miniature tree down to the smallest twig, and this process goes on in each individual branch just as in the trunk. These knots produce figure in the following manner:—When the germ succeeds in forcing its way to the surface, the future rings of the trunk bend and turn aside when they encounter the knot, and in the softer woods do not unite with it. This accounts for whitewood knots being so liable to fall out. The turpentine in other sorts of wood acts as a sort of cement, and keeps the knot in its place. The hardness of knots is due to the close grouping of the fibres, and to their compression by the surrounding wood, which itself is allowed expansion by the yielding nature of the bark. The same operation goes on beneath the ground in the roots of a tree, and splendid furniture veneer wood is obtained from some descriptions.

The bird's-eye maple has internal points or spines on the inside of the bark, which penetrate the wood and make irregular indentations. These cause the peculiar appearance which is so much prized, and from which the wood takes its name.

In woods the figure of which resembles the ripple marks of the sea on fine sand, such as satinwood, sycamore, mahogany, ash, &c., the figure is produced by the serpentine form of the grain. The fibres of all such pieces are wavy on the face at right angles to that on which the ripple is observed, if not on both faces, those parts of the wood which happen to receive the light being brightest. Woods having the silver grain, or, as called by botanists, "medullary plates or rays," possess another source of adornment, viz., a sort of dappled effect, or an effect similar to that produced on silk by threads running crosswise to those longitudinally disposed. English oak, Riga and Dutch wainscot logs, Austrian wainscot, &c., have this peculiarity. In the oak plank the principal streaks or lines are the edges of the annual rings, which show, as usual, parallel lines (more or less waved) from the curvature of the tree or the neighbouring knots and branches. The damask pencillings, or broad curly veins and stripes, are caused by groups of the medullary rays, which undulate in layers from the margin to the centre of the tree, and creep in betwixt the longitudinal fibres. Had the fibres of trees been arranged with the uniformity and exactitude of a piece of plain cloth, they would have shown an even and uninterrupted colour; but being arranged by nature in irregular curved lines, almost every intersection of them by the hand of man partly removes some, and exposes others, thus causing boundless variety of figure. To such a boundless extent do the

changes caused by tints, fibres, curls, knots, &c., exist, that the cabinetmaker scarcely ever seeks to match any pieces of wood for the purpose of causing uniformity of figure in the article he is making, and, indeed, diversity is more pleasing to the eye than uniformity would be, if it were practicable.

As regards colour, some woods are nearly uniform, and some have several shades of the same hue, or of two or three different colours. In the horizontal section of such woods, the tree seems to have clothed itself with different coats of various colours—such as tulipwood, kingwood, zebrawood, and rosewood. In the ordinary planks these markings get drawn out into stripes, bands, and patches, or wavy figures of the most beautiful or grotesque character. Woods variegated both in grain and colour are more generally employed for objects with smooth surfaces, such as cabinet work. Such are Amboyna, kingwood, some mahogany, maple, partridge, rose, satin, snake, tulip, and zebrawood. The beautiful specimens of marquetry exhibited at South Kensington aptly illustrate the use of such wood for the purpose of ornamentation, and they also prove that they are out of place in other than smooth surfaces, for the same style of work in mouldings has a decidedly inferior effect.

The colours of fancy woods are not liable to fade by exposure to light, tulipwood being an exception; but age of course darkens them and mellows the general effect. But the whitest of varnishes should be applied, or the natural tint is liable to be spoiled.

The rich greenish-brown of walnut is much esteemed, and especially for pianoforte cases. The large makers own stocks of this and other fancy woods to an extent few have any idea of. The rich deep orange of Spanish mahogany makes beautiful tables and counter tops, and its large square makes it peculiarly adapted to either use. Honduras, of a brownish tint, is used for all kinds of superior cabinetwork, while oak is principally employed in those parts of house-building where durability is a necessity. Wainscot is preferred for cabinet-work, and the Austrian has lately come into deserved favour. Pitch pine, too, is pleasing both as to colour and figure; rosewood, with its rich tints, is not so much used as formerly. The colour of wood, when in the log, may readily be ascertained by scraping the outer rind, when the figure may also be guessed at with a tolerable degree of accuracy; but to arrive at any degree of perfection as a judge requires very long practice, and it is almost impossible to frame rules in writing, any one of which would not be liable to numerous and bewildering exceptions.

FOREIGN LABOUR AND WAGES.

THE British workman, rightly or wrongly, considers himself so poorly paid that of late he has been in a chronic state of strike; and contractors have been naturally timid about making large tenders, not knowing but that they may be called upon, before their completion, to pay so large an advance to the workman as to leave no fair profit on the transaction. Much, too, has been said about the superior position of the foreign artisan, and what that position is the reports of her Majesty's consuls in various countries now reveal to us. A glance at a few of these reports will be interesting at the present time, in so far as they relate to the building and kindred trades. To begin with Hamburg, Mr. Ward reports that "The wages paid in Hamburg, although much higher than that prevailing in other parts of Germany, are low when compared with the wages paid in England, or with the great increase which has taken place of late years in the cost of the necessaries of life. The average period of work is 63 hours, with occasional work on Sundays. Skilled workmen earn on an average about £45 per year, and ordinary workmen about £30. They pay rent about

£5 to £7 and £11, according to earnings. Stonemasons work 66 hours in summer and 54 in winter, as also do bricklayers, joiners, carpenters, and painters. Cabinetmakers work 66 hours all the year round. A few years ago drunkenness was quite unknown among this class, but of late spirit-drinking has prevailed."

The frugal Dutchman, as a carpenter, joiner, plumber, or smith, earns in the larger towns about 16s. per week, and his wife perhaps 3s. to 4s. more, and Mr. Locock remarks that he can live comfortably and contentedly on what would ill suffice to satisfy the wants of an English labourer, and the necessities of life are as dear and the luxuries dearer than in England. It may be added that the stokers at the gasworks at the Hague receive 17s. 6d. per week. They work 12 hours a day, are well and warmly clad, and rarely taste meat. A very small house may be had from 2s. to 2s. 6d. per week. Leaders or originators of any movement having for object either a simultaneous suspension of work, or to forbid working in a particular factory, &c., or to bring about a cessation of work, or in any manner to fetter it, or to raise the price of labour, are liable by article 415 of the Penal Code to imprisonment from two to five years, and as a natural consequence, strikes are almost unknown. "Where masters and men are forbidden to fight," says the British Consul, "they learn to arrange their differences by more gentle and civilised means."

From Prussia hardly any recent statistics are given. A manufacturer of the important town of Bremen gives the following table of wages for 1867. Journeymen masons 14s. 6d. per week, 12 hours a day in summer. Assistants, 10s. 6d. per week; carpenters, 14s. 6d. per week, and 13 hours work; journeymen, 13s. 6d.; painters and glaziers, journeymen, 12s. per week and 11 hours' work. At the time the British representative sent his report 7,000 Silesian miners had struck for an advance, and the smelters' wages were then at the highest, about 9s. per week, and moulders 15s.; but he mentions that "the owners refuse to recognise the trades' union, and will only treat with the men themselves." Both rent and cost of living are reported as very low, but the most recent returns can be only regarded as an approximate result. It may be remarked, however, that at one of the Silesian blast furnaces wages were in 1868 regulated by the weekly produce of the furnace, and the weekly wages are given as follows: Smelters, 12s. 8½d. to 21s. 11d.; chargers of furnaces, 10s. 11d. to 13s.; barrowmen, 7s. 2½d. to 12s. 6d.

In Belgium the artisan is singularly unfortunate. A family earning less than £40 a year in a town, and £36 in the country, may be taken as partly living on charity; nor do they become entirely independent under £60 to £80. The payment of an ordinary hand in such trades as carpenters, masons, smiths, and the like is from 1s. 4d. to 1s. 8d. a day, two shillings being good wages; and perhaps his family make it up to 2s. 6d. per day. But in spite of his poverty, he will keep Saint Monday, and these and saints' days leave him about 236 working days in the year. In what may be called the domestic trades, the journeyman is, as a rule, either a young or an improvident workman; for a good hand can generally set up for himself. For instance, in Brussels an ordinary carpenter, with a few pounds in hand, or credit for a little wood, may earn 4s. to 6s. a day. The inferior men are in a deplorable way—eat little or no meat, inferior bread with grease, potatoes, soup, and floods of weak coffee and chicory, with bad milk: in fact they are little above the condition of our worst paid agricultural labourers. In factories, however, there is a better state of things, and the men are far superior, better hands being paid from 2s. 6d. to 8s., and the women about 1s. 6d. per day. Colliers earn 3s. 6d. to 4s. 6d. per day, and engine-drivers from 5s. to 8s. Mr. Lumley

adds that the Belgian miner resembles his British brethren, "taking part in strikes at the instigation of persons little his superior in point of education, and apt to lead a life of alternate luxury and misery."

Portugal is reported to have no trades' unions, and the nature of the climate, and the absence of drunkenness, make the wages suffice to meet the workman's wants. No statistics can be had, but the Portuguese Government estimate the earnings of the industrial classes at from 10½d. to 5s. 4d. per day.

In Sweden, in such towns as Gothenburg, the skilled workman may have lodgings at from 12s. to 14s. per month, of a very comfortable description. The making of iron stove-ranges, &c., is paid 2½d. to 3d. per hour for skilled workmen, and 1½d. to 1¾d. for ordinary; skilled carpenters, 3d. to 4d. per hour. At the great patent safety match factory at Iönköping, clever hands earn 3s. 4d. a day, and others as low as 1s. 2d.. This is by piece-work; those who work by the day of 13 hours receive 9d. to 1s. 5d. Skilled smiths earn 2s. 3d. to 3s. 4d. per day of 11 or 12 hours; less skilled, 1s. 7d. to 2s. 3d. for the same time. Trades' unions, as we understand them, have only recently been formed, and to a limited extent.

In Saxony wages have risen considerably of late years. Twelve hours constitute a day's work, and sometimes thirteen. Asphalt-roofers are scheduled as earning 12s. to 18s. per week; glaziers, 6s. to 15s.; house-painters, 6s. to 24s.; sawmill-hands, 9s. to 24s.; stonemasons, 9s. to 30s.; carpenters, 7s. 6d. to 18s. The maximum may be taken for skilled labour. The Saxon workman knows how to keep himself and family on his earnings, and frequently to save enough to buy a small house, but he is never able to lay by much.

In Wurtemberg the building trade has been very active of late years, causing a rise in wages of 80 to 90 per cent., but yet they are only 3s. to 3s. 4d. for a mason or bricklayer, though first-class workmen receive more.

Under Turkish rule, at Broussa, the mason gets 2s. 8d. to 3s. 4d. per day, carpenters 3s. 2d. to 4s. 8d., stonecutters 3s. 2d. to 5s., cabinetmakers 5s. to 6s., and at other places these rates are very much less. A summer day's work is 13 hours.

In Moscow the last returns show the following monthly wages were being paid:—Blacksmiths, £2. 14s. 8d.; joiners, £2. 5s. 4d.; enginemens, £2. 8s. 8d.; day labourers, £1. 0s. 9½d. Wages have increased as rapidly as the rise in provisions, and were it not for "vodka," or corn brandy, the Russian workman would be, comparatively speaking, well off.

In Greece carpenters earn 2s. 1½d. to 3s. 6½d. per day; cabinet makers, 2s. 1½d. to 4s. 3d.; masons, 1s. 9½d. to 3s. 6½d.; plasterers, 2s. 1½d. to 3s. 6½d.; and house-decorators, 2s. 1½d. to 4s. 3d.

Taking the cost of living into due and liberal consideration, the British workman does not seem to be illused. He has a right to get all he can in return for his skill, but it is quite evident that he allows professional agitators to delude him respecting the condition of his fellow-workmen on the Continent. Because many of them are in a miserable condition, is certainly no reason why he should be underpaid; but when employers are closing their works rather than submit to what they consider to be an injustice, and workmen combine to lessen the supply of a necessity of life, there can be little doubt but that they are damaging their own interests, and invoking a hostile public opinion quite strong enough to find a remedy.

The London and County Bank are about to make an important addition to their present banking premises in Nicholas-lane, Lombard-street, and for this purpose they have just purchased the old rectory-house adjoining, belonging to the parish of S. Edmund the King and Martyr, for the sum of £18,000.

ARCHITECTURAL ART IN INDIA.

ON Friday evening last Mr. T. Roger Smith, F.R.I.B.A., read a long and exhaustive paper on this subject in the Hall of the Society of Arts, John-street, Adelphi, Mr. James Fergusson in the chair. The lecturer, after some preliminary observations, said that the three great groups of the architecture of India might be broadly classed as Hindu, Mahomedan, and European—each group representing buildings erected under three different political conditions of the country. The Hindu group comprised the proper buildings of the country; many different races had worked upon them, and, closely examined, they yielded manifold traces of migrations, conquests, changes of style, and other marks of difference; still the group was marked by certain broad, and unmistakable characteristics, and the architecture indigenous to the soil might be considered as one great style, which might conveniently be termed Hindu. The second group consisted of the buildings found in those provinces where the Mahomedan invaders obtained and kept supremacy for a length of time, and where, bringing their art with them, they exercised it with a wise adaptation of their subsidiary forms to the requirements of the climate, and a clever adoption of much of the amazing skill for surface decoration which they found ready to their hands. The Mahomedan buildings of Ahmedabad were the best known of the group, and probably the best worth knowing. The third group of buildings illustrative of the architecture of India consisted of those which dated from the European occupation of India. These were motley, and mostly made no pretensions to architectural character; and when they did make such pretensions they more often than not fell short of the apparent aim of their designers. There were many reasons why these buildings were unlikely to have much merit. For long there was little leisure and as little inclination to indulge in architecture at all. In the moment of conquest and the hurry of newly-established trading, such forts and barracks as could shelter and secure the soldiery, and such rough buildings as would suffice to hold the goods, were all that were attempted. As time went on, the Portuguese, the Dutch, and the English set such fashion as there was in the buildings of the country. Worse models than those nations were buildings at home could not easily be conceived, yet the European buildings in India were worse, and the bathos to which architecture—if it might be called so—sank in India in the early times of the British occupation could not be better described than by saying that it fell short even of our own eighteenth century work at home. One circumstance especially militated against improvement, and prevented the fashions set by the Portuguese (who seemed to have taken such lead as was taken) from being improved upon, and this circumstance still stood in the way of European improvement. It was this: that no Englishman was a settler in India. Englishmen did not transport themselves, their houses, and their modes of life to that country. They only went there for a term of years, and consequently, looking upon their sojourn as temporary, put up with that which in a real colony would soon be superseded. Better days, however, had to come; and the importance of the Viceroy and his court, and of the provincial governors, required that some permanent provision for State, for the administration of justice, and for public worship and public business, should be made. Accordingly, in the capital, and by degrees in other great stations, buildings began to rise for civil purposes, while those for military purposes were constantly being extended and improved. In no country where there were buildings of which remains existed had there been a great political and social crisis, such as an invasion, without a perceptible record being left on the architecture of the period immediately subsequent to the event. The Mahomedan invaders of India made their mark in the country; and the English were at the present time engaged in writing such a record on the face of the country that, were the British occupation of India at once to cease, the visible tokens of such occupation would survive in our canals, railways, ports, and public buildings, or the remains of them, for centuries to come. The custom of the Romans, in occupying comparatively barbarous countries, was to transport their architecture with very small variation, if any, to the new spot. The Mahomedan conquerors of India did not pursue precisely the same course; they

found an existing architecture in the country, and a power of decorative carving, which were very remarkable, and they proceeded to incorporate many features of the national art with their own. Now that attention had been pretty generally awakened to the claims of architecture as a fine art, the question presented itself for solution—What sort of architecture ought we to employ in India? Mr. Smith thought we ought, like the Romans and the Mahomedans, to take our national style with us, but being strangers, as the Romans were, rather than semi-colonists, like the Mahomedans, we should be likely to succeed best if we were not too anxious to incorporate much of the art or style of the country with our own. In the face of the difficulty of defining what our national style really is, it might at least be admitted that there was a recognised modern European architecture; and while it was difficult, and perhaps unnecessary, to lay down the rule that our work in India ought to be English, there could be little hesitation in admitting that it ought to be at least European. In occupying India we had not become colonists; we had remained conquerors. We had not sought to divest ourselves of our national habits, or manners, or dress, or laws, even when convenience would have been consulted by so doing. Let us, then, be European in our art; for art, if it be true, was an expression of national individuality more intense and more truthful than custom, fashion, or government. The Mahomedan style had been advocated, or one of the styles of Hindu architecture, as the most suitable for modern buildings for European purposes—firstly, on account of suitability to climate; secondly, because the natives could carry out the work; and lastly, because such architecture was, or could be made, very beautiful. By far the most powerful of these reasons was that Indian architecture, whether Mahomedan or Hindu, was the offspring of the climate; but if it could be shown by experience that buildings which would not look out of place in England could be erected in India, and would be found perfectly suitable for us, then we might, without hesitation, allow the preponderating weight of the arguments in favour of giving a European aspect to our art to outweigh whatever could be argued in favour of Oriental architecture on the score of its being the architecture of the country. In the second place, the natives, although they could design and build in the native styles, would not be so employed, as the buildings which were built for European use in India had been invariably built under European superintendence or from European designs, and always would be. The last argument in favour of utilising Oriental architecture for European requirements in India would have great weight were it impossible to provide anything beautiful that would also be European. Having argued at great length in favour of employing European architecture for our requirements in India, Mr. Smith proceeded to consider what style, or modifications of style, were best suited to the purpose. The style native to England—English Gothic—was not fitted to be transferred to India without large modification. All its forms were designed to be seen by a horizontal and a faint light. It was essentially fitted to a cold, damp climate; and while on the one hand its characteristics would require many alterations in order to cope with the glare of Indian sunshine, on the other, its provisions for carrying off the gentle shower, or even the steady downpour, of an English wet day, would prove quite inadequate to cope with the torrential rains of a tropical storm. The adoption of the Italian Renaissance, the style in which Wren worked so ably, would be less impracticable for adoption in India than English Gothic. The style took its rise in a sunny country, and the changes which had been made in it to suit it to this country were neither many nor great. Somerset House might be copied in Calcutta without the attempt being wildly and utterly unsuitable. The intensity of the heat and light in India would occasion many variations in the buildings, whether Gothic or Classic, which were put up in that climate. The windows would invariably become smaller and fewer, or if they remained large and open, must be screened by external shelter. The walls would become so thick as to occasion the disuse of the buttress in all Gothic structures; the roof would be flattened; and the extensive use of the horizontal cornice would be encouraged. The moment these changes were proposed in a Gothic structure, the Gothic of Italy and the South of

France—countries whose sub-tropical heat was not unknown—was recalled to the memory; and when they were made in a Classic design, the Italian Renaissance architecture, as practised in the sunny streets of the cities whence it started to overrun Europe, presented itself as the true model. Thus, then, there could be found in the south of Europe models which were essentially fitted for use as guides in designing buildings for hot climates, and these models were unmistakably European. Were they so different from English examples as to be unsuited to the purpose? Mr. Smith unhesitatingly answered, No. An Englishman would recognise in Italian Gothic, or the Gothic of Southern France, the prototype of what he had seen in the course of erection at his university or in his city, so that the very phase of Gothic most in use here at the present day bordered upon that which most appropriately lent itself to the requirements of India. In the case of Renaissance work, there was even less difference between the aspect of the buildings of South Italy and that with which we were familiar under the general name of Classic, than between the two families of Gothic referred to. The open loggia, a feature as fitted for use in India as in Italy, though almost unknown in England, was so essentially consistent with those features which we adopted, that its use involved nothing startling to the English eye. One feature which English architects left behind when they transported Italian Renaissance to this country ought not to be neglected in transferring it to British India. This feature was the beautiful internal quadrangle or cortile, which was the direct lineal descendant of the atrium of a Roman house, and corresponded closely with the courtyard of the dwellings and palaces of almost all the Oriental cities. Of the beauty, coolness, and the comfort to be found in a cortile Italy offered endless examples, perfectly worked out, and Anglo-Indian buildings afforded not unfrequent opportunities of making use of them; yet the cortile was rare, if not unknown, in the arrangement of those buildings. Having thus arrived at some idea of what might reasonably be done in designing important buildings for India, the lecturer reviewed what has already been done. To show how the fashions of building at home had been reflected, as in a distorting mirror, in the architecture of India during the early years of our occupation of the country, he quoted from the BUILDING NEWS* some remarks made on the subject by Sir Bartle Frere in the course of a lecture delivered at the Architectural Museum. When the Greek revival arose, India was long a kind of suburb of Edinburgh. It was quite possible that the Greek movement might have prospered in India had any architect so practical as Mr. Thomson been at work on the problem; as it was, the buildings which had been erected in India as the result of the Greek revival were gloomy and inappropriate. The mode in which the public works were done was very detrimental to their chances of obtaining artistic merit. All public works in India (and until lately most buildings of any pretensions to architecture had been public works) had been designed and carried out by military men, with no special architectural training. With greatly accelerated speed of transit between India and Europe, the transfer of government to the Crown, and the introduction of railways, architecture began to be considered worth cultivating, and the Government began to consider the advisability of obtaining designs for public buildings from architects in England. The first church of good architectural character was (according to the lecture by Sir Bartle Frere, already referred to) designed by Mr. Conybeare. This church, however, according to the same authority, owed some of its best features to Sir G. G. Scott. Sir Bartle Frere, when he became Governor of Bombay, found an active coadjutor in the late Mr. Kinloch Forbes, and a scheme was contemplated for providing Bombay with one of the most complete series of public buildings which any city could boast, and although only part of this scheme had been actually carried out, it had given a great stimulus to the efforts of private enterprise in the architectural embellishment of the chief cities of the empire. After giving a brief description of the buildings on which modern architects (including himself; Mr. Trubshawe, consulting architect to the Government of Bombay; Sir Gilbert Scott, Mr. Cuthbert Brodriek, Mr. Burges, Mr. Paris, Mr. Molecey, Mr. Chisholm, Messrs. Scott and

McClelland, and Mr. Emerson, the latter architect being now engaged in carrying out a cathedral at Allahabad, in a style of Southern Gothic excellently suited to the requirements of the country and the circumstances of the English community) had been employed in Bombay and other cities, Mr. Smith concluded by saying that the designing of buildings for India would always be best left to men who knew something of the country—chiefly to men resident in it—but it ought to be intrusted to educated and artistic architects. In the execution of them great effect would probably in time be obtained by enlisting the skill of native artificers in decorative work, such as carving and pierced stone-work; and Indian interiors might often be rich in carving and bright in colour decoration. There was an infinite amount of scope open here to the decorative artist; and he had the prospect of being able to train, if not to obtain, native painters and carvers to execute this part of his work. In a country where no wall-paper could be used, and where plaster was the only building material that was almost uniformly good, fresco-painting and distemper-colouring seemed to suggest themselves; and where natty manual labour was so cheap and abundant, mosaic might be easily introduced into floors and panels, while a little of the carver's skill bestowed upon the familiar black-wood furniture might be employed with very great success in adorning such wood-work as it was desirable or customary to leave visible.

The Chairman having invited discussion, Mr. EMERSON said it seemed to him that some modification of one of the Eastern styles of architecture would be found more suited both to our own requirements and to the necessities of the climate, than any Western style whatever.

The Chairman (Mr. Fergusson) said that in the early years of the British occupation of India, such a being as an architect hardly existed in the country, and every one who wanted to build was allowed to do exactly as seemed best in his own eyes. The first architect ever sent out to India from this country, as far as he knew, was one of the Wyatts, who was sent out to build the Government House at Calcutta. He produced a building which was very creditable, and which was one of the best public buildings in India up to a recent time. The early Anglo-Indians simply used the Italian orders of architecture which were so fashionable at the close of the last and beginning of the present century, and used them in such manner as seemed to them to suit the exigencies of the time. The whole of the early European architecture of Calcutta and other parts of India was of that type, and the worst of it was that the natives imitated it. It was only within the last 15 or 20 years that architects had been employed in India, and the rebuilding of Bombay had inaugurated quite a new epoch in Indo-European architecture. The question of what style we were to employ in India was a serious one. He presumed that for churches Gothic must be used, because our churches should be distinguished from heathen temples; by the adoption of Gothic forms he thought very good modern churches might be built in India, making the aisles assume more of the character of verandahs, and using the nave only for congregational purposes. The difficulty was the pointed arch, which was a very inconvenient arch for use in India, because with lofty pointed arches it was necessary to have screens from the top down to within 6ft. or 7ft. of the ground, in order to keep out the glare. With regard to public buildings, a much freer style was requisite, and he thought that some modification of the Italian style would be found to be really the only style which could be used, and particularly a low-arched style, for low arches were an imperative requirement. He believed that the solution of the difficulty would come from the use of iron—not iron used to imitate any style at all, but iron used as iron, in balconies, verandahs, &c. The natives used stone for verandahs very much, and in very delicate forms; iron might be employed for such work, but not in servile imitation of stone forms. He agreed with Mr. Smith in saying that to some extent the European buildings should harmonise with the Oriental buildings. Whatever style was adopted, however, good architecture could hardly fail to be effective in India, owing to the necessity for deep shadows and large areas. A few more papers such as Mr. Smith's would do much to further the advancement of architecture in India.

A vote of thanks to the lecturer closed the proceedings.

PROJECTED METROPOLITAN IMPROVEMENTS.

THE report of Mr. Haywood, Engineer and Surveyor to the City of London, on the projects immediately affecting the Corporation of London for which legislative sanction is to be sought during the present session, has been sent to us. The projects reported on are six in number. The first is the "City and West End Railway," of which some particulars were given in THE BUILDING NEWS of Feb. 14, in connection with the report thereon of the surveyor to the Holborn District Board of Works. The whole of the railway is to be underground, and it is to extend from South Kensington by way of the Brompton-road, Knightsbridge, and Piccadilly, to Regent's-circus. From thence south of a new street to be formed from Regent's-circus to Rupert-street, to Dudley-street, S. Giles's, then on beneath Broad-street to Holborn, from the west end of which another new street is to be formed with the railway beneath it as far as Gate-street, thence under Lincoln's-inn-fields, crossing Holborn near Brownlow-street, and continuing from that point to Ely-court, across Hatton-garden and the Farringdon-road, to a junction with the Metropolitan Railway near its station in Charles-street.

The second project is one by which the Metropolitan Railway Company proposes to take a small additional area in the City beyond that to which they are already entitled, in Blomfield-street. The company also seek power to abandon so much of the railway authorised by the Tower-hill Extension Act of 1864, as lies between High-street, Aldgate, and Trinity-square, Tower-hill, at which latter point it was intended to join the Metropolitan District Railway, and thus complete the inner circle. The powers for the formation of this part of the District Railway have, however, long expired, and there is but little probability of the junction between the two railways ever being made upon the line originally projected.

The Midland Railway seek power to acquire land for an additional line of railway between Jacob's Well-passage and Whitecross-street, to run along the southern side of the Metropolitan Railway, terminating near to Whitecross-street, where it is intended to form a large receiving house and goods depot.

The "East and West Metropolitan Junction and Cannon-street Railway" promote a scheme for a line of railway starting by a junction with the authorised (Tower-hill Extension) railway, and proceeding thence by a curve, in a south-easterly direction to Whitechapel High-street, near to Goulston-street, and thence beneath Whitechapel High-street, the Mile-end and Bow-roads, to the North London Railway at Bow.

The North Metropolitan Tramway Company, who have already laid a large number of tramways throughout the northern and eastern districts of the metropolis, seek to extend their system within the City. Firstly, by a double line of tramway commencing at the southern end of S. Martin's-le-Grand, and proceeding along that thoroughfare and Aldersgate-street to Hare-court, where the double line is to terminate, and thence northward by a single line to join the already existing tramway in Goswell-street. Secondly, by a line of tramway to commence at Finsbury-place, and to be carried along South-place, Eldon-street, Blomfield-street, and Liverpool-street, to the eastern side of the North London Railway station. Thirdly, a double line of tramway, from its present terminus at the City boundary at Finsbury-place, to be carried along the Pavement, Moorgate-street, and Princes-street, to the south-west corner of the Bank. Fourthly, a line of tramway, partly single and partly double, from its present terminus at the City boundary at Whitechapel, along Aldgate High-street and Aldgate, to the junction of Fenchurch-street with Leadenhall-street.

The Bill to be introduced by the Government for the erection of the new Mint is apparently the same as that for which notices were served on the Corporation during the last and several preceding sessions of Parliament. No details of the scheme can be obtained.

What is one of Pharaoh's Priests worth at the present day? The *Guardian* answers the question. On Wednesday last the mummies of *Medino* and *Anachmeth*, a Priest and Priestess, presented by Mehmet Ali to the Duke de Puckler Muscau, were sold in London for sixty-eight guineas.

THE "CRITERION," PICCADILLY.

ON Saturday afternoon last a large number of the members of the Architectural Association visited the large and imposing building now in course of erection at the east end of Piccadilly, for Messrs. Spiers and Pond, the refreshment contractors, and intended to be known as the "Criterion." The building is intended by the proprietors as a place for fashionable concerts and balls, such as are given at Willis's Rooms, public dinners, select entertainments, and exhibitions of works of art, part of the building being appropriated as a club. About the end of 1870 Messrs. Spiers and Pond invited applications from architects who were willing to submit designs for the building. We believe that nearly two hundred architects expressed their desire to compete, and from this unusually large number Messrs. Spiers and Pond selected fifteen to send in competition designs for the building, offering four premiums of 150, 100, 75, and 50 guineas respectively to the four best designs in order of merit. The competitors sent in their designs in the spring of 1871, when the premiums were awarded in the following order:—First, to Mr. T. Verity; second, to Mr. R. Phené Spiers; third, to Mr. E. Power; and fourth, to Messrs. Evers and Mileham. At the time the designs were sent in we reviewed them at some length in the BUILDING NEWS.* In brief, the requirements were: On the basement a second-rate general dining-room, with grill, kitchen, &c., servants' hall, and other accommodation, with a minor hall to hold 1,000 persons, either on or below the same floor, with entrances from both Piccadilly and Jermyn-street (the building to be erected on the site of the White Bear and Webb's Hotel, White Bear-yard, and some adjoining buildings, this site being on the south side of Piccadilly, and between Regent-street and the Haymarket). On the ground floor were required a grand entrance, with a vestibule, grand bar, or buffet, 120ft. long; a dining saloon for 150 persons; a cigar divan and smoking-rooms, haircutting-saloon, &c.; with separate entrances for professionals and the several classes of the public seeking admission to the concerts, &c., i.e., separate entrances to pit and gallery, stalls, &c. On the upper floor there was required to be a grand hall of the largest possible dimensions, with several billiard and dining-rooms of various sizes; and a gallery suitable for the exhibition of pictures; manager's rooms and sleeping accommodation for a number of servants, were also required. Mr. Verity, the author of the premiated design, was appointed to carry out the work, the estimated cost being £25,000, and with the result of the competition we believe all the competitors were satisfied—a rare termination to a competition. Mr. Verity has met the requirements of the promoters, as we stated at the time, in a very satisfactory manner. The main entrance is in the centre of the Piccadilly façade, under a large recessed archway, opening into a rectangular vestibule about 30ft. by 25ft., with the principal staircase at the end, opposite the entrance. Archways on either side of this staircase lead to the buffet, 90ft. by 25ft., on the left hand, and the dining-saloon, 71ft. by about 30ft., on the right hand. On the east side of the entrance from Piccadilly is a cigar shop, with telegraph-room beyond, and on the west a staircase to minor hall. An entrance staircase opens on to Jermyn-street, with kitchen beyond between the bar and dining-room. The minor hall, 50ft. by 78ft., is under the dining-room, vestibule, and buffet, and will partake more of the theatre form than at first intended, the original idea being to make this hall a parallelogram in form. By this alteration of plan, the minor hall will be made to afford accommodation for 300 persons more than originally intended, or 1,300 in all. The grand hall, 76ft. by 50ft. occupies the whole of the length of the Piccadilly façade on the second floor, the first floor partaking of the nature of a mezzanine floor, although all the rooms and apartments are lofty and well-lighted. The grand hall will have a movable platform at one end, and will be lighted on the Piccadilly side by the five large windows which form conspicuous features of the design, and from the roof by a large glass dome, which will be placed between the two large mansards which flank either side of the roof on the Piccadilly frontage. These mansards will be fitted up as sleeping-apartments for the barmaids and waitresses attached to the establishment. The

* March 24, 1871, Vol. XX. p. 214.

kitchens and serving-rooms are well arranged one over the other, and comply with the requirement "that the general culinary department is to be of such a nature as will allow of easily increasing or lessening the working power of the same." The building will be warmed and ventilated by Mr. Phipson, on his principle of forcing in the air by means of revolving fans, and passing it over hot-water pipes placed in channels under the basement floor, and up flues in the walls to the various rooms. The Piccadilly facade is entirely of Portland stone, and the facade in Jermyn-street, which will not be so high as the one in Piccadilly, is of white bricks, with stone dressings. The length of the site is 150ft. by an extreme width of 80ft., and the floor of the minor hall is about 30ft. below the level of the roadway in Piccadilly. Mr. Verity, the architect, assisted by Mr. Chaney, the foreman, conducted the visitors over the works on Saturday afternoon last. First of all the basement was visited; here, besides the minor hall, is the boiler-room, containing three boilers for heating and other purposes, two horizontal and one vertical. There will be an hydraulic lift with an ascent of 85ft. On the basement floor will also be a large receiving store, clerk's office, &c. The floor of the grill-room is only 6ft. below the level of Jermyn-street, owing to the difference of level between that street and Piccadilly. The walls of this room are lined with coloured tiles in a very effective manner, the tiles being set with Parian cement, the walls being floated with patent Selenitic plaster. Adjoining the grill-room will be a "dispensing-room," for "dispensing" the beers, wines, &c. In the second-class kitchen, adjoining, will be a large roasting-range, where all the roasting required on the establishment can be done. There will be five "dangles," so that twenty joints can be cooked at a time. This, as well as all the other ranges and cooking-apparatus, will be by Messrs. Benham and Sons. On the left of this kitchen will be the "vegetable kitchen," with a large scullery adjoining. The walls of the kitchens are lined with Cliff's glazed bricks, which, Mr. Verity observed, are the best of their kind for working-in with common stocks. Messrs. Gibbs and Canning produced a brick with a superior glaze, but it was not so suitable for use with stocks as Cliff's. On the ground story all the floors are constructed on Fox and Barrett's principle, the floors above being of Messrs. Dennett's concrete construction. For the basement floors and corridors the patent Victoria stone is largely used. Each class of dining-room has its own kitchen distinct from the others, and the serving arrangements are admirably planned. All the dining-rooms will be floored with parquetry-work, and the grand staircase and vestibule will be decorated in gold and colours, and with painted tiles by Simpson and Sons. The floors of vestibules and lobbies, and the landings on the staircase, will be laid with marble mosaic by Burke and Co. The accommodation of so many varied requirements on the site has called forth great constructive ingenuity on the part of the architect. This is notably the case on the first floor, where a large lattice girder and a solid girder have been introduced to relieve the walls of the entrance-hall from the weight of the floors above, so as not to throw too great a weight on the girders crossing the minor concert-hall in the basement, which extends right under the entrance-hall. Messrs. Smith and Taylor are the contractors, and Mr. Bare is clerk of the works. The buildings are now roofed-in, and are rapidly drawing towards completion; although a great deal yet remains to be done. We hope shortly to give a view of the building.

THE TEMPLE OF DIANA AT EPHEBUS.

THE following letter from Mr. J. T. Wood appears in the *Times* of the 25th ult.:-

Excavations were recommenced last September, and have been continued, with a large number of workmen, up to the present time. The ground, which had been prepared during the spring—that is, cleared out from the present level of the surface to within 6ft. of the pavement of the "crypt," as it has been called—has now been removed entirely over nearly the whole of the Temple site. Reposing on this pavement, which remains in large patches, at the average depth of 22ft., have been found most of the stones which illustrate the architecture and sculpture of the

Temple. The first two stones found this season were from the antæ (pilasters) of the Pronaos, and represent two male figures in combat, the muscles of the chest of the most entire figure being highly developed; both figures are in very high relief, and perfectly nude. One or two less important fragments of sculptured drums of columns have also been found, and recently one very large fragment of a drum, with the upper halves of two nude male figures in high relief. The figures are those of a bearded man leaning on a staff, and regarding with interest some object held in the hands of a younger, beardless man. The sculpture is very much mutilated, and I fear our best authorities will not be able to decide the subject represented. This specimen is remarkable for the large plain space on either side which intervenes between these two and any other figures which might have been carved on the remainder of the column, the fragment itself being a full half of its circumference. The base of a second column has been found *in situ* on the north side of the Temple, which I believe was one of those sculptured at the eastern extremity, or rear, of the Temple. It formed one of the inner row of columns on the north side, while that which was found last year was one of the outer row on the south side.

In respect to the probable height to which the sculpture on the columns was continued, I am of opinion that they were sculptured to the height of one-third of the shaft, and I believe one of the stones now in the British Museum, which certainly was not one of the lowest stones of the column, proves that there must have been at least two; the proportion, however, shown on coins representing the front of the temple is about one-third sculptured, as nearly as I can remember. The extra width of the intercolumniations where the sculptured columns occur also goes far to prove that the sculpture was continued for a considerable height up the columns.

Portions of the western and southern walls of the "cella" have also been found, and within them some small portions of the walls of the Temple which preceded that now found. These walls were strengthened by being thickened out from 6ft. 4in. to 13ft. for the foundation walls of the new Temple, and the former Temple appears not to have been raised, as the last was, on a basement of ten steps, as the wall was composed of carefully-finished stones, with fine joints to a low level, the edges being chamfered to prevent accidental fracture by earthquakes or otherwise. The masonry which supported the ten steps has been found comparatively undisturbed on the north side, and the entire width of the whole, measured on the lowest step, was 238ft. 4in., the Temple itself measuring 163ft. 9in. by 308ft. 4in. The impression of the walls of the former Temple was found to the height of four courses upon the mortar of the rubble masonry of the foundation walls of a church, or some other building, which was built some time after the destruction of the Temple, the site having been then silted up to the height of 13ft. or 14ft.

The two columns *in situ*, the portions of walling of the "cella" remaining, and the impressions of other portions which have been removed on the rubble masonry, the masonry supporting the steps, from which buttresses were built opposite the foundation piers of the columns, have enabled me to complete the plan of the Temple, which is now found to have been octostyle—that is, having eight columns in front, and adorned externally with 100 columns nearly 6ft. in diameter. The interior of the "cella" must have been enriched with two tiers of columns of smaller diameter, as fragments of these were found near the walls. The 36 sculptured columns (*columnæ celatæ*) were, doubtless, placed at the western and eastern extremities of the Temple, as proved by the wider intercolumniations, thus allowing for the high relief of the sculpture, as found in the examples recently discovered. The correctness of the plan is proved in its most essential points by those portions of the building which remain still on its site, and I hope before long to send a number of stones to the British Museum, which will still further interest the public, and enrich our national collection.

P.S.—Since writing the above, I have discovered a large drum of a sculptured column at the extreme eastern extremity, with remains of six human figures, life size. It is thus proved that I was correct in supposing that there were sculptured columns in the rear as well as in the front of the Temple. Another question is also settled by this last discovery—viz., the fact of the

columns having been sculptured to a greater height than six feet, or one drum only. I have supposed that the sculpture was continued for at least one-third the height of the column. The diameter of the drum now found is 5ft. 7½in.; that of one of the others is 5ft. 9½in. This diminution in the diameter of the drums proves that the last found was not the lowest drum of the column, nor even the one directly above the lowest. It is to be hoped that further discoveries will settle the question as to the height to which the sculpture on the columns was carried.

SCIENCE AND ART MUSEUMS IN NEW YORK.

NEW York, according to the *Society of Arts Journal*, appears to be progressing rapidly in the creation of new buildings for the accommodation of Science and Art.

The new Natural History Museum is to be 800 feet long by 600 wide, and will be the largest building in America. £100,000 was voted last winter by the Legislature to commence it, and 200 men are already blasting for its foundations. It is eventually to cost £2,000,000 sterling, and fifteen years will be occupied in its construction. This great building is to cover fifteen acres of ground, and is to be situated on Mount Allan-square, facing Eighth-avenue and Central Park.

The front portion is to be finished directly, and the back portion is to be finished from time to time as needed, and as appropriations are made for it. The material is to be granite. The building is to be four stories high, with students' rooms in the upper story, and rooms and shelves for specimens illustrating natural history, zoology, botany, and mineralogy, on the ground floors. A grand entrance is to be made into Central Park, where now is Seventy-ninth-street. This will be called the Central entrance. The carriage entrances will be on Seventy-seventh and Eighty-first streets. The plans were drawn by Calvert Vaux and J. Wrey Mould. The architecture of the building is to be a kind of French Renaissance similar to the Luxembourg or the buildings around Fontainebleau.

Another great building is to be the new Art Museum. It is to ultimately cover about ten acres, and when finished it will be 800 feet long and 500 feet wide. It is to be built in Central Park, between the Croton Reservoir and Fifth-avenue, directly opposite Eighty-second-street. It will cover a section in the park as far as from Eightieth-street to Eighty-fourth-street. £20,000 is already appropriated for its commencement. The front portion is to be built in the spring, and the back portion will be built from year to year as wanted; £100,000 will be spent this season on the new building.

OBSTACLES TO SANITARY MEASURES.—In his quarterly report for December, 1872, on the sanitary condition of the Whitechapel district, Dr. Liddle observes that, however much the landlords may feel disposed to keep their houses which are let to the poor in a proper sanitary condition, the tenants, owing to their filthy habits, render it almost impossible for them to do so. This remark refers more particularly to those houses in which every room is let to a separate family, and where the yard, privy, and staircase, are used in common by all the occupants of the house. Thus one tenant will not remove the filth from any part of the house or yard, so the filth remains, thereby causing a nuisance to the house. The landlord is required to cleanse and repair the walls and ceilings when necessary; but as a rule, the tenants seldom think of cleansing the floors of their rooms or the stairs. Some landlords keep a man or a woman to look after the privies and the yards for the purpose of keeping them clean. This work is usually performed early in the morning, and it often happens that the first person who uses the privy after the same has been cleansed will deposit filth on the seat, and the next person will do the same thing, or perhaps will throw the filth in the yard or into the dust-bin: as a rule, the tenants will not even take the trouble to put the dust into the bins, but will drop it down by the back door and sometimes in the passage of the house. The stairs are sometimes found to be so encrusted with dirt as to require a pickaxe or shovel to remove it. The teaching of cleanly habits to the poor would form a grand field for missionary enterprise.

OUR LITHOGRAPHIC ILLUSTRATIONS.

S. MARTIN'S CHURCH, BRIGHTON.

This church, the foundations of which are now completed, is being erected to the memory of the late H. M. Wagner, M.A., for more than forty years vicar of Brighton, by his three sons. The detail throughout the building is of the simplest character, dignity and size being relied upon for effect, rather than elaboration. The nave and chancel, which are together 171ft. 4in. in length, are of the same width, 40ft. from wall to wall, throughout. The total internal width, from aisle wall to aisle wall, is 70ft. The length of the chancel 48ft. 9in. In consequence of the street which flanks the building and affords the principal means of access having been raised more than three feet above the natural ground level, there will be a descent into the church from the porch level; a flight of steps, as shown upon the ground plan, being carried across the nave and aisles. Beneath this platform is a tunnel communicating with the coal-vault (placed under the porch), and affording access to two chambers, grated above, in which are to be placed Gurney stoves, the stoking of which will be effected from the tunnel only, so as to shut off, as much as possible, all return smoke from the church. A small stove will stand on the south side of the chancel behind the stalls, for the use of the side chapel. The nave of the church is of six bays of 20ft. 6in., the walls 50ft. 6in. from the ground line to the wall-plate, the height to the ridge of the ceiling being 71ft., and to the ridge of the roof 83ft. The columns are of Darley Dale stone, the arches throughout the building being of red brick, from the Ditchling Potteries.

The use of stone externally is avoided as much as possible. The shafts, &c., inside are of Bath stone; caps to piers, &c., where any weight is borne, of Portland. The chancel is to be groined with ribs of Bath stone, the filling-in being of concrete. The windows throughout are simple lancet lights, with the exception of that at the east end. This will be of five lights. The sill is kept at a height of 43ft. from the floor line, to accommodate a reredos, which is intended to be of an exceedingly elaborate character. The organ is to project from the north wall of the chancel to a distance of six or seven feet into the church, and provision is made over the sacristy for receiving a blowing engine, or for placing the bellows, as may be found desirable. Opposite to the organ, and projecting from the south wall, will be a gallery, approached by the round turret. This is provided for the use of the band of the regiment attending the church. The building is to be lit with gas pendants. The whole of the work is being executed with the patent Selenitic mortar, from the Glynde quarries. The present contract, which does not include the tower above the roof line, but is inclusive of chancel fittings, gas, heating, &c., is taken by Mr. Jabez Reynolds, of Brighton, at £11,538. The church will seat 1,169 persons, exclusive of the vacant spaces, which would receive 300 more. Fixed seats are not included in the contract. The architect is Mr. Somers Clarke, junr., 3, Delahay-street, Great George-street, Westminster.

MR. ROSS'S DESIGN FOR S. ANDREW'S CATHEDRAL CHURCH, INVERNESS.

One of our illustrations this week represents S. Andrew's Cathedral Church, Inverness, which we have reproduced from the *Builder* of about three years since. The cost of the building was £18,000. It was erected by Inverness workmen, from the designs, and under the superintendence of, Mr. Alexander Ross. The foundation-stone was laid by the Archbishop of Canterbury, in the presence of five Scotch bishops and the Bishop of North Carolina; and the opening service was performed in the presence of the Bishop of Winchester, the Bishop of Oxford, the Bishop of Rochester, and a large number of Scottish and English clergy. In fact, the erection of the cathedral was regarded as a great event in the ecclesiastical annals of Scotland, and doubtless Mr. Ross, the architect, put forth all his power. The design and execution of the cathedral reflected so much credit on him, that he was appointed one of the six competitors for the Edinburgh Cathedral, about which so much has been recently said.

MR. ROPER'S DESIGN FOR A LONDON CHURCH.

We also give an alternative sketch, sent in in competition for a London church in June last, by Mr. G. F. Roper. These respective designs by Mr. Ross and Mr. Roper tell their own tale. We have deemed it advisable to thus practically appeal to facts, as the most expeditious way of settling a somewhat painful controversy. If Mr. Ross should desire it, we would willingly publish designs of two of his latest works—namely, the episcopal church at Laurence Kirk, and a church at Lenzie Junction, not yet finished.

SWANDOWNER'S SCHOOL, BRIGHTON.

The charity was originally founded, for the education of 30 girls, by a former inhabitant of the town named Swandowner. The present accommodation is, however, for 100 girls. On the ground floor are the rooms for the resident mistress, class-room, lavatories, cloak lobby, and water-closets, &c. A stone staircase leads to the first floor, which consists of one large school-room 35 by 20 and 29ft. high, with an open timber roof in deal, varnished. The materials used are selected Southampton facings, pale yellow and red, and Ground Box and red Mansfield stone. The walls are built hollow, with a 2in. cavity and iron ties. The style is an adaptation of late Gothic of a German character in the details throughout. The building was erected and occupied in the year 1867, costing £1,900, from the designs of G. Somers Clarke, architect, of London, by Mr. John Chappell, builder, of Steyning, in Sussex. The gasfittings and ironworks were supplied by Messrs. Hart, of Wych-street.

LODGE AT CASTLE ASHBY.

The lodge of which we give an illustration was built for the Marquis of Northampton, at Castle Ashby. It is one of a pair at the south end of the principal avenue. Messrs. E. W. Godwin and Crisp were the architects.

STREET CLEANSING IN THE CITY.

A SERIES of experiments were made in 1867, under the direction of Mr. William Haywood, the City Surveyor, with a view to determine the value of the system of street cleansing by jet and hose. His report was favourable, and it was deemed expedient—in view of the rise in prices of iron and labour—to repeat the experiments towards the end of 1872, more especially with regard to the streets in which asphalt had been laid down as a paving material.

Cheapside, the Poultry, Mansion House-street, and Old and New Broad streets were selected for the experiment, which was commenced on the 17th of October last, and continued for one week.

The following Table shows the results obtained in washing Cheapside and the Poultry in 1867, when paved with granite, and more recently, when paved with asphalt:—

	Granite in 1867.	Asphalte in 1872.
Time occupied in washing	2h. 19m.	2h. 4m.
Consumption of water in gallons per square yard per day	1'99	1'90
Total cost, including supervision, wear and tear of hose, &c., per square yard per annum	Pence 9 01	Pence 8'20
Total cost per mile of main street per annum	£969	£934

The cost of washing asphalt, therefore, seems to be about three or four per cent. less than that of granite, while a higher state of cleanliness is obtained.

The probable cost of street washing for the whole of the City is estimated by Mr. Haywood as follows:—

	TOTAL COST.	
	Per Mile.	For 7 Miles of main thorough- fares.
Cost of fixing hydrants	£ 650	£ 4,550
Cost of washing granite pave- ment per annum	969	6,783
Cost of washing asphalt pave- ment per annum	934	6,538

It will therefore be safe to estimate the cost per mile of fitting streets with hydrants at £700, and the annual cost of washing at £1,000.

COMPLETION OF THE COLSTON HALL, BRISTOL.

BEFORE another month has elapsed the entire scheme of Colston Hall will have been completed; and, in addition to the spacious saloon at present utilised, there will be a second room capable of containing 800 persons. In 1861 plans for the construction of the large hall were invited. Ten architects competed, and the designs sent in were referred to Professor Donaldson, who assigned the first place to that of Messrs. Foster and Wood, and the second to Mr. Masters, and the latter gentleman received a premium of thirty guineas. Building operations forthwith commenced, and the work proceeded steadily. In 1867 the main hall was opened for public use. The dimensions of this saloon are as follows:—Length, 150ft.; width, 80ft.; and height, 72ft. Busts of Mr. George Thomas and Mr. Finzel are placed at the upper part of one of the side walls, and similar busts of the late Mr. H. O. Wills and Mr. R. Charleton are designed to be also placed in the hall. The entrances are set off with the heads of celebrated musical composers. The most prominent object in the room is the organ, built at a cost of £2,500 by Mr. Henry Willis, of London.

In Colston Street the halls have an elaborate frontage, 96ft. in length, and of a corresponding height, in terra-cotta, variously coloured. The lower part consists of a handsome loggia, which extends the whole length of the front, divided into seven arches, each about 16ft. in height by 19ft. wide, the three middle ones giving access to the vestibule, which communicates with the grand staircase. The other four recesses are glazed, and an iron railing of suitable design is placed in front. Doors, having grilled fanlights, and thickly studded with ornamental bolts, are fitted to the entrance arches, approached through iron gateways. At the entrance to the loggia, carriages will set down their occupants, who will then pass into a vestibule, the roof of which is of open timber work, with ceiled interstices, and thence into the corridor to the grand staircase. The latter is of magnificent proportions, being 34ft. in width, 64ft. long, and 30ft. high, the roof being supported by pillars of Ham Hill stone. Broad steps of Pennant stone, flanked with huge balusters of terra-cotta, occupy the middle of the space, and lead up to the great and lesser halls, the latter of which is entered by two spacious doorways at either end of a corridor. The pillars from the street level to the first floor are of Ham Hill stone, with handsomely carved capitals, some of them bearing the city and others the Colston arms. Above this are seven deeply-recessed windows, through which daylight is admitted into the smaller hall—an apartment 92ft. long by 36ft. deep and 30ft. high. The exterior columns between the windows are of red Mansfield stone, with terra-cotta caps and bases, the former being cast in antique devices, and the whole frontage is surmounted by a rich cornice. The walls of the smaller hall are stuccoed, and the ceiling is covered and fitted with a rich cornice. There is a gallery at one end, similar to that of the grand hall, with a side staircase leading to it. A movable platform will occupy the other extremity.

Communicating with this room are a couple of retiring-rooms, 33ft. long by 26ft. deep, and 19ft. high, supplied with lavatories and every necessary convenience; and above these retiring-rooms will be the hall-keeper's apartments. The halls stand on the same level, a staircase leading from the grand flight to the tribunes of the larger. A third room occupies the ground floor beneath the second hall, and will seat about 200 people. It is 60ft. in length, 26ft. deep, and about 17ft. high. This room, which is intended for small public meetings, stands on the right-hand side of the vestibule on entering, and a committee-room on the left-hand side. The basement is devoted to a spacious kitchen, provided with necessary cooking apparatus, and a lift communicating with the two halls above. The entire undertaking will cost about £40,000, of which the great hall alone has absorbed nearly £30,000, inclusive of the site.

The large hall was built by Messrs. J. and J. Foster, the clerk of the works being Mr. G. Pauley. The work of constructing the smaller hall and frontage has been under the superintendence of Mr. G. Salmon, clerk of the works; Mr. J. Diment, [of S. James's-square, is the builder.



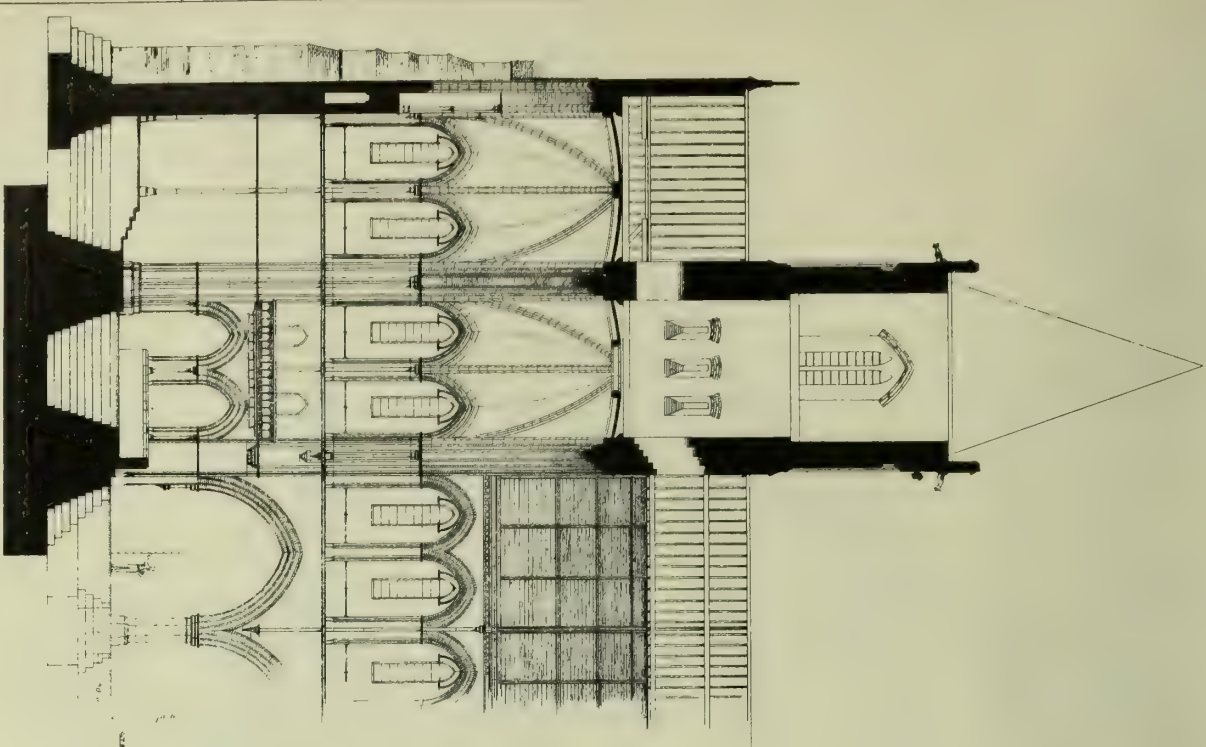
Swan Downers Schools Brighton G. Somers Clarke Archt.



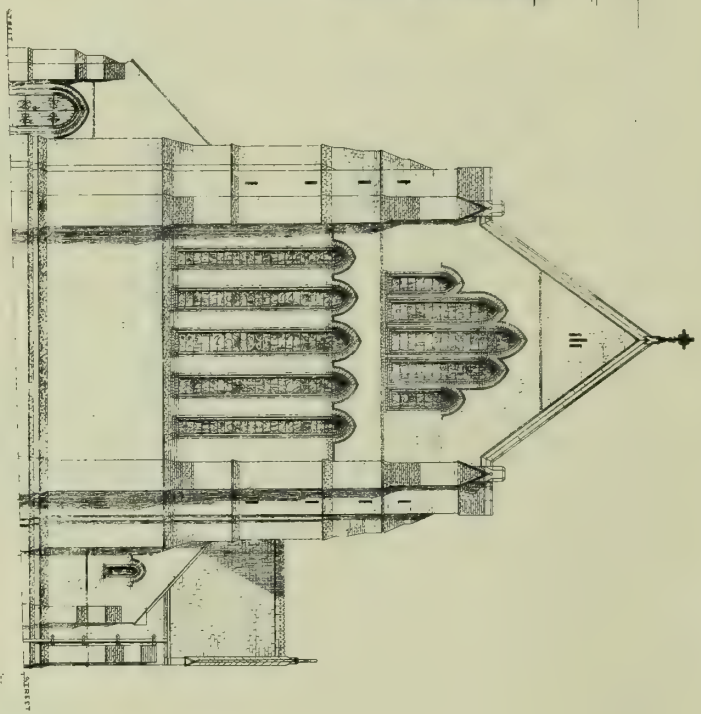
THE BUILDING NEWS MAR. 7. 1873.

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LEWIS ROAD: BRIGHTON:

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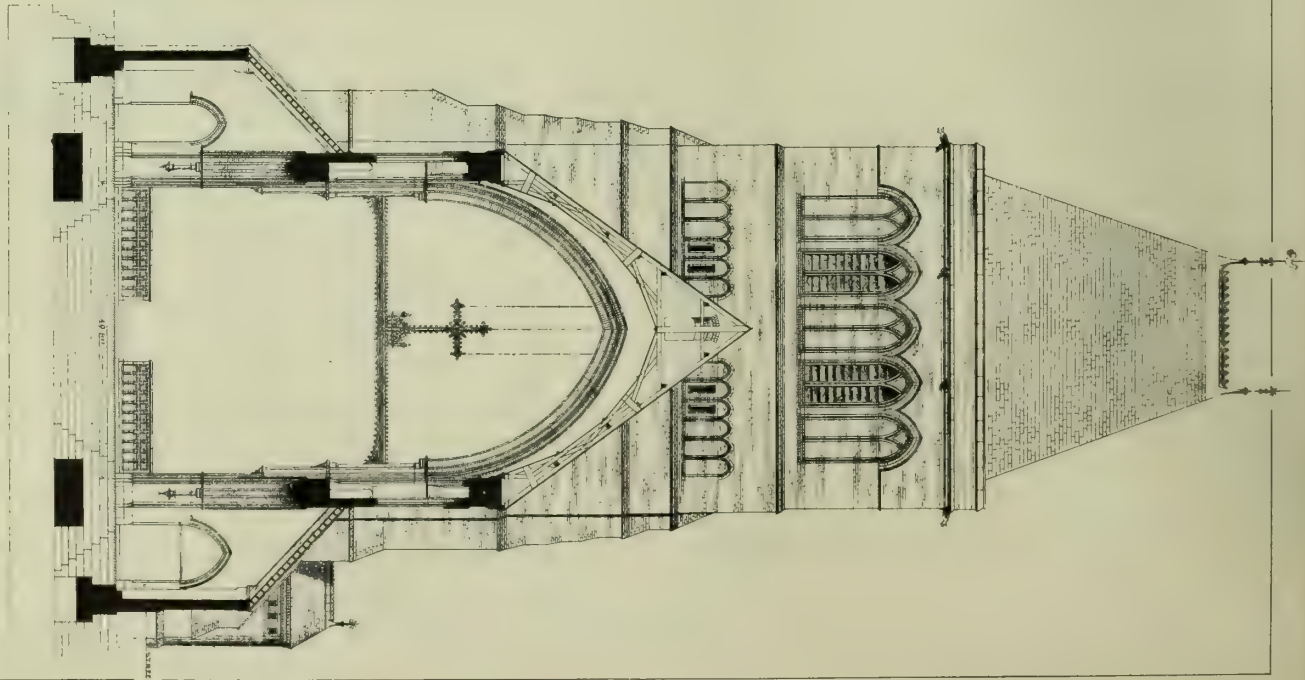


SECTION THROUGH CHANCEL LOOKING SOUTH.



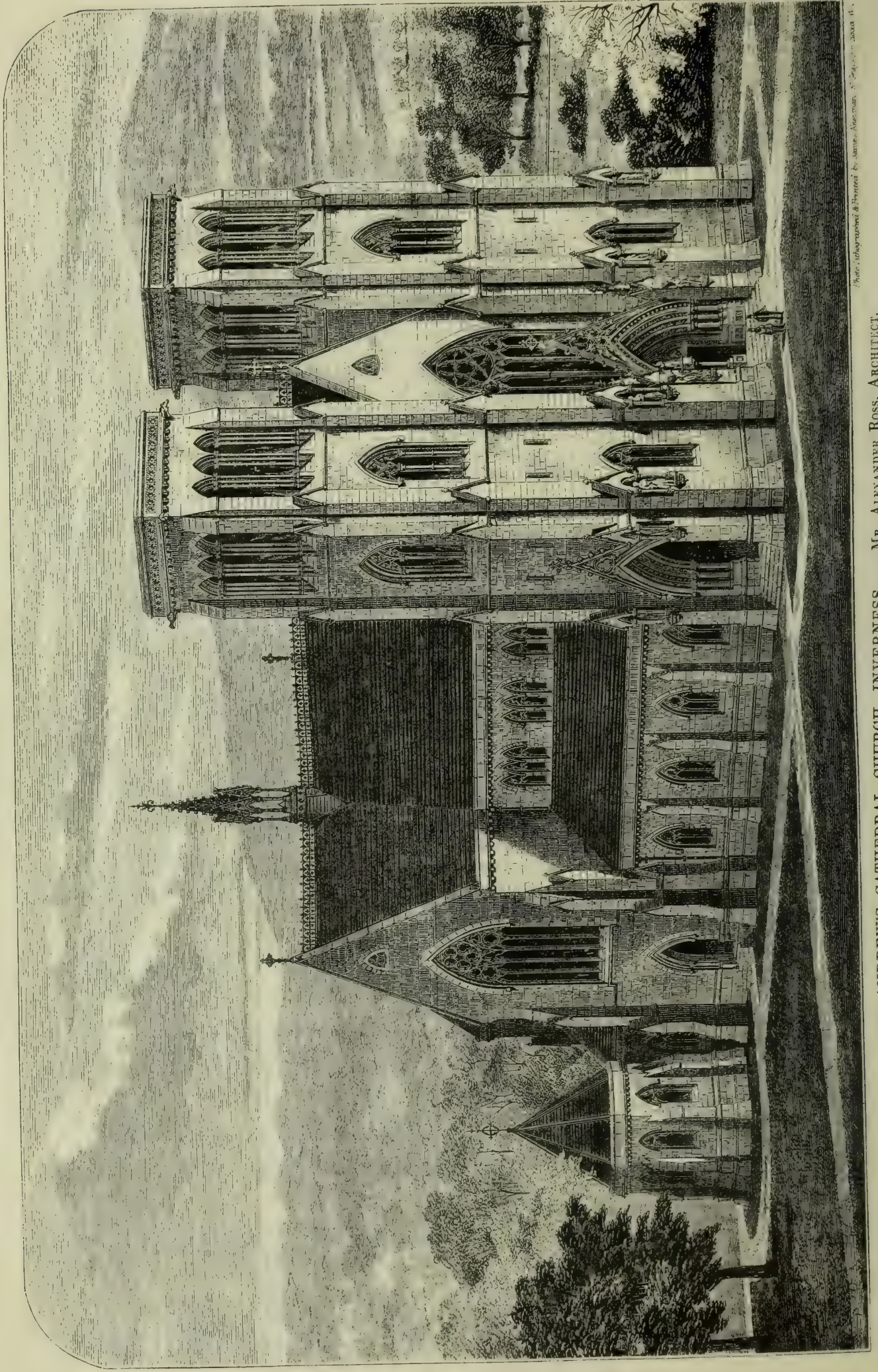
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SECTION THROUGH NAVE LOOKING EAST.

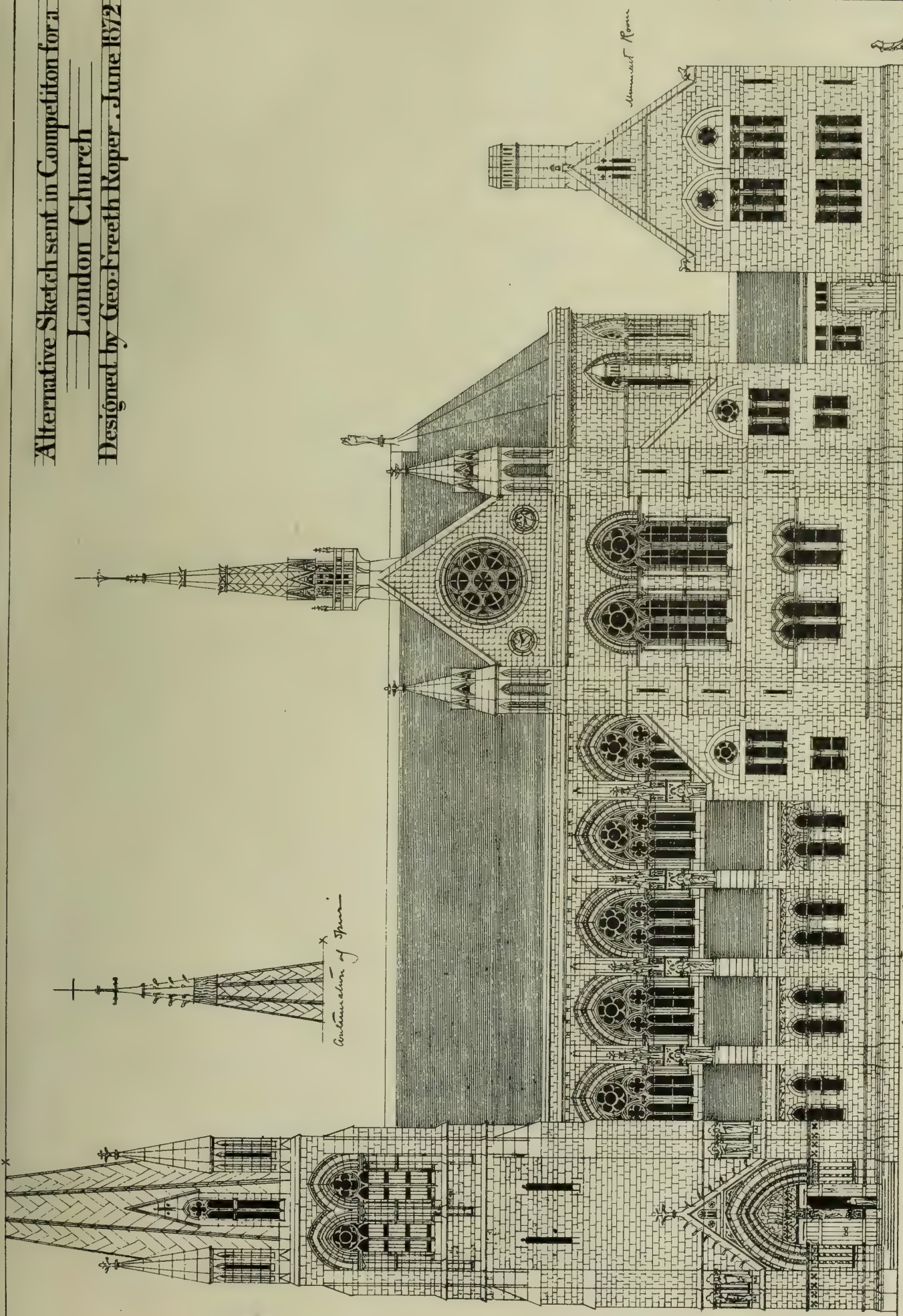
THE BUILDING NEWS. MAR. 7. 1873.



ST. ANDREW'S CATHEDRAL CHURCH, INVERNESS.—MR. ALEXANDER ROSS, ARCHITECT.

Photo. lithographed & printed by James Macdonald, 10, Regent-street, London W.

Alternative Sketch sent in Competition for a
London Church
Designed by Geo. Freeth Roper. June 1872



Mineral Town 206 feet to top of Vault -

Scale 1/4 of an Inch = 1 foot

Club for Communication and Amusement

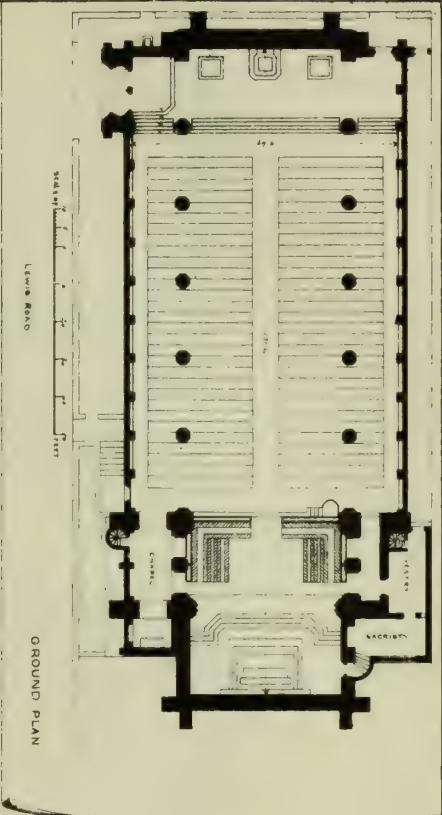
Staircase to Galleries

Stairs to Belfry and
porch and church

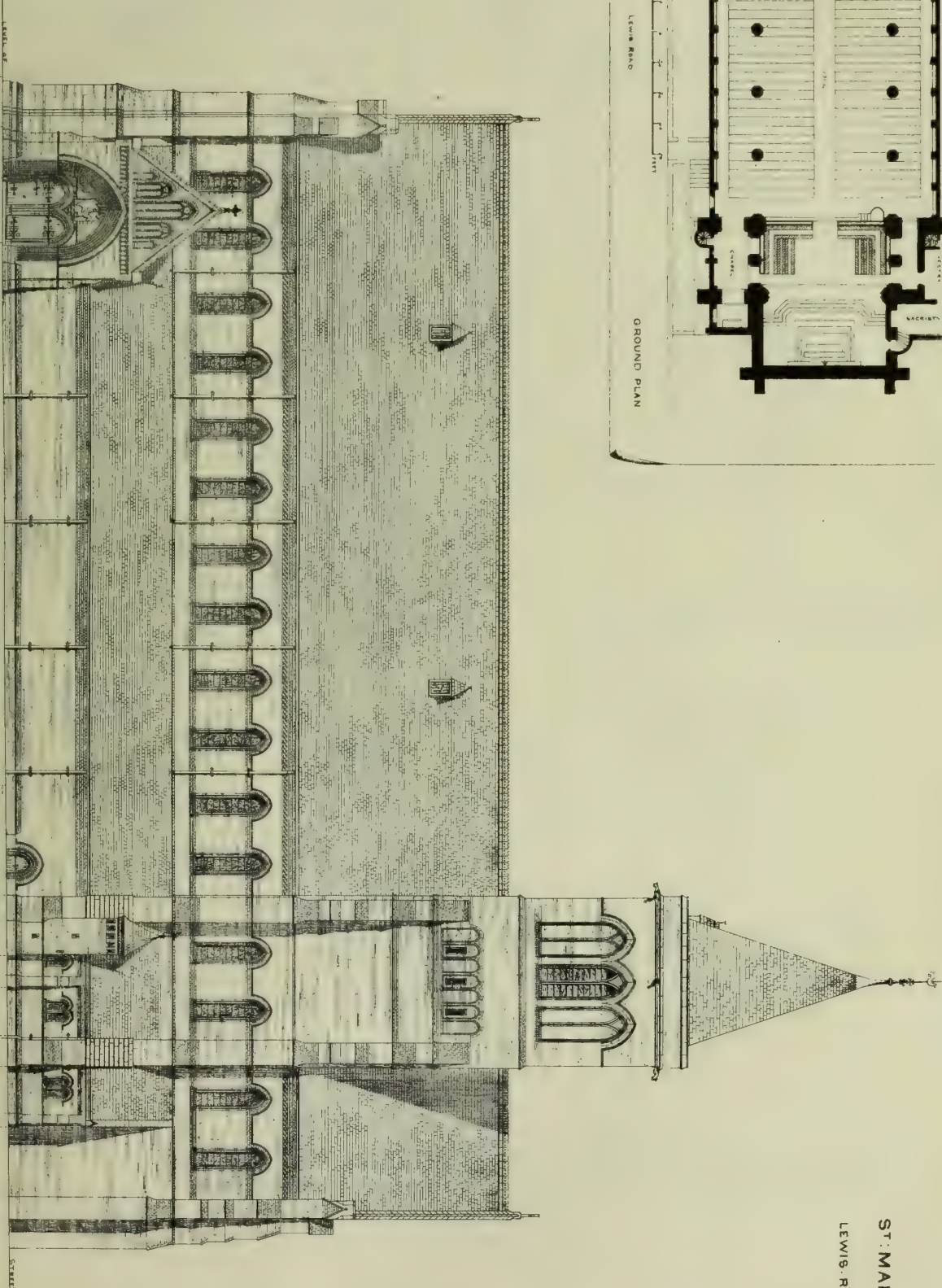
Entrance to Vestibule



The Building News Mar. 7. 1873.



ST. MARTIN'S CHURCH.
LEWIS ROAD BRIGHTON.

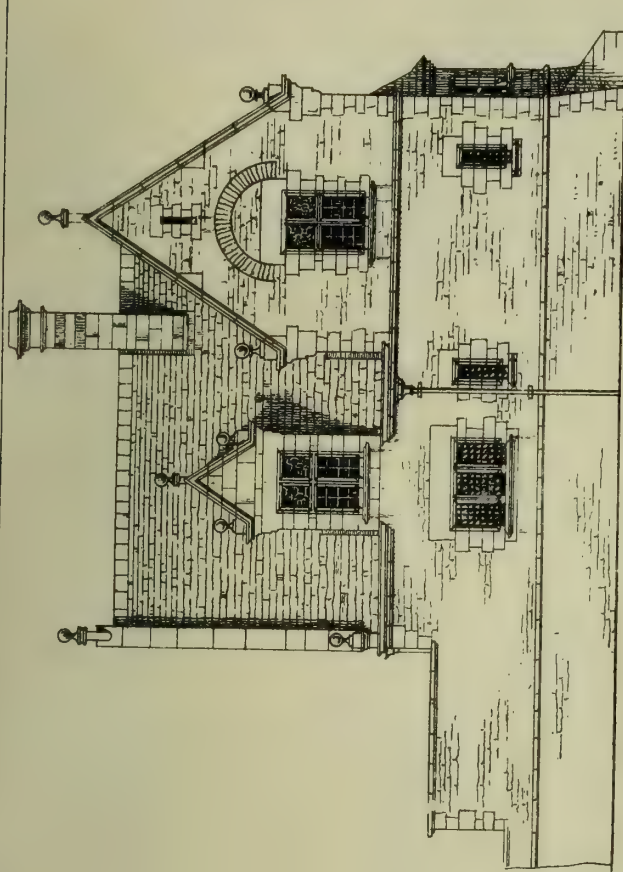


SOMERS CLARK JUN. ARCHITECT
3, DELAWARE STREET S.W.

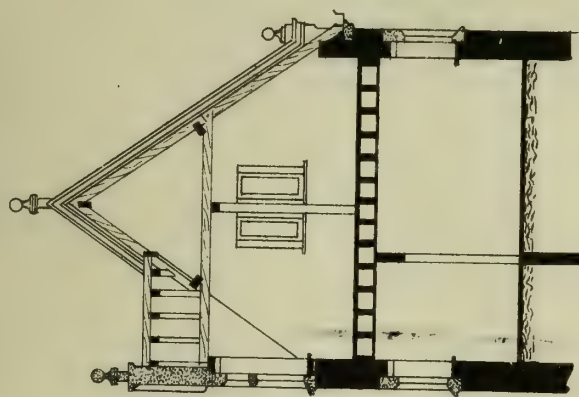
20 SOUTH LODGES

, CASTLE ASHBY.

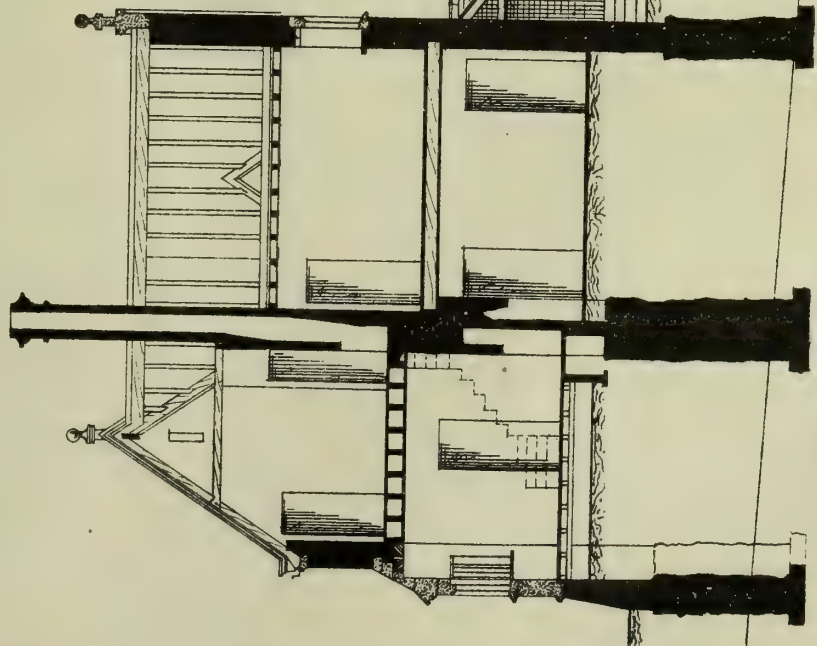
MESSES GODWIN & CRISP ARCHITECTS



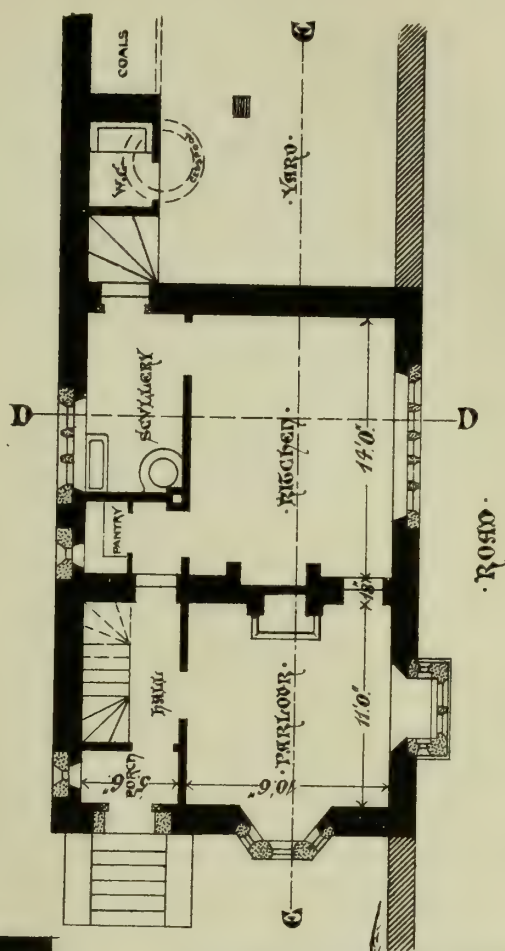
BACK ELEVATION



SECTION D-D



SECTION C-C



GROUND PLAN



MAURICE B. ADAMS, DELT.



START'S HILL ESTATE, ORPINGTON, KENT.

WE illustrate this week the plan for laying out the above estate, for which Messrs. Th. Batterbury and J. Kiddle, architects, gained the first premium (and were subsequently appointed architects to the estate) in a public competition, as noticed by us a few weeks since. We have preferred to illustrate the plan, for its practical use, instead of the bird's-eye view. The estate is at present a freehold farm, belonging to Mr. J. L. Lovibond, and distant three-quarters of a mile from the Orpington station on the South-Eastern line. There is no doubt that considerable skill has to be displayed in laying out an estate, but especially where there are undulations, as in the present instance; as it would be obviously a mistake to place the roads and houses on low ground instead of the highest.

In Messrs. Batterbury and Kiddle's successful plan, it is obvious that as much as possible has been made of the natural advantages of the site; for instance, the brooks (which are always valuable acquisitions to an estate) have, where practicable, been made to serve, and very properly so, as boundary lines to several of the plots; the roads have been placed on the high ground between the brooks, and, consequently, in two instances they have been made to follow the course of the brooks themselves, and thus take a natural form. The main road, running through the estate, is already partly made. The public footpaths, shown on the plan, have not been in any case diverted, but made to serve as boundaries to some of the plots. The largest and highest plots are those facing the "Avenue." It is proposed that the estate should be a private one, and to allow of this being carried out, four lodges, one of which is already built, have been shown.

We understand that no levels whatever were supplied to the competitors; consequently all particulars had to be obtained from actual observations.

VICTORIAN BUILDING-STONES.

THE samples of stone sent to the Melbourne Exhibition from many parts of Victoria, and supposed to be suitable for building purposes, present some features of interest. There are specimens of the following varieties, viz.:—Freestone, granite, octohedron stone, bluestone, marble, flagstone, sandstone, basalt, limestone, bathstone, hearthstone, miscellaneous stones from various localities, unnamed; also, specimens of slate.

Granite and bluestone are the most abundant of all Victorian stones: bluestone is the most available. With few exceptions, the freestones are not remarkably good, softness being one of the objectionable features. A sample from Mansfield, No. 1526, according to the *Australian Mechanic*, appears to be an excellent specimen of a good, sound, durable, workable freestone, cool in colour (light blue), and apparently of a tough texture. A chocolate-coloured freestone specimen, also from Mansfield, may be pleasingly applied to internal decorations, as progress is made in taste.

The specimens of bluestone appear to be highly satisfactory and abundant. There is no doubt about the serviceable qualities of this stone for so many building purposes. It is a highly valuable stone for foundations, flagging, stores, warehouses, &c.; Castlemaine, Footscray, and Malmesbury send the best specimens.

The samples of granite exhibited come from various parts of the colony, Harcourt sending the finest sample. In slates, Inglewood and Stawell exhibit useful varieties, but Willunga furnishes the most interesting and valuable specimens.

In marbles the colony does not excel. The sample most worthy of notice comes from Mansfield. Wahgunyah sends some stones for sharpening edged tools, which it is said are equal to any imported stones of this kind. Should this prove to be the case, Wahgunyah will, indeed, possess a local source of wealth.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT a special general meeting of this Institute held on Monday last, Horace Jones, Esq., Vice-president, in the chair, it was unanimously resolved that, subject to Her Majesty's sanction, the royal gold medal (annually bestowed on some

architect or author of works on architecture), should this year be awarded to Mr. Thomas H. Wyatt, President of the Institute.

At the same meeting, the Soane Medallion (with £50 under certain conditions of Continental study) was awarded to Mr. William Frame for his design for a public hall, while medals of merit were voted to Mr. Frederick C. Deshon and to Mr. J. H. Eastwood, for their designs.

Mr. A. H. Kersey gained the Institute Silver Medal and five guineas for a large set of drawings illustrating S. Mary's Abbey, Malton, Yorkshire, and in the same competition medals of merit were awarded to Mr. Arthur Hill, for his drawings of Cormac's Chapel, Cashel, and to Mr. Thomas Garratt, for his drawings of S. Mary's Abbey, Lilleshall, Shropshire.

A medal of merit was awarded to Mr. Alfred Jowers, for his essay on "Architectural Criticism."

The next meeting of the Institute will be held on Monday, the 17th inst., when Mr. Alan S. Cole, of the South Kensington Museum, will read a paper on the art of *Sgraffito* decoration. The chair will be taken at 8 p.m.

PARLIAMENTARY NOTES.

THE CHELSEA WATER BILL.—In the House of Lords on the 27th ult., the principal subject under discussion was the Chelsea Water Bill, the second reading of which was moved by Lord Fitzwalter. The measure was opposed by the Marquis of Salisbury, who pointed out, as a fatal objection to it, that it authorised the construction of 1,000 yards of wall from 22 to 27 feet in height immediately opposite Hampton Court Palace, thus disfiguring one of the most attractive spots on the river.—Lord Granville recommended that the Bill should be sent to a select committee, in order that the facts of the case might be fully inquired into. In the subsequent debate the second reading was supported by Lord Grey, and opposed by the Marquis of Hertford, Lord Middleton, and the Duke of Richmond.—Replying to Lord Granville, Lord Fitzwalter intimated that the promoters of the Bill would undertake not to interfere with the banks of the Thames; but notwithstanding this assurance, on their lordships going to a division, they rejected the Bill by the large majority of 41, the numbers being 29 ayes to 70 noes.

THE CHARING-CROSS AND VICTORIA EMBANKMENT APPROACH BILL.—In the House of Commons, Lord Elcho proposed to refer the Charing-cross and Victoria Embankment Approach Bill to a "hybrid" committee of nine members, five to be named by the House and four by the Committee of Selection. The object of the Bill is to make an approach to the Embankment from the "finest site in Europe," by the removal of Northumbeland House and some adjacent properties; and the main ground of the noble lord's proposal was that the Metropolitan Board of Works asked power to sweep away one of the few old historical landmarks still remaining in the capital, without securing an equivalent in the nature of public convenience, or indicating what was the kind of improvement that was to take its place. If Northumbeland House disappeared, the only thing that would be exposed to view was the side of the Charing-cross Railway terminus, one of the ugliest objects, architecturally considered, that could be imagined. In fact, the board seemed to have decided upon the measure in the first instance without plans or models, whilst, according to the model just deposited in the library, the gradient of the approach was by far too steep.—Mr. B. Cochrane seconded the motion, and insisted upon the necessity resting on the Metropolitan Board of Works of producing data that would show the new street would take off at least half the traffic of the Strand, and be in reality a great metropolitan improvement.—Colonel Hogg (Chairman of the Board of Works) opposed the motion, as being contrary to the usual procedure of the House on private Bills, and a direct infringement of the standing orders, according to which, when a Bill had gone through a second reading, it should be referred to a select committee chosen by the committee of selection. Such a tribunal as that was much more likely to give satisfaction to the House and the promoters of the Bill than the hybrid body suggested by the noble lord. He thought, also, that some confidence might be reposed in the board and their officers, who had carried out various metropolitan improvements

of late years with the approval not only of their fellow-citizens but of intelligent foreigners. The Embankment had not accomplished the object of relieving the traffic in the streets to the extent that had been expected; a new approach was therefore necessary, and the question was how that could best be made. His own opinion was that the scheme laid down in the Bill was the best; that it would be a credit and an honour to the metropolis if it were allowed to be executed, and he protested against getting rid of the Bill by a side-wind.—Mr. Beresford-Hope was not prepared to confide in the Board of Works, and added that that body must have a very bad case if they could not trust it to a hybrid committee.—Dr. Brewer, a member of the Board of Works, opposed the motion, as did Mr. Bonham-Carter, Chairman of Committees, who condemned it as varying the procedure of the house and setting an inconvenient precedent. On the House dividing the motion was negatived by 187 to 72.

THE BETHNAL-GREEN MUSEUM.—Mr. Baxter, in answer to Mr. C. Reed, on Tuesday, said that probably the hon. member was not aware that the Turner collection of drawings at Birmingham, which he wished sent to Bethnal-green Museum, consisted only of fifty small sketches which would only fill half the side of an ordinary drawing-room; but there would be no objection to send them to Bethnal-green provided the same precautions were adopted as were in existence in reference to the pictures now there.—Mr. Forster, in reply to Mr. C. Reed, said that it was rather a strong term to say that in 1870 arrangements were directed to be made for the establishment of a school of art and science, and a library, in connection with the Bethnal-green Museum; though he certainly hoped that it would be possible to make such arrangements in reference to a school of art soon, on account of the large collection of pictures that had been placed there. As to a library, he could see no reason to believe that there was any necessity for having one there.

THE METROPOLITAN BOARD OF WORKS AND THANKSGIVING DAY.—Colonel Hogg, in answer to a question by Mr. Rowing, in reference to the disallowance by the official auditor of the cost of erecting seats on the Embankment on the Thanksgiving-day, said that on the occasion of her Majesty proceeding in state to St. Paul's to return thanks for the recovery of his Royal Highness the Prince of Wales, the municipal authorities deemed it their duty to show their respect and loyalty, in accordance with usage in London and all other large towns. The expenses incurred by the Metropolitan Board for the erection of seats amounted to £3,579. 17s. 6d., and were incurred for the purpose of enabling the local representatives of the whole of the metropolis to testify their loyalty by participating in the general rejoicing. The auditor had thought fit to disallow the sum in question, not, however, as far as he knew, on the representation of the ratepayers of the metropolis, but only of a small number of objectors, who were represented at the audit by about eight ratepayers. He might add that the money had been paid, and that he was not aware what course might be adopted by the board.

TRAMWAYS IN THE CITY.—On Tuesday, at a meeting of the City Commission of Sewers, at which Mr. Farrar presided, the Joint Finance and Streets Committee brought up a report upon the application of the North Metropolitan Tramways Company to be allowed to lay down tramways in Moorgate-street and Aldgate High-street. They recommended that, under certain conditions, the requisite permission should be given to the company; but that previously to any decision being arrived at, the matter should be laid before the Common Council for consideration. The debate upon the report was adjourned until the next meeting, to give the engineer an opportunity to furnish some particulars as to the effect of the introduction of tramways into the City thoroughfares. A petition, purporting to be signed by 31,000 persons, in favour of the extension of the Tramway Company's line was brought before the Court by the promoters, but there being not a single petitioner present in support of it, it could not be accepted. At the same time, Mr. Rigby, a member, made some strong observations as to the manner in which the signatures to the petition had been obtained. A memorial against the proposed extension was presented from the inhabitants of Moorgate-street and Finsbury-pavement.

THE LATE MR. JAMES MURRAY.

THE four children of the late Mr. James Murray, Fellow of the Royal Institute of British Architects, are, by the death of their mother, left homeless and destitute orphans. The eldest boy has been fortunately apprenticed to the Trinity House, and the youngest is elected to the British Orphan Asylum, but the two little girls, aged 13 and 14, must depend entirely upon the kindness and liberality of friends for their support and education, till they are able to maintain themselves. An urgent appeal is therefore made on their behalf, believing that so sad a case must meet with generous sympathy and ready help. Subscriptions are thankfully received by Mrs. Gulson, Coventry; J. C. Horsley, Esq., R.A., Willesley, Staplehurst, Kent.

SUBSCRIPTIONS RECEIVED.

	£	s.	d.
Royal Academy of Arts	25	0	0
Artists' General Benevolent Institution	50	0	0
Architect's Benevolent Society	50	0	0
Sir W. Tite, C.B., M.P., F.R.I.B.A.	10	0	0
A. J. B. Beresford Hope, Esq., M.P.	3	0	0
Sir G. Gilbert Scott, R.A., F.R.I.B.A.	5	0	0
P. C. Hardwick, Esq., F.R.I.B.A.	10	0	0
T. H. Wyatt, Esq., P.R.I.B.A.	5	0	0
J. C. Horsley, Esq., R.A.	3	3	0
E. M. Barry, Esq., R.A., F.R.I.B.A.	2	2	0
G. E. Street, Esq., R.A., F.R.I.B.A.	5	5	0
Norman Shaw, Esq.	2	0	0
Mrs. Norman Shaw	10	0	0
F. Bennoch, Esq.	2	2	0
Mrs. Pegg	1	1	0
J. Foster, Esq., F.R.I.B.A.	2	2	0
E. H. Martineau, Esq., F.R.I.B.A.	3	3	3
C. J. Phipps, Esq., F.S.A., F.R.I.B.A.	1	1	0
A. Waterhouse, Esq., F.R.I.B.A.	10	0	0
J. Macvicar Anderson, Esq., F.R.I.B.A.	3	3	0
A. W. Blomfield, Esq., F.R.I.B.A.	5	5	0
Professor Donaldson, F.R.I.B.A.	2	2	0
J. Phené, Esq., F.S.A., F.R.I.B.A.	1	1	0
Sir M. D. Wyatt, F.S.A., F.R.I.B.A.	2	2	0
W. Papworth, Esq., F.R.I.B.A.	10	0	0
J. R. Botham, Esq., F.R.I.B.A.	1	0	0
D. Brandon, F.S.A., F.R.I.B.A.	5	0	0
C. F. Hayward, Esq., F.R.I.B.A.	1	1	0
Professor Hayter Lewis, F.R.I.B.A.	3	3	0
W. Peachey, Esq., F.R.I.B.A.	1	1	0
J. Fowler, Esq., F.R.I.B.A.	1	1	0
G. Bidlake, Esq.	1	0	0
Mrs. Lloyd	10	0	0
H. Clutton, Esq., F.R.I.B.A.	5	0	0
E. L. Rounieu, F.R.I.B.A.	2	2	0
W. Burges, F.R.I.B.A.	5	5	0
T. H. Browne, A.R.I.B.A.	2	2	0
Horace Jones, Esq., F.R.I.B.A.	2	2	0
W. H. Lynn, Esq., F.R.I.B.A.	2	2	0
Anon	5	0	0

Building Intelligence.

CHURCHES AND CHAPELS.

BIRKENHEAD.—A new Irvingite Church was opened at Birkenhead on Sunday last. The building is constructed wholly of brick. The style is that of the first half of the thirteenth century. The interior, which is also lined with brick, is lofty and well proportioned. The cost of the edifice complete, without land, will be about £1,300. The contract has been carried out by Mr. W. H. Forde, builder, of Cloughton-road, Birkenhead, from the designs and under the superintendence of Mr. David Walker, of Lord-street, Liverpool.

BIRMINGHAM.—A curious discovery has been made at S. Martin's Church. When the foundations of the old chancel were laid bare, a large chamber was found underneath the chancel with a fireplace in it, and in the fireplace a few pieces of coal, showing that it had been used—this being also proved by the condition of the sandstone, part of which was vitrified by the action of the fire. The chamber had a door, opening on the north side of the chancel outwards to the church-yard; and was lighted by three windows—two under the great east window, and one on the south side. The full extent of the chamber has not yet been traced; but there is reason to think that it extended nearly to the second arch, which is conjectured to have marked the boundary of the chancel. The use of this chamber, of course, remarks the *Birmingham Daily Post*, can only be guessed at. Possibly it was the sacristy of the church, as there is no trace of any other place of this kind. But it might, possibly, have been occupied by a chantry priest: perhaps one belonging to Clodshale's Chantry. It would not have been an uncomfortable place for this purpose, for the ground sloped rapidly down to the Bull Ring on the one side, and also fell sharply away towards Moat Row on the other. There is no evidence of the chamber having been a crypt, used for the purposes of burial, or of worship

—the presence of the fire-place militates against these suppositions, and there is no trace of groining or vaulting of the roof. This, however, is not to be wondered at, for the place had, at some time, been completely filled up with earth—probably during the alterations at the latter end of the seventeenth century.

CHURCH LAWFORD.—A new church has been built at Church Lawford, upon the site of the old one. It was intended to have left the old tower standing, but after the removal of the rest of the church, this was found to be so unsafe that it had to come down as well. The style of the new building, like that of the old one, is Early Decorated, and under the careful superintendence of the clerk of the works, the whole of the available portions of the early church have been preserved and re-inserted in the new building. The nave arcade on the north side is almost all old; so also are the Early Lancet windows upon the north side of the chancel, and other features. An old Norman doorway, with two curious little lights of the same date, have been preserved upon the south side. The church consists on plan of chancel, south chancel aisle, nave, north and south aisles, and tower at west-end of nave. The nave is divided from the aisles by an arcade of five bays, and from the chancel by a richly-moulded arch. Above each bay is a clerestory window. The roofs are in a great measure old stuff, a large quantity of the oak being in excellent preservation. The glazing throughout is of Cathedral tinted glass. All the chancel fittings are of oak. The font is old, and octagonal in shape, and the pulpit is Jacobean in date. The aisles and chancel are laid with encaustic tiles, by Messrs. Minton, Hollins, & Co. The seating throughout the church (exclusive of the chancel) is of deal, the ends being moulded. A good deal of carved stonework in concentrated about the west doorway. The tower groups exceedingly well with the rest of the church. The architects were Messrs. Slater and Carpenter, of London; Mr. W. Thompson being clerk of the works. Messrs. Law and Son, of Lutterworth, were the contractors; Mr. Barlow being foreman of the masons. The carving throughout has been executed by Mr. Harry Hems, of Exeter. The total cost has been about £5,000.

STOKE-UPON-TRENT.—The work of restoring Hartshill Church, Stoke-upon-Trent, is so far advanced that divine service was resumed on Sunday. The gallery and brick arch over it have been removed. A new stone archway in the Early English style has been substituted. The tower is to form a baptistry, and a vestry is being built on the north side of the tower. The alterations and improvements have been made from the designs of Sir G. G. Scott, under the superintendence of Mr. Clarke. The carving has been done by Messrs. Farmer and Brindley, London, and the masonry by Mr. Bradbury, of Stoke.

WINKLEIGH.—Several years ago Mr. Ewan Christian restored the chancel of All Saints' Church, Winkleigh, Devon, and now the rest of the fabric has been almost entirely taken down, and is being rebuilt in a substantial manner, from designs by, and under the superintendence of, Mr. John F. Gould, of Barnstaple. The north wall and the lower part of the tower are old; so also are the granite piers and arches of the arcade separating the nave from the north aisle, and about half the roof timbers. Excepting these and a few other items, all the work will be new. The upper part of the tower has been rebuilt, and surmounted by carved pinnacles. It rises to a height of 80ft. and has been further strengthened by new buttresses. These, as well as the belfry windows of the church, are of Hatherleigh stone, the walls of the structure throughout being of local stone, quarried in the immediate neighbourhood, Middlecott stone, a warm, red material, being introduced in the south porch and other parts of the building. The wall-plating upon which the roof rests, on the south side and upon the outside of the church, is not a little curious from being of solid oak, projecting beyond the wall outline, and ornamented in carved patera. The crestings of the roof, the copings, saddle-stones, carved gurgoyles, and other exterior carving, the crosses, &c., are all in Ham Hill stone. In plan, the church consists of a chancel, nave, north aisle, the Loosedon aisle, organ chamber, vestry, and west end tower. The roof of the nave, partly old, is of English oak, elaborately carved. The rich effect of the roof will be further enhanced by painted decoration, and a considerable amount of mural de-

coration is also contemplated. The seating is to be all of the best English oak, with carved bench-ends. A new organ, by Hill and Sons, with case harmonising with the rest of the fittings of the church, will be placed in the new organ chamber on the north side of the Lady Chapel, or near the choir aisle. Mr. George Vickery is clerk of the works, and the stone and wood carving is being executed by Mr. Harry Hems, of Exeter. Mr. J. Dendle, builder, of Barnstaple, has the contract for all the carpenters' and joiners' work. It is expected that the church will be ready for opening about midsummer.

SCHOOLS.

SHEFFIELD.—The second of a number of elementary schools which are being erected by the Sheffield School Board, under the provisions of the Education Act, is now rapidly approaching completion. The building is substantial and neat. Its construction was projected in the early part of last year, the tender of Messrs. Sharp and Sons, of Mulberry-street, being accepted at an outlay of £2,500.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

TERMS OF SUBSCRIPTION.

(Payable in advance.)

Nineteen and sixpence per annum (post free) to any part of the United Kingdom. To the United States £1. 6s. (or 64 dols. gold). To France or Belgium, £1. 6s. (or 32 francs). To India (via Southampton), £1. 14s. 10d. To any of the Australian Colonies, New Zealand, the Cape, the West Indies, Canada, Nova Scotia, or Natal, £1. 6s.

N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance.

Subscribers receiving their copies direct from the office are requested to observe that the last number of the term for which their Subscription is paid, will be forwarded to them in a coloured wrapper, as an intimation that a fresh remittance is necessary, if it be desired to continue the Subscription.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—A. M. and Co.—S. G.—J. P. S.—Two Subscribers.—C. B. A.—J. H. V.—Competitor.—W. and Co.—S. W. and Sons.—A New Subscriber.—G. S. C. C.—An Intending Competitor.—H. C.—J. H.—C. S. B.—En Avant.—Aide-toi.—C. G. and S. C.—T. and H.—A. W. N. B.—S. P. C.—J. M.—E. W. G.—Inquirer.

J. H. H.—Unsuitable.

J. H. HALL.—The plans to hand.

E. TWINING.—The controversy has not expended itself. See illustrations this week.

J. A. G.—Yes, if suitable.

J. A.—Too much of an advertisement.

"BUILDING NEWS" CHURCH-PLANNING COMPETITION.—Up to the last hour of going to press we have received additional inquiries and suggestions in reference to this competition. We must, therefore, defer our answers till another week. In the meantime we may say that the time will be extended to the 1st of July, 1873.

R. S. S.—Yes, at the Royal Academy and the London University.

J. REES.—We shall give two or three more.

F. C. D.—The sketches came to hand.

QUATREFOI complains that two of our illustrations were printed last week in "chocolate-coloured ink," as he thinks the effect thereby is not so good as with black ink. We used the chocolate ink last week not from choice, but because the school-planning drawing was so drawn that if black ink were used the illustration would not have looked so well. It is somewhat unfortunate that the selected plans were not the best drawings.

W. L.—A continuation of the discussion would be profitless. See our illustrations this week.

Correspondence.

TO LAND SURVEYORS.

To the Editor of the BUILDING NEWS.

SIR,—As your valuable paper is read by surveyors generally, will you allow me, through your columns, to call the attention of land surveyors in particular, and in fact all who use the parish maps published by the Ordnance, to the fact that the lines which many suppose to represent actual boundaries do not in fact do so. Among land surveyors the custom—I might almost say universal—is to measure the ditch with the hedge, or a distance of five links from the stump of the hedge, and show this as the actual boundary; whereas the Government surveyors have shown the “actual fences”—i.e., the hedges—ignoring a custom well known, spoiling the utility of the maps largely as to the areas, because they do not show on which side of the hedge the ditch is situate, and therefore not real boundaries.

I have recently had to compare the Government survey of an estate with the tithe survey, and finding a difference, the question was raised as to fences *versus* boundaries. I at once wrote to the Ordnance Survey Office, receiving a reply bearing out my statement.

I think the matter is an important one, and should be known to prevent error.—I am, Sir, &c.,

J. T. H.

SPURIOUS DESIGN AND AUTHORSHIP.

SIR,—The correspondence which has appeared in your journal between Messrs. Ross and Roper is important to the profession, inasmuch as it discloses a practice far too common, and indicates, as I have said in a former letter, a very unhealthy condition of our art. It also places the relative positions of “architect” and “draughtsman” in a new light. Without wishing to interfere in this unpleasant controversy, or to draw any inference as to the claims of the said parties, I wish to remark on the broader question at issue, namely, How far the duties of architect (designer) are identical with those of draughtsman (designer), or to what extent an architect may intrust the working out or details of his design to another?

In the case of the design for the Edinburgh Cathedral, we are, in the absence of original sketches or data, in the dark as to the real authorship of the design in dispute. As to the merits of the design I will not here enlarge, further than to remark that from the published drawings you have favoured the profession with, little originality or judgment is displayed, though it is clear a “popular” school of foreign Gothic, and an unmistakable individuality of treatment, have been freely laid under contribution in its composition.

As I have said elsewhere, however, this is a little fault, or rather a special recommendation of fashionable architecture. But may not such a “combination” or “manufacture” of design, as is patent to all in this particular instance, considerably reduce the “architect’s” share or function in such a work? I do not wish to be personal. If the “assumed architect” said to his assistant, “I want this church to be in general type and plan like such-and-such a church; that its character and style shall be ‘French,’ not English (naming some particular examples); that its treatment shall be after the manner of So-and-so, and its plan and detail shall further conform to the requirements of ritual and other ecclesiastical appointments”—if such instructions, I repeat, were given and illustrated by sketch or diagram, it is quite evident the authorship, or actual creative power employed about such a design, would be so doubtful and unimportant as to reduce considerably the pretensions of both parties concerned in its production. The one who gave the instructions could hardly be called its architect in any greater sense than that of selecting or choosing the design, whilst he who carried the instructions into effect could not aspire to any higher title than that of “draughtsman.” Although in such a case little honour or credit could be given to either party, the *directorship* claims an advantage.

It must not be forgotten, as I have enforced in another paper, that a *drawing* is not a *design*, nor does the power of drawing require a knowledge of design. They are quite distinct, and may be practised separately. Hence we have expert draughtsmen who are nothing but copyists, and

prolific inventors or designers who cannot draw a line. This cannot be too strongly enforced, because it is continually confounded by architects and art-teachers, who look upon both as inseparable. When a man can draw what he conceives mentally—a rare gift to accomplish well—he possesses a great advantage over those who cannot so express themselves. There are different degrees of this power. The man who can think out his idea, and then express it, is more of an architect than he who allows his conceptions to be dictated or formed by the suggestion of example or precedent. There are a great many very clever draughtsmen, who can quickly put together the ideas of others, but who cannot synthetically work out or develop their own; and it may be that the gentleman who assisted in the instance of the Edinburgh Cathedral may be classed in this category, though much credit may be due to him in working out the drawings. It must also be observed that much practice in a particular style and subject begets a kind of instinctive facility in “making” a design—though it cannot be called real *genuine* art. The test, then, I would make to distinguish the mere “draughtsman” or copyist from the artist or architect, is not a mere dexterous use of the pencil, or expertness in delineating-power, as some imagine, but the power of intellectual invention as compared with manipulative skill; the evidence, manifest in the work, of thought and design springing from necessity.—I am, Sir, &c.,

G. HUSKISSON GUILLAUME.

Southampton.

VENTILATION WITHOUT DRAUGHT.

SIR,—Of course, by attending the fortnightly visits of the Architectural Association to “Buildings of Interest,” one acquires a considerable amount of practical information, and gains not a few ideas, or “wrinkles,” so to speak. Indeed, these visits are most valuable to the student; and to those who are unable to attend them your reports must be of great advantage. The following is one of the wrinkles I got during our visit a week or two since to the Lambeth new Workhouse, lately erected under the superintendence of the architects Messrs. Parris and Aldwinckle. Although the little arrangement of which I am about to speak may not be new to some of your readers, it is certainly not generally known, or would be more generally used. It is simply this, and may be best explained by the accompanying sketch. The object of its use is that the windows may be opened sufficiently to promote ventilation, without a draught. The extra expense is very trifling, the bottom rail of the sash being made a little wider than is usual, and a fillet about 2in. or 2½in wide introduced between the sill and bottom bead. So slight an extra is it that in all probability a builder, in giving an estimate for a building in which the sash-frames were so specified, would take no notice of the alteration, the advantages of which are obvious.—I am, Sir, &c.,

A MEMBER OF THE ARCHITECTURAL ASSOCIATION.

PROFESSIONAL PRACTICE.

SIR,—I was rather surprised a few weeks back to read in one of the excellent lectures by Mr. Roger Smith on the above subject, that he rather sided with, and held up as quite legitimate and fair, that architects should divide or share commissions with surveyors for quantities supplied, the latter, of course, taking all the responsibility. It appears to me, Sir, that the system of architects receiving either a portion, or dividing commissions with surveyors, is a very pernicious one, and ought to be condemned. In the first place, it must be an act of injustice to one of two parties; either the proprietor has to pay more for quantities than he is entitled to pay, or the

surveyor is mulcted out of his fair dues. I expect in some cases there is a little of both; but chiefly I should say that it is the surveyor who is beaten down in price, which may be judged principally from the fact that even in the largest provincial towns there is scarcely such a thing as an independent surveyor of position and respectability the majority of those who are surveyors being generally men of straw, and who do not occupy the position they ought to, considering that it requires great skill and knowledge to be a good surveyor.

My opinion is that surveyors suffer more since it has become the custom of architects to appoint them than when they were appointed by the contractors; and a good many architects seem to imagine that almost any pay which the surveyor receives is a perfect windfall to him—that it is a kind of sinecure—and that almost any amount he receives will pay him well. I have been told that it is even the custom of architects in the largest practice in the metropolis, dividing or sharing in the surveyor’s commission, which, if true, I consider is greatly to be deplored. It cannot be right, it appears to me, for any one who does no part of the work, and shares in no part of the responsibility, to take a large share of the payment, which is either due entirely to the surveyor, or may be an overcharge to the proprietor. I believe it is a fact that several architects have rather exulted that a gentleman of Mr. Roger Smith’s standing and position should, in public lectures, advocate, or at least condone this system; and that such architects are endeavouring, in consequence, to make even more stringent terms than ever with surveyors, thinking that it is now perfectly justifiable—being thus, as it were, commended—and thereby stifling any little qualms of conscience they might formerly have had.

If this goes on much further there will scarcely be a respectable surveyor left, as so many who think themselves such seem willing to undertake work, for the sake of a job, at the smallest possible rates.

If young architects are desirous of receiving the emoluments derived from quantities, in order to better their incomes, it surely would be much better for them to do the work themselves, and thereby fairly earn the commission. This would be no injustice, in my opinion, to the proprietor, but rather the reverse (as the architect knows more about his own plans, and what he requires, than any other person). It would be unjust for them to receive money for doing nothing, which money must be taken away from the proper fees to which the surveyor is entitled, or else the proprietor must be made to pay for more than he ought to.

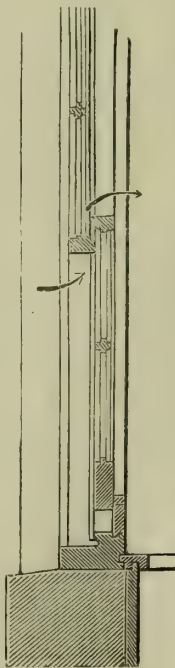
I do not believe that it was ever intended in this world, that men should receive large sums of money for doing nothing; and I have reason to think that many conscientious people will agree with me, that it is time that this bargaining and huckstering with surveyors should cease.

As in your valuable journal you are doing your best to weed out of the architectural profession all abuses which may exist, I am sure that you will do me the favour of inserting this letter in your next issue, in the hope that it may do some good.—I am, Sir, &c.,

AN OLD SUBSCRIBER.

BUILDING-STONE.

SIR,—The character of the architecture and the durability of a building very much depend upon the stone employed; and in the peculiar atmosphere of London and all large towns the builder needs every information as to the resisting powers, cohesion, &c., of such stones. No matter which way the force is applied, building-stone ought to have great powers of cohesion. It should also be even-grained, and able to furnish blocks of large size; nor ought it to contain elements of swift decomposition by means of atmospheric influence; and it should not absorb water. But as all these qualities can hardly be expected to be combined in one description of stone, a brief notice of some of those more generally in use may be of service. Caen stone is an Oolite of the same geological species as our own worked near Bath, only more uniform and better in colour. The texture also is more open, and the material is superior in almost every other respect. For certain kinds of exposure it is inferior to some kinds of English Oolite stones, but none excel it for internal work. The magnesian limestones valuable for building purposes, are chiefly those which present equal proportions of carbonate of lime and carbonate of magnesia in a semi-



crystalline state. Such stone has a peculiar pearly lustre when broken, but its colour, when worked, is a light yellowish brown, which does not change by exposure. It is costly either to quarry or work, and is remarkable for resisting compression. It weighs upwards of 150lb. to the cubic foot. Ancaster stone is of a fine colour, and blocks of from three to five tons may be procured. It weighs 139lb. 4oz. per cubic foot, absorbs very little water, and its cohesive power is very high. Ailsa Craig is a single rock of greyish compact felspar, with small grains of quartz and minute particles of hornblende. Craigleith is a sandstone of the Carboniferous series, consisting of fine quartz grains with a silicious cement and occasional plates of mica. Its weight is 146lb. per cubic foot. Kirkcudbright granite has been tried at the Liverpool Docks and similar works, and is adapted for ornamental architecture. Inverary granite is remarkable for its hardness and extraordinary resistance to wear and tear. It is of two kinds, one containing mica and red felspar, and the other hornblende and white felspar with quartz. That known as Cornish is the granite obtained from near Penrhyn, and has long been used in England in the construction of public works. Its weight may be taken at 14 cubic feet per ton. Up to this time Porphyry has not been used very much. It is very durable, however, and is susceptible of the highest polish. The Portland stone is well known and very excellent, but costly and rather heavy. It contains 95 per cent. of carbonate of lime, one of silica, and one of carbonate of magnesia. Its specific gravity 2.145, and its cohesive power moderate.

Massive stones from top to bottom of the quarry-bed are generally more durable than the foliated or fossil materials of the same description, and crystalline stones are superior to amorphous ones, both in appearance and durability. The granites, quartz rocks, and transition marbles furnish the most lasting building materials. The sandstone conglomerates, and the sandstones partly metamorphosed by the vicinity of plutonic rocks, are usually more durable than the limestones; and of limestones, those presenting a regular crystallisation are to be preferred.

If possible, stone should be laid in the natural way of the bed; for the resistance of building-stones to physical forces depends greatly upon the homogeneous nature of their grain, and the direction of their planes of stratification and cleavage. The resistance to disintegration and decay depends also very much on the same causes, especially when the stones are employed in the same building. Building-stone should be quarried some time before it is used, and should be exposed to the weather in order to free it from quarry damp.

Mr. Rennie, the distinguished engineer, made some experiments upon different kinds of stone, as to their bearing power, and gives the following results:—

	Weight of Cwt. qr. lb.	Weight of stone. lb. oz.
Green Moor Yorkshire Blue Stone	2 3 27	2 12
" " " White	3 0 23	2 12
Caithness	7 2 17	3 0
Valentia	7 3 3	3 2

Few experiments have been made on the cohesive power of stone; but Gauthey, a German engineer, found that a piece of stone of what he called "soft givry," 1ft. square and 1ft. long, required a weight of 5,000lb. to break it across, one end being fixed in a rock, and the weight hung on at the other; and that "hard givry" required, under similar circumstances, 5,600lb. to produce fracture. In default of further information, this is merely a guide, but, as that, very valuable.

The following table, given by Barlow, of the specific gravities of various stones, and the weight of a cubic foot, is very useful. Rainwater is taken as 1,000:—

	Specific gravities.	Weight of a cubic foot in lbs.
	From To	From To
Bath Stone	1975 2494	123.43 155.87
Blue Lias Limestone	2467	454.13
Bramley Fall	2506	156.62
Mean of various kinds	2000 2686	125.00 167.87
Stonework	ditto	ditto
Yorkshire Paving	2356 2507	147.25 163.37
Sandstone is chiefly supplied by Newport (Monmouth), Yorkshire, Kent, Linlithgow, Derbyshire, &c. Limestone by Devonshire, Wiltshire, Derbyshire, Dorsetshire, Glamorganshire, and Bedfordshire. Magnesian Limestone by Derbyshire and Yorkshire; and Oolitic stones by Lincolnshire, Northamptonshire, Somersetshire, Wiltshire, Oxfordshire, and Gloucestershire.		

The prices in London of Yorkshire stone are quoted as follows:—

1in. self-faced slab per 1,000 superficial feet, 32s.; 1 1/2in., 36s.
Paving slabs (self-faced) per 1,000 superficial feet 2-in., 45s.; 2 1/2in., 59s.; 3in., 57s.
Tooled Paving per do. 1 1/2in., 38s.; 2in., 53s.; 2 1/2in., 60s. 9d.; 3in., 68s. Per foot superficial 4in., 10 1/2d.; 5in., 1s. 2d.; 6in., 1s. 6d.
Rubbed Paving per 100 superficial feet, 2in., 67s.; 2 1/2in., 67s.; 3in., 77s.
Tooled Landings per superficial foot, 2-in., 10d.; 2 1/2in., 1s.; 3in., 1s. 2d.; 4in., 1s. 4d.; 5in., 1s. 8d.; 6in. 2s.; 7in. 2s. 4d.; 8in., 2s. 8d.
Tooled Coping per foot run, 12in. x 2in., 11d.; 13 x 2in., 1s.; 12 x 3in., 1s. 1d.; 13 x 3in., 1s. 2d.
Tooled Steps per foot run, 9 x 6in., 1s. 8d.; 12 x 6in., 1s. 10d.; 13 x 6in., 2s.; 14 x 6in., 2s. 2d.; 12 x 7in., 2s.; 12 x 8in., 2s. 2d.

Cisterns are now generally made of slate, the latest quotations from North Wales for the best lin. to 1 1/2in. slabs, planed on both sides with bolts complete being (at Port Madoc).

Under 5ft. cubic contents 3s. per cubic foot.
From 5 to 10ft. " 2s. 6d. "
" 10 to 15ft. " 2s. "
" 15 to 20ft. " 1s. 10d. "
" 20 to 30ft. " 1s. 9d. "
" 30 to 40ft. " 1s. 8d. "
" 40 to 50ft. " 2s. "

A cubic foot contains six gallons one pint.

Yorkshire Hare Hill Sawn slabs per foot superficial (in London) 1in., 5d.; 1 1/2in., 5 1/2d.; 1 1/2in., 6 1/2d.; 2in. 8d.; 3in., 9 1/2d.
Ditto Robin Hood per foot superficial, 1in., 6d.; 1 1/2in., 6 1/2d.; 1 1/2in., 7 1/2d.; 2in., 9 1/2d.; 2 1/2in., 1s.; 3in., 1s. 2d.

W. R.

PLYMOUTH TOWN-HALL.

SIR,—Now that the discussion of the ownership of designs is on the tapis, it may not perhaps be amiss to inquire what views the public at large may hold on the subject. At Plymouth, where they are erecting a noble pile of public buildings, the real author of the architecture, i.e., Mr. E. W. Godwin, is most carefully ignored. I know not whether it be from professional jealousy or public prejudice, but from the local papers and local gentlemen loud is the praise of Hine & Norman. Mr. Godwin's name is never mentioned and not much known. Yet to his genius, Plymouth owes so much in her public buildings! Why confine yourself to the Ross and Roper controversy, in placing honour where honour is due? Perhaps the most effectual way of disabusing the public mind of the error and injustice into which they have fallen in this case would be to give a view of the buildings in Mr. Godwin's characteristic style and draughtsmanship; say from the N.E., including the very piquant circular tower. To the profession, at least, such an illustration would be sufficient evidence of real ownership. Were you to lay the matter before Mr. Godwin, I have no doubt he would do so in self-defence.—I am, Sir, &c.

JAMES HICKS.

Sparnon, Redruth, 3rd March, 1873.

HOUSEHOLD TASTE.

SIR,—Assuming that the extent to which architects and others are permitted to deal with the internal decorations and furniture of the houses erected under their guidance is of importance, I am desirous of making a few observations on the illustration which appeared in your last week's issue, entitled, "Designs for Furniture and Decorations," by Cox & Sons, Southampton-street, Strand; and, before proceeding further, I would protest against such free use of the word "artist." It seems that any person who can hammer into a scroll a piece of iron is dubbed "artist;" he who can dispose along the side of a room certain already manufactured articles is also termed "artist"; and it would be easy to multiply instances. We all know that there are artists and artists; but let us make a distinction between the manufacturer and the artist in the true sense of the term.

In the design for the side of a drawing-room, the work of "artists," the first thing to be condemned is the suggestion to fill the small panels above the ordinary-looking dado, with "hand-painted tiles." Being acquainted with the character of these tiles, the notion of fixing them in a drawing-room appears to me to verge on the ridiculous. Next notice the door, with its ugly panelling and equally ugly head. To the right is a triptych, borrowed from the sacristy of some cathedral, or from Wardour-street. To the left is an indescribable piece of furniture adorned with very bad tracery, and seeming to ask the question of its *raison d'être*. The cabinets are of that abominable type of design now unfortunately so common in the show-rooms of Gothic dealers. The same remark applies to

the other small articles, and we pass over the "powdered ornament" to the "deep frieze," and, happily for art, the cost of properly executing such a frieze would preclude all but the very few from "giving the order." The scroll above we are familiar with, and with the "enriched construction" of the ceiling it would be well to do no more than recommend attentive study of its detail.

In the design for the side of a dining-room we have a wainscoting far too high for a dining-room, and the idea for which was probably obtained from contemplating one of the large apartments of the Houses of Parliament. The suggestion, however, of enriching the panels with "heraldry, flowers, and fruit, in proper colours," is original, and did we but know what the "proper colours" were, or are, should feel disposed to accord it a high place in the range of art triumphs. The erection over the fireplace is filled with tracery, heraldry, and other stock designs of the ugliest description. I should be very sorry to be compelled to sit opposite to that fireplace for any length of time; more of the well-known scroll-work, and another deeper frieze of absurd character, well befitting the comic Christmas-cards of Marcus Ward, but quite out of place in a dining-room. This last observation also applies to the design for a frieze, at the bottom of the sheet.

The extent to which Gothic furniture, as it is called, is now manufactured demands that reason, to say the least, should be kept in view; but I challenge any person not quite mad to deny that the existing method of constructing household furniture is totally and unreasonably devoid of either art or usefulness. The whole paraphernalia of a cathedral is exhausted in furniture design, including, as I saw the other day, flying buttresses resisting the thrust of nothing; and you, Sir, would be doing a kind act by permitting the exposure and condemnation of a growing vitiated taste in matters that affect the comfort and art education of us all.—I am, Sir, &c., W. W.

SCHOOL-PLANNING COMPETITION.

SIR.—Like many other of your correspondents, I am surprised that the design bearing the motto "We Live to Learn" should have been selected to occupy the first position—this partly from the fact that the author has not in all things attended to the regulations given, and partly because the building is such an inconveniently lofty one.

I have no doubt the judges had sufficient reasons for placing it first, but, at the same time, I have been unable so far to find any advantage in having two of the schools upstairs when one would have done, especially as very little more playground has resulted from the arrangement than could otherwise have been obtained. In our town here we have about seven schools in progress, under different architects, some of them to accommodate 800 scholars, and not one of them is more than one story high.

Upon looking at the third prize design, I am still more surprised to find that in all the most important details of arrangement it is exactly the same as the one I submitted—in fact, it is almost in plan a fac-simile of mine. I can only discover two important points of difference between the two.

There are one or two points in which the plan is not in accordance with the instructions. For instance, accommodation is required for 100 scholars in the graded schools at three rows of desks, allowing 18in. of space for each. This would require rooms 7ft. longer than the ones shown. Then, again, the buildings in Cross-street are brought within 3ft. of the causeway, instead of 5ft.

Upon looking at the great similarity of the plans, the question naturally arose, Why of two designs so much alike should one be placed third and the other thirtieth?—a question which I cannot answer. I admire the elevation of the design published (although the judges report its expensiveness an objection) and the draughtsmanship; but, at the same time, I cannot think that my own is so far behind in these matters as their relative position would seem to indicate.—I am, Sir, &c.,

AUTHOR OF THE DESIGN "SPERO."

SIR.—The name and address of the author of the school design furnished last Friday are quite at variance with the list of competitors given Jan. 24th. You will, doubtless, allude to it in your next.

May I be allowed to point out the following points or demerits?

- 1st. The line of frontage in Cross-street.
- 2nd. Want of cart access to playground.
- 3rd. No communication between caretaker's house and general building.
- 4th. Girls cross open yard to w.c.
- 5th. Classrooms wrongly lighted, especially drawing-class room.
- 6th. Insufficient desk room in boys' and girls' schools.
- 7th. Boys and girls' entrances too adjacent.
- 8th. Misplacement of master's and mistress's rooms.

—I am, Sir, &c., ONE OF THE LOT.

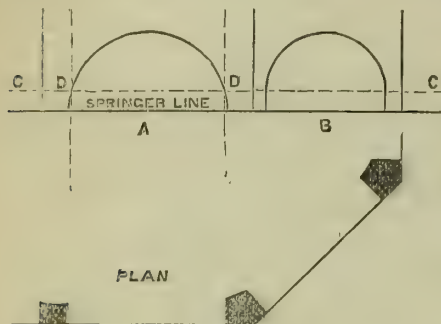
[The mistake as to the address arose from two competitors using the motto "E. R. R." It should have been "John Gibson, Market-street, Malton," and not "25, Oxford-road, London," which is the address of the other "E. R. R."—Ed.]

VITREMANIE.—Messrs. Barnard and Son, who introduced the Diaphanie process for the ornamentation of windows, have recently accomplished several improvements in the art, which they are about to introduce under the name of Vitremanie. The designs are so printed that, after being covered with a cement called glueine, and allowed to dry, they have simply to be wetted with water and pressed on to the glass. The paper on which the design is printed can then be removed entire, leaving on the glass a perfect and durable transparency.

Intercommunication.

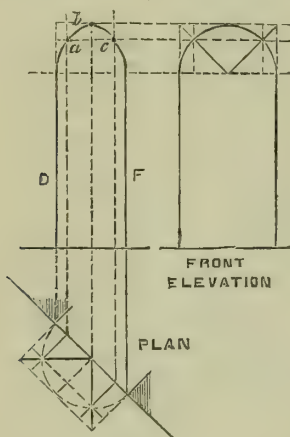
REPLIES.

[2799].—**Geometrical Drawing.**—In answer to "M. R.," it is easily shown that the diagonal elevation of a semicircle cannot be a stilted smaller semicircle. Supposing it to be so, let A be a semicircular arch in direct elevation, and B one of the same size in diagonal elevation. The springer of the arch B must be on the line C C, in order to get the same height as arch A; but the line C C cuts the circumference of arch A at the points



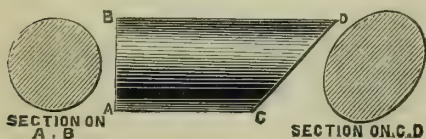
D D and vertical lines drawn through the points of intersection fall within the circumference. Thus proving that B is not an accurate diagonal elevation of A, because the portion between line C C and the springer of A is the segment of a circle; while in arch B it is a vertical straight line. B is a semi-ellipse, with its transverse diameter coinciding with the springer line of arch A, and having its conjugate diameter equal to the diameter of arch A. And it is the truest ellipse that can be. This I hold to be an axiom requiring no proof, and incapable of disproof.—**GEOMETRY.**

[2799].—**Geometrical Drawing.**—The annexed sketch will, I hope, prove to "M. R." that a semicircle cannot be described through the points a, b, and c to meet



the lines D and F; therefore, it must be a semi-ellipse.—**BARNARD W. CUMMING.**

[2799].—**Geometrical Drawing.**—I think the accompanying sketch will clearly prove to "M. R." that a semicircular-headed opening on a cant is not a semi-



circle struck from a higher point, but a semi-ellipse. Take a cylinder, as shown in sketch, and cut it to the cant or bevel required, and the section so obtained will form a true ellipse.—**FRANK CHISWELL.**

[2800].—**Weare's Patent Night-Stools.**—In answer to question of "T. W. C." (No. 2500), Mr. Weare's present address is 28, London-road, Newcastle-under-Lyme, Staffordshire.—**J. A.**

[2803].—**Clerk of Works' Duties.**—Are: To look after all the men; as the work is done, to see it is done in a workmanlike manner; and inspect all materials; to take notes of dimensions for the assistance of the surveyor when extras are measured. — A clerk of works ought not to be expected to make drawings, only set them out full size from the details which are prepared by the architect. The salary is from £2. 2s. to £4. 4s. per week, according to the job.—**B. B.**

[2810].—**Ornaments of the Profession.**—In reply to "Aide-toi," Mr. Wm. Burgess was a pupil of Mr. Edward Blore; Mr. E. W. Godwin, F.S.A., was a pupil of Mr. W. Armstrong; and Mr. E. Street, R.A., was a pupil of Mr. Owen Carter.—**M. B. A.**

STAINED GLASS.

CORK.—Last week a stained glass window was erected over the altar of the Blessed Virgin in the Cathedral, Cork. The subject is the Assumption—Our Lady appearing in the midst of a golden cloud, borne aloft by two angels, and surrounded on all sides by heavenly spirits. The window is the work of Mayer and Co., London.

EASTHAMPTON.—A new window has been erected in the church of Easthampton. The window is cruciform, and stands in the baptistery, immediately over the font. The subject is the "Baptism of our Lord." In the intersection of the arms is the dove, and round are the emblems of the Four Evangelists. The window has been executed by Mr. Wallis.

PAISLEY.—An application has been made on behalf of the Glasgow S. Andrew's Society, for liberty to fill in with stained glass a window in the Abbey Church, to the memory of Sir William Wallace, of Elderslie. The subject selected is Samson assailing the enemies of his country single-handed, and the artist is to be Mr. James Ballantyne, Edinburgh.

THE LATE DAVID COX.—The memorial window to be placed in Harborne Church, where the remains of this great artist lie, has been intrusted to Messrs. Hardman & Co., of Birmingham.

WATER SUPPLY AND SANITARY MATTERS.

KENDAL.—The Corporation of Kendal have sought the opinion of the sewage authorities, who take opposite views as to the utilisation of sewage. In the first instance they called in Mr. Blackburn, of Aldershot, who is known to entertain a very decided preference for "wide" irrigation; and since then they have called in to examine the locality Mr. Bailey Denton, C.E., who, it is equally well known, regards intermittent filtration through natural soil as the more economical treatment where land can only be obtained at a very great cost, which is the case at Kendal. Mr. Denton's report will be delivered, it is said, within a fortnight, and it will be curious to observe the effect it will have in deciding the question whether irrigation or intermittent filtration shall be adopted. There does not seem to be any disposition to resort to any chemical means of precipitation, such as the "A. B. C." or phosphate of alumina, processes.

LAND AND BUILDING SOCIETIES.

BURSLYM.—The 4th annual meeting of the Burslem Town and Country Building Society was held on Thursday week. The report read showed an increase in the society's receipts of nearly £400, and advances to borrowing members of nearly £4,000, during the year. There was a large increase of members, especially from the mining districts, and the whole of the year's proceedings were regarded as indicating the very satisfactory progress which the Society had made.

WEST GLOUCESTERSHIRE BUILDING SOCIETY.—The 3rd annual meeting of the West Gloucestershire Permanent Benefit Building Society was held on Thursday week. The report stated that the large sum of £22,790 had been invested, and this fact was pointed to as evidence of considerable success.

LEGAL INTELLIGENCE.

THE LEEDS SEWAGE INJUNCTION.—**ATTORNEY-GENERAL V. CORPORATION OF LEEDS.**—Mr. Graham Hastings moved before Vice-Chancellor Bacon, on Thursday week, on behalf of the Leeds Corporation, that the injunction which had been granted against them might be further suspended until the 2nd of March, 1874. He said the application was supported by an affidavit showing that the Corporation had erected works by which the sewage was purified and carried off at the rate of one million gallons a day—that they had purchased more land, and had entered into further contracts for the erection of additional works. He (the learned counsel) was authorised to say that Mr. Charles Hall, on behalf of the informants, was satisfied with what was being done, and would assent, with the sanction of the Court, to the suspension of the injunction as asked by the notice of motion. It was, therefore, proposed to take an order that the injunction be further suspended until the 2nd March, 1874, the Corporation to pay the costs of the motion.—**The Vice-Chancellor:** You take that order by consent?—**Mr. Graham Hastings:** Yes.—An order in the terms proposed was accordingly made.

PROPOSED UTILISATION OF LEADENHALL MARKET.—At a meeting of the Court of Common Council last week, the Chairman of the Markets Committee presented a report submitting plans for the construction of a poultry market on the site of Leadenhall Market, at an estimated cost of £25,000. The project was, however, strongly opposed, and was ultimately lost by a small majority. The subject was then referred back to the committee for reconsideration. A further report, submitting plans and specifications for the reconstruction of Billingsgate Market, at an estimated expense of £59,200, was carried almost unanimously.

Our Office Table.

THE BIRMINGHAM MUNICIPAL BUILDINGS.—The Estates and Buildings Committee of the Corporation having conferred with Mr. Thomason, the architect, as to what alteration it might be thought advisable to make in the elevation of the municipal buildings, that gentleman submitted to them an alternative elevation for that which had received the sanction of the Council, the cost of the alternative elevation not to exceed that of the original design. The committee recommended the Council to adopt the alternative elevation in lieu of the former. Mr. Waterhouse, the Committee's consulting architect, had recommended—that their first care should be to get a good plan suitable for their uses, and it did not so much matter what the elevation might be, as that, after all, was a matter of taste. But the Council are not disposed to accept the Committee's recommendation, nor Mr. Waterhouse's advice, to give no heed to the elevation. Ultimately it was determined that the designs should be submitted to public exhibition for a month.

BELFAST ARCHITECTURAL ASSOCIATION.—A meeting of the above Society was held on Monday evening, 3rd March, at the Museum; Mr. O'Neill, F.R.I.A.I., in the chair. A paper was read by Samuel P. Close, A.R.I.A.I., descriptive of an excursion made last autumn to Northamptonshire by the members of the London Architectural Association. Mr. Close referred to the many places of interest visited by the excursionists, including Burghley House, the churches of Uffington, Tallington, West Deeping, Northborough, Helpston, Barnack, Fotheringhay, Oundle, Woodford, Raunds, Finedon, Higham Ferrers, Earl's Barton, Cogenhoe, &c., &c. The paper was illustrated by a large number of drawings, embracing some portion of almost every place visited.

EXETER SCHOOL OF ART.—The annual distribution of prizes to the students took place on Friday week. The success of the students in the Government examinations has been greater this year than for many years past. A great impetus was given to the students by the very liberal award of £25 for prizes, granted by the Trustees of the Gilchrist Fund, through the instrumentality of the late Sir John Bowring, who took a warm interest in the school. At the national competition, one silver medal, one National Queen's Prize, eight third grade prizes were obtained, and at the local second grade examination 25 prizes were granted, whilst 68 students passed the examination. Eight full-drawing certificates were awarded, and two free studentships. The total number of students successful in obtaining prizes or passing one or more subjects of the second grade was 80. The Treasurer's report showed a sum of £21. 18s. 5d. in favour of the School. Comparing the fees received during 1871 and 1872, there was a falling off in the latter year of £20, attributable to the decrease in the attendance at the afternoon ladies' class, and it might fairly be attributed to the persistently wet weather during 1872.

THE NEW SOUTHWARK AND CITY SUBWAY.—A pamphlet, by Mr. P. W. Barlow, has been sent to us, embodying a description of the Southwark and City double line of subway, and showing the effect it will have in relieving the traffic of London Bridge. The object of the promoters of the scheme is to construct a double line of subway or tunnel from S. George's Church, in the Borough, to Arthur-street, City. It is intended to run trains through the subway worked by rope traction, to convey passengers at a charge of one half-penny. The Act of Parliament has been obtained, and most of the land required agreed for. The details of the plan have been favourably reported on by Mr. Vignolles, F.R.S., Sir W. Armstrong, Mr. Bazalgette, and others.

DEATH OF MR. ROBERT GRAVES, A.R.A.—We have to record the death of the last member of the Associate Engravers of the old class of the Royal Academy, which occurred on the evening of the 28th of February at his house in Grove-terrace, Highgate-road, in his 75th year, leaving the line engraving of "Lady Bowater" by Gainsborough, now exhibiting at the Royal Academy, unfinished. His last complete plate was the portrait of Charles Dickens, after W. P. Frith, R.A., for the second volume of Mr. Forster's Life. He was elected a member of the Royal Academy in 1836, having then just completed his line engraving of Lord

Byron, after Thomas Phillips, R.A., at which election (the only time in 100 years) he did not go to the ballot, having obtained the whole of the votes of the Academicians present. Besides larger plates, he has engraved over 100 book plates after Landseer, Wilkie, Mulready, and other eminent painters. His grandfather was Robert Graves, the well-known printseller 100 years since, of Catherine-street, Strand. His father, Robert Graves, was considered the best judge of engravings of his time. He leaves two sons; the elder, Robert Edmond, has for some years past been attached to the staff of the library of the British Museum.

"HINTS TO SANITARY LEGISLATORS."—The author of a pamphlet recently published, and bearing the above title, takes occasion to recommend therein, at some length, the moulded carbon block filters introduced by Messrs. Atkins & Co. The carbon blocks for these filters are manufactured at Chepstow. The best animal charcoal is pulverised, and to this is added certain proportions of Norway tar, with a continuation of other ingredients equally finely powdered. The combined material is then thoroughly mixed with liquid pitch, and the amalgamation is kneaded into a paste capable of being moulded into blocks or slabs of any size. Messrs. Atkins and Co.'s carbon filters are now in use in the army and navy, and improvements in manufacture consequent on a long experience, have entitled them to take a leading place among the best known means of purifying water.

A HOUSE FOR THE LONDON LEARNED AND SCIENTIFIC SOCIETIES.—The plan of providing a home and local habitation for such of these Societies as are not accommodated at Burlington House is said to have lately assumed a very definite and practical form. A freehold site of ample area has been secured, close to the Broad Sanctuary, therefore near the Houses of Parliament, the public offices, &c., and of most easy access by road or railway from all parts of London. The leading members of the Societies who have instituted the plan have agreed to form a small limited liability company to carry it to completion, and more than half the necessary capital has been already privately subscribed. The balance will no doubt be forthcoming from other Fellows of the Learned Societies and the public as soon as the details are published. No high rate of interest is promised, but it is believed, after a very careful calculation, that 5 per cent. may be permanently relied upon.

THE LOYALTY OF THE BOARD OF WORKS.—It is to be feared, if the statement of the London correspondent of the *Manchester Guardian* is correct, that owing to an omission from the Act constituting the Metropolitan Board of Works, the ratepayers have no direct means of recovering the £3,000 or £4,000 which the Treasury auditor has recently surcharged for the expenses incurred on Thanksgiving Day. Feasting and merrymakings by metropolitan local authorities at the expense of the ratepayers have become far too common. Two or three years ago a pauper lunatic asylum at Leavesden was commenced by the Metropolitan Asylums Board, then recently appointed. Nearly their first financial operation was the spending of about £100 in a junketing party to lay the foundation-stone of that edifice, at the cost of the rates, of course. The auditor of a large union west of Temple Bar was not long since struck with the extraordinary consumption in the workhouse of mops, brooms, pails, and scrubbing-brushes, out of all proportion to the wants of the house. Scrutiny revealed the startling fact that the surplus had been consumed in furnishing the Guardians with luncheons. The mops, pails, and brooms had been changed into bread, cheese, meat, ale, wine, &c., and in those pleasant shapes they had graced the weekly table and afforded the Guardians a morning meal.

LIGHT OUTSIDE S. STEPHEN'S.—An intense magneto-electric light, and an exceedingly powerful gas-light, will shortly be exhibited simultaneously on the north and west sides of the upper part of the Clock Tower. The current in the former will be generated by a magneto-electric machine moved by steam power, which a high authority in this country pronounces to be a decided step in advance of every other machine of the kind. The latter is in operation at various lighthouses on the Irish coast, and may in favourable weather be seen at the distance of twenty-five miles. The exhibitors have proposed

that the trial shall be made at their own cost, except in very trifling particulars.

GAS-LIGHTING BY ELECTRICITY.—At the meeting of the Society of Arts on Wednesday evening, Mr. W. Lloyd Wise, C.E., read a paper on "Gas-lighting by Electricity, and means for lighting and extinguishing street and other lamps simultaneously." The author of the paper referred to several methods that had been at various times proposed, especially that recently applied to street lamps in Preston, according to the plan of Professor Klinkerfues, director of the Royal Observatory, Gottingen, who opens and closes the supply near the burners, and ignites or extinguishes the gas as required, by simply changing the pressure at the gasworks. The paper was illustrated by diagrams, and a large collection of apparatus kindly lent for the occasion by Mr. Billington Booth, chairman of the Preston Gas Company. The apparatus will remain on view a few days at the society's house in the Adelphi, to afford members and others feeling interested in the subject, who were not present at the meeting, an opportunity of seeing it in operation.

BLASTING BY ELECTRICITY.—On Monday a further experiment was made with electricity as a means of firing blasting charges in Mr. Fyfe's quarries at Kemnay, Aberdeen. A huge breast of rock, calculated to weigh about 2,000 tons, was bored in eleven places, charged and fired almost simultaneously by a current of electricity from a battery which was under the care of Mr. David Wright, electrician, Aberdeen. The huge mass was started with little noise from the report, but with a rumbling sound like that of distant thunder. A second blasting was fired on Tuesday. Although the ground was covered with snow, and a heavy snowstorm was falling, wires extending 1,500ft. in length being laid, and a current of electricity put on, in an instant a tremendous explosion was heard, which shook the ground like an earthquake. Great masses of granite were upheaved in the air, and about 5,000 tons were displaced. It is the largest blast which has ever been witnessed in these quarries, effected by means of electricity applied by a new apparatus most ingeniously constructed.

EXTENSION OF DUNDEE HARBOUR.—In accordance with the request of the Dundee Harbour Trustees, Mr. Harrison, C.E., has prepared a report and plan of a large scheme of harbour extension. Mr. Harrison proposes to construct a wall from the outer bend of the esplanade to the Beacon Rocks, and from thence to the Stanner-gate. This wall he proposes should be built of concrete, and founded at a great depth, and when finished would be about two miles in length. Within this wall 250 acres of space would be enclosed, which would be allocated to new basins, docks, timber ponds, quays, sites for warehouses, &c. The structural cost of the new works is estimated at £450,000, exclusive of filling up ground by the dredger for the next ninety years.

DEATH OF MR. IVIE MACKIE.—The death of Mr. Ivie Mackie, of Liverpool, occurred late on Sunday week last. Mr. Mackie was born in the village of Dailly, in Ayrshire, in 1805. Apprenticed to a builder, and beginning the world as a journeyman mason, he worked his way to the business of a sub-contractor, in Glasgow, where he attained a fair degree of success. In 1826 he went to London, and was employed upon the Hammersmith Suspension Bridge, the Blue-coat School, and the General Post-office. On one occasion in after life, when waiting upon the Postmaster-General as one of a deputation from Liverpool, Mr. Mackie pointed out to the late Sir John Potter some of his own workmanship on the pillars in front of the latter building. Circumstances, however, directed him to Dublin, where, after a few years of service in Mr. Findlater's wine and spirit warehouse, and of private enterprise as well, he entered into partnership with his employer, and in 1839 the well-known firm of Findlater & Mackie was established. When Mr. McEwen introduced into the streets of Manchester his new and improved system of omnibus accommodation, and from want of adequate capital was about to abandon his enterprise, Mr. Mackie stepped in, made all the arrangements necessary for the continuance of the traffic, and laid the foundation for that extensive service which has been conducted by the Manchester Carriage Company.

The Weymouth Town Council have resolved to extend the outer pier 100 feet, according to the plan of Sir John Coode, C.E.

CHIPS.

The corner-stone of a new Wesleyan Methodist School Chapel was laid on Tuesday week at Hemthole, York. The style of the building is Gothic, the cost £1,500, and the accommodation for from 300 to 400 scholars.

The annual distribution of prizes to the students of the Frome School of Art took place on Tuesday week.

Last night Sir John Lubbock, Bart., M.P., F.S.A., laid before the Society of Antiquaries an account of his researches during a tour last autumn on the site of Troy. Sir John also read a report by M. Schliemann on his excavations on the plain of Troy.

New (Roman) Catholic schools, in connection with S. Patrick's, Middlesborough, were opened last week. The design of the building is plain and substantial, ornamentation being carefully avoided, with the exception of three circular stone windows having quatrefoil lights and label moulds, and also blue brick strings. The entire cost will be about £2,000. The contractor for the whole of the works is Mr. Henry Hallgate.

The Aberdare School Board have finally decided respecting the plans sent in competition for their schools. The designs prepared by Messrs. Alexander and Henman, architects, of Stockton and Middlesborough, and Mr. E. Sugden, of Bristol, were selected, and those gentlemen have received instructions to proceed at once with the working drawings.

At Briton Ferry, the School Board have adopted the plans of Mr. Walter Douglas Blessey, of Cardiff, for their new schools.

Trade News.

WAGES MOVEMENT.

BRADFORD.—The operative joiners of Bradford are seeking to obtain a rise of their wages to 7½d. an hour all round, irrespective of the qualifications of the men, and the knocking off of an hour on Saturday, leaving work at twelve instead of at one o'clock as at present. A conference of masters and men was held on Wednesday week, at the Builders' Technical Schools, Bradford, Mr. John Beanland in the chair. The question was discussed in all its bearings, and the masters offered to concede the hour on Saturday, and to give the men an advance of ½d. an hour all round, the new regulation to come into force on the 1st of June. The wages now paid average from 6½d. to 6¾d. per hour, according to ability, and the hours per week are 50½. In the event of any future alterations, the employers are desirous that twelve months' notice should be given by either side. The masons only give six months, but the joiners are differently situated, and the masters feel that they should have twelve months' notice, in order that they may arrange their contracts. It is hoped no difficulty may be experienced in arranging matters amicably.

BRADFORD.—In November last, the masons of Bradford gave their employers six months' notice that at the expiration of that period they would require an advance of 3s. per week. Since then negotiations have been going on between employers and employed, and a mutual arrangement has been come to, by which the men receive an advance of 2s. per week upon the present rate; payment of the enhanced amount to commence in May next.

EDINBURGH.—On Friday last, in accordance with a resolution passed at a meeting held about ten days ago, about 300 of the 1,400 joiners employed in Edinburgh came out on strike. The ground of dispute was the refusal of the masters to give an advance of 1d. per hour, though they intimated their willingness to give ½d., which took effect on Saturday last. The great majority of the men, about 1,100, are now working on these terms, and it is said that the places of those who have gone out are being rapidly filled up. The strike is chiefly confined to the smaller squads, the larger employers being, with one exception, scarcely affected by it. In Leith only 56 men are reported as having come out on strike.—A meeting of the joiners on strike was held on Saturday afternoon, when it was resolved to accept the terms offered by the masters, viz.—7d. per hour, being an advance of ½d. on former wages. Some of the men have left in order to seek work elsewhere, a number of the vacancies having been filled up during the 24 hours' strike. In Leith a similar result is not improbable, as the number of men on strike does not now exceed 30, out of about 160, which is the total number of hands in Leith.

GLASGOW.—Last week the house-joiners of Glasgow laid before their employers a request for a rise of wages from 7d. to 7½d. per hour. The employers have declined to accede to the request, and the men are to have a meeting on Saturday, first to consider whether or not they shall resort to a strike, with the view, if possible, of enforcing the desired rise.

GREENOCK.—The master joiners of Greenock having acceded to the demand of the men for an increase of wages, the new arrangement came into force on Monday. The increase was ½d. per hour, the wages being now 7d. per hour.

HUDDESFIELD.—The Huddersfield journeymen painters have decided to ask the masters for a reduction of the hours of labour from 58½ to 56 per week, and an increase of ½d. per hour in wages.

LEAMINGTON.—At a meeting of the Leamington Builders' Association, held on Tuesday, it was decided to adhere to the terms formally submitted to the men, and to reject those of the Trades' Union Council, to refer the matters in dispute to arbitration. In the course of the proceedings, it was pointed out that the proposal of the men to refer the terms to six masters and an equal number of operatives connected with each branch of the trade, really meant an arbitration board of thirty-six operatives against six employers. The proposition was rejected on this and other grounds.

PRICES OF TIMBER AND DEALS AT HULL, 3RD MARCH.

Onega best red, per Petersburg standard	£15 5 0	£15 10 0
Petersburg best red	14 0 0	14 5 0
Riga white	10 10 0	10 5 0
Geffe best, 3 by 11	12 15 0	
Ditto 3 by 9	12 5 0	
Wyburg red	12 5 0	
Memel second red	10 5 0	
Quebec best yellow pine	25 0 0	
Ditto, second	16 0 0	16 10 0
Richebucto best pine	20 0 0	
Ditto second	14 0 0	
S. John's spruce	9 0 0	
Memel crown pipe staves, per 12	30 0 0	

TIMBER, PER LOAD.

Best Memel	4 3 0	
Do., Dantzic	4 0 0	4 5 0
Memel and Dantzic second	3 15 0	4 0 0
Quebec red pine	3 10 0	4 5 0
S. John's yellow pine	5 0 0	
Quebec yellow pine	5 0 0	
Quebec oak, per foot cube	0 3 6	0 3 9
Quebec elm	0 2 0	0 2 3
Memel wainscot crown logs	0 6 0	

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portmadoc and Whitland Abbey Green, the New "Purmann" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.

24 by 12	22 by 12	20 by 10	18 by 10	18 by 9
420s.	370s.	285s.	245s.	225s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8½
225s. 6d.	170s.	212s. 6d.	130s.	77s. 6d.

Per m of 1200 Slates, subject to a discount. Marble and Framed Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A & G's Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BRIGHTON.—For erection of Board Schools in Hanover-square.

Newnam	£1,683 0 0
Patching and Son	1,509 0 0
Olliver	1,494 0 0
Barnes	1,500 0 0
Cheeseman and Co.	1,495 0 0
Lockyer (accepted)	1,480 0 0

CHISELHURST.—For works at Buller's Wood, for Mr. F. Sanderson. Mr. E. N. Bazeley, architect.

Booker	£1,050 0 0
Burrows and Brooker	975 0 0
Staines and Son	946 0 0
Ward	878 0 0
Nightingale	828 0 0

CLAPHAM, NEAR WORTHING, SUSSEX.—For schools for the parishes of Clapham and Patching. Mr. Richard Stokesbury, architect.

Watson	£670 0 0
Bushby	663 0 0
Jarrett	649 0 0
Snawin	639 0 0
Tidy	581 0 0
Terry	561 0 0

HULL.—For a villa at Park Gates, Beverley-road, Hull for Mr. J. W. Davis, exclusive of painting and gasfitting Mr. Robert Clamp, architect.

BRICKLAYER AND PLASTERER.

Usher	£450 0 0
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CARPENTER AND JOINER.

Fewtass	£253 15 0
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MASON.

Taylor	£115 0 0
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PLUMBER AND GLAZIER.

Cherry	£66 10 0
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SMITH.

Perkins	£61 2 6
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SLATER.

Ellis, Owen, and Jones	£25 10 0
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IPSWICH.—For erecting warehouses for Mr. A. J. Christie, coal merchant.

Gibbons	£1,439 10 0
Trew	1,295 0 0
Luff	1,155 0 0
Bennett	1,000 0 0

KENT.—For Congregational Church, Milton-on-Thames, Kent. Messrs. Sulman and Rhodes, architects. Quantities supplied.

Anscumb	£4,156 0 0
Dove Bros.	4,125 0 0
Macey	4,060 0 0
Blake (accepted)	3,990 0 0

LEICESTER.—For erection of Board School in Oxford-street.

	Material.	
Allen	£6,465	£150
Major	6,479	165
Ratcliffe	6,446	160
Bland	6,255	155
Osborne Bros.	6,355	250
Neale and Sons	6,200	150
Herbert	6,190	170
Forster	5,720	150
Fern	5,640	110
Sackree	5,635	150
Kellett	5,457	200
Butler, Newman, & Simpson	5,484	170

LONDON.—For new warehouse premises for Messrs. Bartram and Harvey, Gresham-street and Staining-lane. Mr. William Allen Dixon, architect.

Mann	£2,735 0 0
Staines and Son	2,618 0 0
Perry Bros.	2,624 0 0
Niblett and Son	2,511 0 0
Gibson Bros.	2,459 0 0
Nightingale	2,398 0 0
Aitchison and Walker	2,375 0 0
Wicks, Bangs, and Co.	2,300 0 0

LONG BUCKBY.—For new Board Schools, Long Buckby, Northamptonshire. Mr. T. Heygate-Vernon, architect. Quantities supplied by Messrs. Mann and Saunders.

Woodridge and Son	£2,499 0 0
Conquest	2,454 0 0
Adams and Johnson	2,342 17 0
Marsh	2,200 0 0
Shelton	2,137 0 0
Goodridge	1,998 10 0

LONG BUCKBY.—For alterations and additions to infants' school, Long Buckby, Northamptonshire. Mr. T. Heygate-Vernon, architect. Quantities supplied by Messrs. Mann and Saunders.

Woodridge and Son	£380 0 0
Adams and Johnson	341 16 0
Goodridge	333 9 0
Conquest	324 10 0
Marsh	305 0 0
Shelton	300 0 0

MURSTON.—For rebuilding of the church on a new site. Mr. W. Burges, architect, 15, Buckingham-street, Strand.

Wallis and Clements	£3,750 0 0
Shrubsole	3,519 0 0
Adcock and Rees (accepted)	3,496 0 0

NEWBURY.—For alteration of premises in Bartholomew-street, for the Corporation.

Harrison	£325 0 0
Biddiss	363 10 0
Brown	245 10 0
Groome and Co.	239 10 0
Elliott	252 5 0
Whiter (accepted)	240 16 0

NEW SWINDON, WILTS.—For roads and sewers on Great Medghury, close to New Swindon, Wilts. Mr. W. Read, surveyor.

Contract No. 1.

Barnes	£356 0 0
Wiltshire	343 0 0
Phillips (accepted)	338 0 0

NORFOLK.—For building a new rectory at Threxton. Mr. R. M. Phipson, F.S.A., architect.

Hawes	£1,500 0 0
Goggs	1,297 0 0
Hubbard	1,275 0 0
Cornish	1,240 0 0

NORFOLK.—For restoring Horsham S. Faith's Church. Mr. R. M. Phipson, F.S.A., architect. No 2 includes new stone piers and arches to nave, and rebuilding clerestories.

	No. 1.	No. 2.
Holmes	£2,700 0 0	£3,111 0 0
Bunn	2,520 0 0	2,921 10 0
Cornish	2,128 0 0	2,615 0 0
Tooley	1,885 0 0	2,535 0 0

TAUNTON.—For building the Royal Marine Inn, Silver-street, Taunton, for Mrs. Crane. Mr. A. W. Galbraith, architect.

Fox	£440 0 0
Templeman and Handford	420 0 0
Moss	392 10 0
Smith	360 0 0
Spiller	338 0 0
Yandell (accepted)	317 0 0

TO ARCHITECTS.

GREEN ROOFING-SLATES.

As supplied to H.R.H. The Prince of Wales at Sandringham. The Penmoyle Sea-green Slates are specially adapted for Churches, Public Buildings, &c., &c.

(Less costly than ordinary Gothic Tiling.)

These durable and non-absorbent slates can be obtained in sizes suitable for Gothic Architecture, at prices as under.

In Railway Trucks, Docks, Gloucester—

	Per 1,200 Slates.	Equivalent to per square
Best Green Slates 14 by 7	217 6	16s. 6d.
Do. do. 13 by 8	217 6	16s. 6d.
Do. do. 13 by 7	250	14s.
Do. do. 12 by 7	118 6	13s.
Do. do. 12 by 6	176	11s.

Prices of large Sizes, Cost of Transit, Reference testimonials, and Sample Specimens may be obtained on application to

MESSRS. RANDELL & CO., Corsham, Wilts.

Specimens at Museum of Geology, Jermyn-street, Piccadilly, W., and at Architectural Museum, Tufton-street, Westminster

BATH AND OTHER BUILDING STONES, OF BEST QUALITY.

RANDELL, SAUNDERS & CO., Limited
Quarrymen and Stone Merchants.

List of prices at the Quarries and Depots, also cost of transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE:
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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—SOCIETY OF ENGINEERS.—Discussion on Mr. W. H. Fox's paper "On Continuous Railway Brakes—Atmospheric and Electric." 7.30 p.m.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—Continued Discussion on Mr. Thornton's paper "On the Indian Railway Gauge." 8 p.m.

WEDNESDAY.—SOCIETY OF ARTS.—"On Signalling at Sea, with Special Reference to Signals of Distress." By Captain Columb, R.N. 8 p.m.

ARCHITECTURAL ASSOCIATION.—Meeting of Elementary Class of Design; subject: Details of Window and Cornice of Club-house. 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—Meeting of Class of Construction and Practice; subject: "Mason, Slater, and Tiler." Visitor for the evening, Mr. T. Blashill. 6.30 p.m.—Meeting of Class of Design; subject: "A City Luncheon Bar and Café." 8 p.m.

SATURDAY.—ROYAL ARCHITECTURAL MUSEUM.—"On the Art of Producing Artistic Ironwork." Lecture I. By Mr. Thomas Peard. 3.15 p.m.

COMPETITIONS OPEN.

CLITHEROE, March 19.—For the erection of a public hall Mr. William S. Varley, architect, New Market Chambers, Blackburn.

LEICESTER, May 14.—For designs for municipal buildings, to comprise all public offices, assize court, and police buildings. Premiums of £200 for the best, £100 for the second best, £50 for the third best designs. T. Standbridge, Town Clerk, Leicester.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 6s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tiler, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY, March 11.—For 1,400 loads of yellow pine, 1,600 loads of red pine, 570 loads rock elm, 19,000 feet run of yellow pine deals, 310,000 feet run of spruce deals, 30 yellow pine spars. Francis W. Rowsell, Superintendent of Contracts, Contract Department, Admiralty, Whitehall, S.W.

ADMIRALTY, March 11.—For 750 loads of Riga fir timber, 605 Riga handmasts. Francis W. Rowsell, Superintendent of Contracts, Contract Department, Admiralty, Whitehall, S.W.

AMERSHAM, Bucks, March 12.—For the erection of new national schools at the Amersham and Wood-row, Bucks. Mr. Arthur Vernon, architect, High Wycombe.

BARROW-IN-FURNESS, March 17.—For the erection of a new bank in Ramsden-square. Messrs. Paley and Austin, Lancaster.

BEDMINSTER, March 15.—For the completion of seven tenements in Mount Pleasant-street, Bedminster. Wm. R. Richardson, Clare-street, Bristol.

BRADFORD, March 13.—For the supply of marble chimney pieces required at the Town-hall. W. T. McGown, Town Clerk, Corporation Offices, Bradford.

BRIERLEY HILL, March 11.—For the erection of school buildings to accommodate 800 children, and residences for the master and mistress at Brierley Hill, J. L. Holberton, Clerk to the Board, High-street, Brierley Hill.

BRIGHTON, SHOREHAM HARBOUR, March 20.—For dredging, deepening, and widening the eastern arm of the harbour between the middle pier and the lock, and other works. Robert Upperton, Clerk to the Commissioners, Pavilion-buildings, Brighton.

BRISTOL SCHOOL BOARD, March 20.—For the erection of public elementary schools in the district of S. Philip's. E. Wilson, Clerk to the Board, Small-street, Bristol.

CARDIFF, March 24.—For the erection of a Governor's house, at the county gaol. Tho. Dalton, Clerk of the Peace, 6, Working-street, Cardiff.

CHORLEY, March 15.—For the supply and erection of a telescopic gasholder. 100ft. diameter and 25ft. deep. Richard Jackson, Solicitor, Clerk to the Chorley Commissioners, Chorley.

CLECKHEATON, March 12.—For the erection of a weaving-shed, warehouse, engine-house, boiler-house, and chimney, for the Cleckheaton Mill Company (Limited). M. Brayshaw, architect, Bowling Old Lane, Bradford.

ECKINGTON SCHOOL BOARD, March 14.—For the erection of four schools and masters' houses, in Eckington, Renishaw, Marsh-lane, and Ridgeway. William Ascoug, Clerk to the Board.

ETON, March 13.—For the repairing and improving the High-street. E. H. Long, Clerk, Windsor.

HUDDESFIELD SCHOOL BOARD, March 12.—For the erection of the Fitzwilliam-street School, to accommodate 800 children. Otho Giles Abbott, Clerk to the Board, 57, Estate-buildings, Huddersfield.

ILKLEY, March 17.—For the erection of a convalescent home in Castle-road. Charles R. Chorley, architect, 19 Park-row, Leeds.

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 14, 1873.

THE COVENT GARDEN QUESTION.

OF the ways and means by which the ancestors of the majority of the present aristocratic families of England came by their enormous wealth and possessions, history records many a curious story, and among the rest we have the gifting of Covent or Convent Garden by Henry VIII. When that merry monarch of polygamic memory set about the abolition of the conventual establishments of the country, alienating their possessions to secular purposes, and appropriating all their belongings, consequent on his quarrel with the Pope, this garden which belonged to the monks of S. Peter at Westminster, "with seven acres, called Long-acre, of the yearly value of £6. 6s. 8d.," fell to the King's brother, Protector Somerset, as his share of the ecclesiastical spoils. On the latter's attainder, the property reverted to the Crown, and was then granted to John, Earl of Bedford, by letters patent dated 1552, and the same year his lordship built himself a large timber mansion on the ground occupied by Southampton-street, and which was approached by a spacious garden from the Strand. For a long period Covent Garden was allowed to remain a neglected field. There is no further mention of it until the year 1631, when the then head of the house of Bedford bethought him to turn his valuable property to account. In the "Annals of the Reign of Charles I." we read that "the king having granted leave to the Earl of Bedford to edify at pleasure upon the Convent Garden, it being a very ample and spacious area and content, the earl plied his design with such celerity and quick dispatch, as he soon reared such numerous rows of stately and ambitious buildings as made Old London envy the magnificence of her sub-urbary city." Thus was the present square formed from the designs of Inigo Jones, who took the notion of the piazza from the square at Leghorn. However, only the north and part of the east sides were completed. The original S. Paul's Church, in the centre of the west side, was completed by the same architect two years after the square was laid out. Apropos of this church, which was intended as a chapel of ease to S. Martin's-in-the-Fields, an anecdote is told by Horace Walpole. When the Earl of Bedford sent for the architect, he told him he wanted a chapel for the parishioners of Covent Garden, but he would not, he said, go to any considerable expense. "In short," said the Earl, "I would not have it much better than a barn." "Well then," replied Inigo, "you shall have the handsomest barn in England." The edifice cost the Earl £4,500, but it has cost from first to last a great deal more than that. The original building was of brick, with stone columns to the portico, with a roof of red tiles. On the apex of the pediment was a stone cross, which, it is said, gave great offence to the Puritans. It could boast of having the first long pendulum clock seen in Europe, so says Mr. Peter Cunningham. The church was repaired in 1727, by that noted amateur architect, the Earl of Burlington; and in 1788, it underwent a thorough restoration, at a cost of £11,000. Seven years afterwards a fire, caused by the carelessness of plumbers engaged in repairing the roof, destroyed the whole of the interior, leaving only the bare walls standing. It was rebuilt by Mr. John Hardwick, on the plan and in the proportions of the original edifice. The front is plain but massive; the portico is of the Tuscan order, and the capacious roof is sustained by the walls alone, without the aid of pillars. We have not space to enumerate all the illustrious

characters who lie buried around S. Paul's; but among others may be mentioned Sir Peter Lely, whose monument, with his bust by Gibbons, and his epitaph by Flaxman, shared the fate of the church when destroyed by fire in 1795; Grinling Gibbons himself; Sir Robert Strange the engraver, "who warred with the Academy for their contemptuous neglect of engravers;" Thomas Girtin, the father of the school of English water-colours, Turner's early companion; Wycherley, the dramatist; Butler, the author of Hudibras; Davies, the bookseller who introduced Boswell to Johnson; Macklin the actor, and Peter Pindar.

For at least a century and a half the square was a fashionable place of residence, and a famous rendezvous of the town gallants. The well known Evans's was occupied in succession by Sir Harry Vane the younger, Sir K. Digby, Ben Jonson's great friend and patron; and Admiral Russell, afterwards Earl of Oxford, who gave a splendid *fête* here in celebration of his acquittal of the several charges of high crimes and misdemeanours preferred against him by the House of Commons in 1701. The house was, in 1774, converted into an hotel by David Low, a hairdresser of Tavistock-street, and is said to have been the first family hotel established in the metropolis. Its subsequent conversion into a singing and supper-room was the work of Evans, a low comedian of Covent Garden Theatre. At the Tavistock lived four great painters—Lely, Kneller, Sir James Thornhill, (Hogarth's father-in-law) and Richard Wilson. The Bedford coffee-house is celebrated as the resort of Fielding, Churchill, Hogarth, Goldsmith, and their contemporaries; and Fox, Burke, and Sheridan have also conferred lasting distinction on the Piazza. Among other celebrities, Pope's Lady Mary Wortley Montague lived here in 1730. In the centre of the square stood, until the year 1790, a tall column, surmounted by a dial. It was erected eight years after the Restoration, the inhabitants, it appears, contributing to the expense.

The market originated, according to Mr. Cunningham, in 1656, in a few temporary stalls at the back of the garden wall of Bedford House, on the south side of the square. In 1671, William, Earl of Bedford, having a keen eye for making money, obtained from Charles II. a patent for the market. Some years afterwards there appear to have been twenty-three salesmen, who were severally rated at 2s. and 1s. The old market is described as a strange assemblage of shed and penthouse, rude hall and crazy tenement, coffee-house and gin-shop, intersected by narrow and ill-lit footways. Hogarth has left us several characteristic views of the place in his time—it was a favourite subject with artists. Here is one of Hogarth's pictures. In the front, somewhat to the right, is an old man, a well-known beggar, soliciting charity. Near him is Dr. Craddock, the rector of Covent Garden parish, afterwards Archbishop of Dublin. In the centre, seated by the column, with vegetables before her, is the figure of a very handsome woman known by the name of the "Duchess." She appears to be extravagantly dressed, which we are told was her custom. Her second husband's name was Wharton, and among her numerous admirers was the eccentric and profligate duke of that name. She died in 1778 at the age of eighty-nine. Near her are three females, Lady Archer (the last occupant of Evans's) her daughter and maidservant. Immediately behind them there is one of the porters of the garden seated, smoking. On the steps of the column are two figures, an old man and woman singing ballads. Next to them is a man in a red waistcoat, serving out rice milk, a portrait also introduced by Hogarth in his "Morning." On the left corner of the picture are to be seen two more noted characters, old Mr. Blake and his wife, the latter in the act of frying sausages and smoking. At a short distance from this ancient couple is a very

conspicuous figure, standing in front of the church with a number of empty cherry sieves on his head. This is George Carpenter, who, when a boy, obtained his living by carrying fruit baskets to the water-side for the market gardeners. By constant practice he had acquired such dexterity that, it is said, he could take up from the ground twenty-four half sieves, place them on his head, and shake off any given number. Carpenter married, and became the proprietor of the coffee-house, originally the "Queen's Head," afterwards the "Finish"—appropriate name enough for a night-house. It was one of the old market sheds on the east side of the square, nearly opposite the "Hummums." Here Carpenter amassed considerable money, and on the death of Mr. Gyfford, a brewer, he became lessee of the market, paying the Duke of Bedford a rental of £1,400 a year. The "Finish" was only cleared away in 1829. Near it stood John King's coffee-house, where drunken rakes were wont to fight with swords and fire-shovels—no uncommon thing in those days.

Old Bedford House was pulled down in 1704, but it was not until 1829 that the picturesque, yet wretched, conglomeration of rickety sheds was swept away to make room for the present market-buildings, which were erected in the following year, from designs by the late Mr. Charles Fowler, architect, at a cost to the ground landlord of £42,000. A facade has been added to the north-west side, and the market is at present composed of four principal parts, each of which have like characteristics. The centre is formed of an arch on the entablature of two Tuscan columns, with a single-faced archivolt, supported by two piers, which sustain an elevated triangular pediment, the tympanum of which is adorned by armorial bearings, and the motto of the Bedford family. On each side of this centre is a colonnade of the Tuscan order. The columns are of granite, and of the Palladian-Tuscan, with an ornamental balustrade, employed for the business of the market. At the extreme angles of the four portions is a varied quadrangular pavilion. Over the centre of the building is a conservatory for exotic and other plants for sale, and which is called the Bedford Conservatory. It is reached by a flight of steps at either end, and on the pediment is an emblematic figure of Plenty. The central arcade, running the whole length of the market from east to west, is, as everybody knows, occupied by shops where you may buy pears at a guinea each and strawberries at a shilling an ounce. Altogether, there are from fifty to sixty shops proper in the buildings, but besides these there is the stall or stand accommodation. Of this it is impossible, without official returns, which are not to be had, to form any estimate, because the moment a stall-holder has disposed of his goods he has to make way for another, and so on. Each holder of a stall has to pay a toll of a shilling, while the shopkeepers, in addition to their regular rent, are charged twopence on every box of oranges, or other fruit, they may receive—an impost which they look upon as a great hardship. The former class of dealers, as we have all heard, have of late been loudly complaining of their unprotected condition in the market, and most people will agree that their position is anything but an enviable one. They have petitioned the Duke of Bedford to make such improvements in the market as will give them more comfort and convenience. It is said there are difficulties in the way preventing the Duke complying with this request. Before any improvements, worthy of the name, could be carried out, many of the houses in the square would, we are told, have to come down, but the leases of these houses not yet having expired cannot be touched. Besides, it would, it is said, require municipal if not imperial resources in order to make the market what it ought to be. All that the stall-holders ask is shelter of some kind from the rain, and it

will occur to most persons who know the market that this might readily be accomplished without any elaborate scheme of pulling down the adjoining houses. Of course, the greater the improvement the better; but assuredly something ought to be done, for when we consider the markets possessed by some provincial towns, Covent Garden, its historical fame notwithstanding, is simply a disgrace to the metropolis. Millions, it is believed, are annually paid for fruit and vegetables here. When this is considered, and when we further consider the splendid income which the head of the house of Bedford receives from the market, we do not think the complaint of the market-gardeners is unreasonable.

MUNICIPAL UNDERTAKINGS IN LANCASHIRE.

A BRILLIANT innovation upon the ordinary routine of civic duties has been made by the Corporation of Liverpool. Any person conversant with art and civic matters in this country, being ignorant of the fact to which we are directing attention, would despise as the wildest of wild hallucinations statements that aldermen and town-councillors may be teachers and critics of Fine Art, and the "most powerful agents" for resisting the "domination of narrow cliques of artists," "the coalition of picture-dealers," and the evil effect upon art produced by mercenary artists who degenerate into mere art-manufacturers! Nevertheless, these views of civic duties are being promulgated in Liverpool, in sequence to a most successful example of their practicability.

The Corporation of Liverpool has a "Fine Arts Committee," of which Mr. J. A. Pieton, F.S.A., the well-known Liverpool architect, is the chairman. This Fine Arts Committee has just issued a report upon the Second Autumn Exhibition of Pictures, held under its auspices in 1872. In addition to statistical information of a most encouraging character, the report contains critical, technical, and suggestive remarks, made with the laudable intention of popularising and "exciting a widely-spread interest in art among the masses of the general population." It asserts that municipal authorities have "peculiar facilities" for becoming the "powerful agents" for rendering those services to art to which we have referred. It notices with regret "the absence of that preliminary training in many of the younger artists without which true art is unattainable;" it rebukes other artists for covering canvases in size quite out of proportion to the importance of their subjects; and others for selecting "abnormal proportions" in the shape "of their works." Further, the report defines the appreciation of the various classes of visitors who attended the Exhibition, remarking of one class that "the working mandetects and resents mawkishness and affectation with much more unerring keenness than the drawing-room critic;" and of another class, that "while to those who considered themselves connoisseurs the absence of technical defects seemed to be the chief requisite, the people, with an accurate instinct, required the higher qualities as a *sine qua non*, while tolerant of minor deficiencies." Extraordinary as this report is, emanating from such a source, its value as a contribution to the art-history of Great Britain is considerable, from the fact that the names of several patrons of art and "consulting artists" appear upon the list of the committee which prepared it. Other most commendable features of the proceedings mentioned in the report are that the Corporation expended £600 in purchasing pictures from the Exhibition for the permanent Gallery of Art now in course of formation in Liverpool; while out of the total sum of £6,214. 4s. 6d. expended upon works of art in the Exhibition, £2,149. 17s. were expended by individual members of the Corporation.

Such meritorious proceedings as these deserve the widest recognition and the highest praise. It is devoutly to be hoped that the Liverpool Fine Arts Committee will proceed a step further, and initiate a national movement—advocated in this Journal—for establishing Fine Art scholarships in the centres of learning, commerce, and industry. Their annual Exhibition will supply ample funds for the purpose, while there is no other public body so thoroughly qualified to inaugurate the undertaking.

In a totally different field, the Corporation of Manchester is taking the lead in a public movement. Last year a Bill was introduced into the House of Commons by one of its most practical members, Mr. Leeman, member for York, with a view of imposing clearly-defined duties upon corporations and other public bodies in the expenditure of public moneys. This Bill, after being so mutilated in its progress that its author is now one of the most zealous advocates for its repeal or amendment, passed through Parliament, and is known as the Borough Funds Act. Coupled with the interpretation placed upon it by Lord Redesdale, it now exists as a vexatious obstruction to measures of public improvement. An instance, out of which the movement for its repeal or amendment arose, occurred at Nottingham. The authorities of Nottingham, in their capacity as guardians of the public health, desired to restrain the erection of dwelling-houses upon a water-logged site below the flood level of the river Trent; but, under the provisions of the Borough Funds Acts, their hands are so tied that, practically, they can do nothing. In this dilemma the Nottingham authorities appealed to other corporations; Manchester has responded, and taken the lead in seeking to obtain redress for this great legislative blunder. As the Act stands, and is interpreted, before the costs of any public improvement, or the costs of opposing any scheme or measure prejudicial to the interests of a district, can be incurred by a corporate body, such corporate body must obtain an absolute majority of its own members, an absolute majority of the ratepayers electing it, and the consent of a Minister of State. So long as these restrictions remain, town improvements and sanitary progress will inevitably be retarded.

While advocating with other municipal bodies their unrestricted right to expend the rates they have the power to levy, the municipal authorities of Manchester have exemplified, during the past week, their practice in that respect. The completion of their new Town Hall has been under consideration by the General Purposes Committee and by the City Council. In the course of their proceedings, it was stated that the probable cost of the new Town Hall would be £800,000; the interest of that sum at 4 per cent. would necessitate an annual charge in perpetuity upon the ratepayers of £28,000, involving, provided the rentals of the city continued to increase in the same ratio as they had during the past ten to fifteen years, a rate of 3½d. in the pound. This statement was followed by an assurance that "there were very few within the city of Manchester who would grumble at the rate which might be imposed."

When Manchester is prosperous there may or may not be "grumblers" at the expenditure of almost a million of money upon a public building; certainly, there can be no remonstrance from those who know the ennobling influence of a grand public edifice, especially when assured that its cost can be cheerfully paid by a flourishing community. But, on the other hand, there are silent remonstrances against mere ostentation, and terrible pleas for the consideration of a more vital question than civic grandeur, going on from day to day, and hour to hour, in the city of Manchester. While the great civic palace in Albert-square is rising as a monu-

ment of affluence and art, the dwellings of the great bulk of the population are being extended, in other districts, with an absence of sanitary arrangements both disgusting and disgraceful; and the average death-rate of the city continues to be recorded as one of the highest in the kingdom!

To prevent misapprehension as to the cost of the new Town Hall building, it should be stated that the estimated cost of the structure and fittings—£300,000—is still regarded as not likely to be exceeded. In the instructions to competing architects it may be remembered that the cost of the building and fittings was not to exceed £250,000; but, as in the case of the Edinburgh Cathedral competition, additions and improvements upon the selected design were made to the extent of £50,000. The total cost of £800,000 includes an item of £342,000 for the site, and another of £120,000 for interest of money up to the present time. The sum of £600,000 has already been paid, and there is a heavy contract yet to be entered into.

Upon the recommendation of the architect, Mr. Waterhouse, the works not included in the present contract of Messrs. George Smith and Co., of London, will be thrown open to competition. Tenders will be invited in one lump sum for the completion of the building, including, among other works, the construction of the Albert-square and Cooper-street towers; the joiner's work; the plastering, plumbing, glazing, and painting. The quantities will be prepared forthwith, and the tenders will be received in the beginning of the month of May.

The demolition of houses for the Deansgate Improvements still continues. During the past week the Victoria Music Hall, on Victoria-bridge, at which a lamentable accident occurred some years ago, has been pulled down. There are indications already that Manchester will possess, in the new Deansgate, one leading thoroughfare worthy of the city, provided the new frontages fall into worthy architectural hands.

In Salford the Corporation have instructed their newly-appointed borough engineer, Mr. A. M. Fowler, to prepare a plan for the sewerage of their borough. His scheme has been approved by the district Sewerage Committees of the Town Council, and is now under the consideration of a special committee. In Salford, as in Manchester, the filth is disgusting, the death-rate is excessive, and sanitary remedial measures ought not to be delayed for a day. At the meeting of the Corporation, when Mr. Fowler's sewerage scheme was considered, it was stated that "more than half the children born in Salford died before they were five years of age!" This state of a population is appalling.

The course of the main trunk sewer designed by Mr. Fowler will drain the three districts of the borough—Salford, Pendleton, and Broughton, receiving in its course the discharge of existing sewers and terminating at Mode Wheel in an outlet equal to a circle of 8ft. 6in. in diameter, where it will empty itself into the river Irwell. The scheme does not include any provision for preventing the further pollution of the inky Irwell. The calculations for the work are based upon the data that 200,000 inhabitants have to be provided for, each person contributing 20 gallons of sewage-water to the sewers in seven hours. The quantity of water from this source to be carried off by the sewers amounts to 1,528 cubic feet per minute; the rainfall, which is considerable, added to this, will, it is calculated, produce a grand total of 93,082 gallons per minute to be discharged into the river Irwell! The engineer is of opinion that the work may be accomplished without difficulty, in consequence of the soundness of the strata and the slight interference with traffic upon the route laid down. The estimated cost of the scheme is £64,715, with the sum of £1,000 extra for storm overflows.

The expedition with which this scheme has

been prepared and proposed for adoption indicates that the Corporation and their Engineer are resolutely alive to the obligations imposed upon them by the calamitous statistics of the public health in their district.

The Corporation of Bolton are making an effort to open with a royal ceremony during the ensuing summer their new Town Hall, now rapidly approaching completion from the designs of Mr. William Hill, of Leeds, with whom Mr. Woodhouse, of Bolton, has been associated.

A movement, not strictly municipal, has also been started in Bolton for the erection of a new infirmary and dispensary for medical and surgical cases, at a cost of £20,000. Blackburn, with a much smaller population, has a fine institution of the kind; and Wigan, with a population of less than one-half that of Bolton, is about to open a similar public building. The promoters of the Bolton hospital refer to the public spirit and material prosperity of their town, and express confidence that their project will be taken up and carried to a successful issue.

NOTES ON STONEWORK.—VI.

MAGNESIAN LIMESTONE.

THE sandstones procured from the Carboniferous system of rocks, such as those of which some qualities were given in the last article, are, although not the only sandstones, the best and most generally used in this country. It may therefore be worth while, before proceeding to the Permian rocks, to offer some few further remarks on the qualities of some of these Carboniferous sandstones. The commissioners for the selection of stone, formerly referred to, found that a piece of stone from Bramham Moor, Yorkshire, weighing in its ordinary state 4,149 grains, weighed, when thoroughly dried, 4,144 grains, thus showing that in its ordinary state it contains above 0.12 per cent. of water. The same piece thoroughly saturated weighed 4,329 grains, showing its capability of absorbing a quantity of water equal to 4½ per cent. of its weight when dry. The specific gravity of this stone—hereafter to be known by the contraction sp. g.—was 2.008.

A piece of Park Spring stone, the sp. g. of which was 2.321, weighed when thoroughly dry 4,647 grains, and in its ordinary state 4,676 grains, which showed an amount of absorption in this state of 0.62 per cent. The same piece when saturated weighed 4,819 grains, showing a capacity of absorption of 3.7 per cent. These are the differences between the thoroughly dry and the thoroughly wet states. The following are the differences between the ordinary state and the saturated:—

	Craigleith, near Edinburgh.	Heddon, Northum- berland.	Kenton, Northum- berland.	Darley Dale, Der- byshire.
Specific gravity of dry masses	2.232	2.229	2.247	2.628
Weight of 2-inch cubes in the ordinary state	4,698gr.	4,557gr.	4,658gr.	4,685gr.
Weight when sa- turated	4,859 „	4,765 „	4,848 „	4,826 „
Percentage of water absorbed	3.42	4.56	4.80	3.00

The pieces of stone were placed under the receiver of an air-pump, and the quantity of water absorbed in this process represents the space occupied by the pores or interstices of the stone, “unless we suppose that in some cases the adhesion between air and the solid particles is so great that the entire removal of the atmospheric pressure is not sufficient to counteract the force. It is certain that, when this pressure is not removed, long immersion in water will not occasion the displacement of all the air contained within the pores” (Commissioners’ Report).

Experiments were made on the crushing strength of these stones, in the following manner:—A 6-inch hydraulic press, with a pump 1in. diameter, was used, and it was calculated that 1lb. at the end of the pump lever was equal to 2.53cwt. on the face of a 2-inch cube of stone acted upon by the press, or about 71lb. per square inch. The pressure was applied by increments of 1lb. at a time, at intervals of one minute. The numbers in the following table are the numbers given in the Commissioners’ report, multiplied into 2.53, and represent the pressure in cwt. on a 2-inch cube; if divided by 4, they represent the pressure per square inch in each case.

	Craigleith.	Heddon.	Kenton.	Darley Dale.	Bramham Moor.	Park Spring.
Weight pro- ducing first fracture	151.80	65.78	121.44	222.64	80.96	141.68
Crushing weight	280.83	141.68	177.10	253.00	220.11	270.71

Other experiments, given in Gwilt’s “Encyclopedia of Architecture,” on the crushing strength of sandstone from the Carboniferous system, on 1½in. cubes (2¼ square inch), show results as follow:—Yorkshire paving, of a sp. g. of 2.507, 12,856lb.; Bramley-fall stone, sp. g. 2.506, 13,632lb.; Derby grit, sp. g. 2.316, 7,070lb.; Craigleith white freestone, sp. g. 2.452, 12,346lb. Sir William Fairbairn, in his “Useful Information for Engineers,” second series, gives experiments made on Yorkshire stone by himself, or under his immediate direction, as follow, on 2-inch cubes, the pressure being applied at right angles to the bedding:—

	Fractured by lb.	Crushed by lb.
Idle quarry, Bradford	42,484	43,380
Jegrum’s-lane	45,172	47,860
Spinkwell	31,732	37,108
Coppy quarry	37,108	41,588
Mean	39,124	Mean 42,484

The following were the results of experiments on 2-inch cubes when the pressure was applied in the direction of the bedding:—

	Fractured by lb.	Crushed by lb.
Shipley, near Bradford	33,524	38,900
Heaton	33,524	40,692
Heaton-park	29,940	31,732
Old Whatley	35,316	35,316
Manningham-lane	28,148	37,108
Mean	32,090	Mean 36,749

The relative strength in the line of the bedding to that at right angles to it is thus as follows:—

First fracture, as 82 to 100.

Ultimate crushing weight, as 86 to 100.

All the above-named stones are from the valley of the Aire, a famous locality for good stone, and the results of experiments upon them are high, the mean crushing weight of the nine stones being, as is seen by the above figures, 9,824lb. per square inch; but other experiments by Mr. George Rennie on Yorkshire sandstone show a result of only 6,127lb. per square inch.

The capacity of absorption of water of the sandstones from the valley of the Aire is stated to be as follows. Each specimen was weighed before immersion, and after immersion for 24 hours:—

Name of Quarry.	Specific Gravity.	Absorbed 1 part by weight in
Shipley	2.452	63.6
Heaton	2.420	49.8
Heaton-park	2.385	44.1
Spinkwell	2.329	30.1
Idle	2.464	56.3
Jegrum’s-lane	2.400	46.2
Spinkwell	2.456	53.8
Coppy quarry	2.408	46.0
Old Whatley	2.415	38.9
Manningham-lane	2.401	46.3
“	2.421	45.0

Succeeding to the Carboniferous system is the Permian, or Magnesian Limestone series of rocks, the lower part of which, immediately above the coal-measures, consists of a red rock called the Lower New Red Sandstone. It was called the New Red Sandstone by the earlier geologists, in contradistinction to the Old Red Sandstone system, which lies below the Carboniferous formation, and it is now called the Lower New Red, to distinguish it from the main body of the New Red Sandstone, which lies above the Magnesian Limestone formation. It is of a purple, reddish, or brown-speckled colour, from the presence of the oxide of iron. It is chiefly made up of quartz and decomposed granite. In its lower portion it is a coarse conglomerate, but in the upper portion it is a fine-grained sandstone, and is quarried in the mid and counties and in Shropshire for common buildings.

The magnesian limestone proper is a series of thick beds of stone composed of carbonate of lime and carbonate of magnesia, varying from an almost pure carbonate of lime to an admixture containing upwards of 40 per cent. of carbonate of magnesia—hence called magnesian limestones. Their structure is often peculiar, occurring in thick beds, with subordinate concretionary masses, and layers of a powdery consistence, and not unfrequently in a peculiar brecciated or pseudo-brecciated arrangement, as if the mass on consolidation had been broken up internally and again consolidated. When the magnesian limestone assumes a granular and crystalline texture, it is known by the mineralogical name of dolomite, after the French geologist, M. Dolomieu (Page). The Houses of Parliament are built of this stone, but unfortunately this particular instance of its use cannot be adduced in its favour. Nevertheless sufficient evidence was obtained before the Houses were built to show that it is really an excellent stone. Of course, for such fine work as that of these buildings, it was necessary to select a free-working stone, as well as a durable one, and the Commissioners decided to recommend the magnesian limestone of Bolsover moor, in Derbyshire, which is a light yellowish-brown stone, weighing in its ordinary state 151½lb. per cubic foot, and at that place there was found a depth of 12ft. of workable stone, in beds of from 8in. to 2ft. in thickness, but from circumstances which it is now useless to regret, however grievous it is to think that the reign of a pettifogging spirit should have brought them about, the stone was badly selected, or rather was not selected at all, and the decay which has already set in in consequence of paltry disagreements about who should pay a salary of £200 a year, in such an important national affair as this, is patent enough to everybody. Most of the stone used in the Houses of Parliament was procured from Anston, in Yorkshire, and, when properly selected, good stone can be procured from these quarries, of which there is a proof in the Piccadilly front of the Museum of Geology, which is built of the same stone, and has stood very well. Magnesian limestone from the Anston quarries has been used in London in the front of the Amicable Fire-office, in Fleet-street (1842 or 3), and according to the report of the second commission to inquire into the decay of the stone in the Houses of Parliament (1861), the state was generally very good.

The Record Office in Fetter-lane, begun in 1851, of Kentish rag with Anston stone dressings, showed symptoms of decay in the dressings.

The new Hall and Library of the Society of Lincoln’s Inn is of red brickwork with Anston stone quoins and dressings (1843). The Commissioners report numerous symptoms of decay, especially in portions where the stonework is liable to take up water, either from the direct rainfall or by capillary action. The coping of the inclosure walls towards Lincoln’s-inn-fields is reported to be much decayed, and the plinths, weatherings, strings, quoins, and, in fact, all the stone, as being

seriously affected. At the Museum of Economic Geology (1850), in addition to the north front in Piccadilly, the south front, in Jermyn-street, has dressings of Anston stone, nearly all of which are intact. The stone was carefully selected by competent persons. In 1849 some of the flying buttresses of Westminster Abbey were restored in Anston stone, which was used for the saddle-back copings, arch stones, haunches, &c., and has decayed irregularly.

We have followed here the sense of the report of the Commissioners on the decay of the stone in the Houses of Parliament, but with reference to this matter, it seems to the present writer to be worth some consideration whether in some parts the evident defects are not in some, and perhaps in a great, measure, to be attributed to simple crushing; for certainly never since the beds took their present position in the quarry has this stone been subjected to such a weight as is now piled upon some of the lower courses. In other parts the decay is more attributable to inferiority of quality, and is the result of the chemical action of the atmosphere. In proportion as the stone is crystalline, so does it appear to have resisted the decomposing effects of the atmosphere.

The component parts of the magnesian limestone of four of the localities visited by the Commissioners are given in the following table:—

	Bolsover.	Huddleston.	Roche Abbey.	Park Nook.
Silica per cent.	3.60	2.53	0.80	
Carbonate of lime do.	51.10	54.19	57.50	55.70
Carbonate of magnesia do.	40.20	41.37	39.40	41.60
Iron, alumina do.	1.80	0.30	0.70	0.40
Water and loss do.	3.30	1.61	1.60	2.30
Sp. g. of dry masses	2.316	2.147	2.134	2.138
Sp. g. of particles	2.833	2.867	2.840	2.847
Quantity of matter in grains, disintegrated by Brard's process for 8 days	1.5	1.9	0.6	1.8

The weight of magnesian limestone in its ordinary state and when saturated with water is as follows:—

	Bolsover.	Huddleston.	Roche Abbey.	Park Nook.
Specific gravity of dry masses	2.316	2.147	2.134	2.138
Weight of 2 inch cubes in the ordinary state	4,490gr.	4,493gr.	4,408gr.	4,356gr.
Weight when saturated	5,042gr.	4,735gr.	4,754gr.	4,784gr.
Per centage of water absorbed	3.11	5.38	7.85	9.82

The powers of cohesion, or strength to resist crushing weights, were as follows, in cwts. upon 2in. cubes.

	Bolsover.	Huddleston.	Roche Abbey.	Park Nook.
Weight producing first fracture	177.10	86.02	60.72	65.78
Crushing weight	296.00	154.33	139.15	154.33

A similar stone from Brodsworth, in Yorkshire, of a sp. g. = 2.093, absorbed 10.23 per cent. of its weight of water, was fractured by a pressure of 65.78 cwt. on a 2in. cube, and completely crushed by a pressure of 164.45 cwt. A specimen of magnesian limestone from Cadeby, in Yorkshire, absorbed one-fourth of its bulk of water. Its weight is about 126.9lbs. per cubic foot, which would indicate a sp. g. of 2.030, and if it absorbs one-quarter of its bulk of water the per centage of its weight (of water absorbed) would be 12.32.

The experiments of Sir Wm. Fairbairn on the strength of Anston stone in 1in. cubes give the strength to resist fracture = 2,154lb.,

and before it was finally crushed the weight applied was 3,050lb. The stone procured from Worksop, in Nottinghamshire, proved much stronger, the fracturing weight being 3,946lb. on a 1in. cube, and the crushing weight 7,098lb. In the neighbourhood of Mansfield, according to Mr. Hull, the series consists of an upper and lower bed of magnesian limestone, with intermediate sandstones. The lower limestone is the more important, having a thickness of from 70ft. to 100ft. It is variable in quality, and at Mansfield passes into a white calcareous sandstone. The components of the white and red siliceous dolomites of Mansfield, according to the analyses of Mr. Richard Phillips, are as follows:—

	White.	Roseate.	Brown.
	Per cent.	Per cent.	Per cent.
Silica	51.40	49.40	49.40
Carbonate of lime	26.40	26.50	26.50
Carbonate of magnesia	17.98	16.10	16.10
Iron, alumina	1.32	3.20	3.20
Water and loss	2.80	4.80	4.80
	100	100	100

In the direction of Nottingham the formation deteriorates, and passes into a friable calcareous sandstone. The stone of the Mansfield-Woodhouse quarries is a massive but irregularly-bedded crystalline limestone of a fine yellow colour, in some places speckled with black. It is hard and durable, as may be seen in Southwell Church. Bolsover-moor stone is nearly identical in geological position with that of Mansfield; it is a yellowish-brown dolomite, compact and fine-grained. The components of these two stones are as follows (from Mr. Hull):—

	Bolsover-Moor.	Mansfield-Woodhouse.
	Per cent.	Per cent.
Carbonate of lime	51.10	51.65
Carbonate of magnesia	40.20	42.60
Oxide of iron and alumina	1.80	Trace
Silica	3.60	3.70
Water and loss	3.30	2.50
	100	100.45

The keep of Conisbro' Castle, Yorkshire, is built of coarse-grained and semi-crystalline magnesian limestone from the adjacent hill, and is in excellent preservation, although the mortar is gone from the joints. The church at Hemingborough, in Yorkshire (fifteenth century), is in a very perfect state. It is built of white crystalline magnesian limestone, resembling that from Huddleston. Professor Daniell gave it as his opinion, based upon experiments, that the nearer the magnesian limestones approach to equivalent proportions of carbonate of lime and carbonate of magnesia, the more crystalline and better they are in every respect. This stone is well preserved in Tickhill Church, of the fifteenth century; Huddleston Church, of the same period; Huddleston Hall, of the sixteenth century; and at Roche Abbey, of the thirteenth century, it is for the most part intact; but the churches and Minster of York, Howden Church, and others in that part, built of magnesian limestone, have suffered severely from atmospheric influences.

On the origin of magnesian limestone, Mr. Page makes the following remarks in his "Advanced Text-book of Geology":—"As in the case of coal, rock-salt, flint, and other rocks whose formation cannot be satisfactorily accounted for by the ordinary conditions of mechanical sediment, the origin of the magnesian limestone has given rise to much ingenious speculation. The most prevalent hypotheses are—first, that the carbonate of magnesia was deposited simultaneously with the carbonate of lime; and, second, that it was subsequently injected in the state of gaseous vapour. There are difficulties, no doubt, in the way of both hypotheses, but the former is that which admits of most extensive and satisfactory application."

Professor Phillips remarks that the circumstances which permitted the accumulation of the magnesian carbonates of lime are in a great measure unknown to us. That they were originally deposited in the same chemical condition as we now see them, without the subsequent aid of any igneous operations, is perfectly evident. It has been imagined, because certain beds of the carboniferous limestone contain a large proportion of magnesia, that the one is derived from the ruins of the other. But, as Professor Sedgwick observes, all the magnesian beds in the carboniferous limestone would be quite insufficient for the purpose, and the crystalline character of the Mansfield and other varieties of magnesian limestone clearly negatives this mechanical solution. Beds rich in magnesia alternate with others devoid of that substance; the same beds are in one tract magnesian, in another yield pure lime; and in general we must be content to shelter our ignorance under the statement that, from some unknown cause, the waters of the sea were then decomposed in such a way as to permit very generally the precipitation of united magnesian and calcareous carbonates, the possible circumstances of which must be entrusted to the examination of the chemist.

THE LABOUR MARKET IN THE UNITED STATES.

THE 1872 report from Consul-General Archibald, New York, to Earl Granville, on "The Condition of the Industrial Classes and the Purchase Power of Money," is a valuable State document. This article deals almost exclusively with the building trade. It is difficult to arrive at the population of this Consular District, but in 1870 it amounted to 6,168,677. Of these 4,663,210 were natives of the States, and 1,035,080 were contributed by Great Britain and the British dominions. The Consular District comprises New York, New Jersey, Connecticut, Delaware, and Rhode Island.

There has been during the past two years an increased demand for skilled labour in certain trades. This was owing in some measure to the influence of the Franco-German war in diminishing the emigration of that class of operatives. The wages of skilled labour, however, have not increased, but there has been a corresponding decline in the prices of certain provisions, fuel, and other commodities. There has been a fair employment in the various branches of manufacture, more especially in those of iron, which is at present the most prosperous. Woollen manufactures are not very flourishing, owing to the pressure of the high tariff on the raw material. A modification and reduction of the duties, are, however, now proposed by the Committee of Congress who have the matter in charge. Cotton and other manufactures can hardly be said to be in a prosperous condition. For the present the supply of unskilled labour in the large cities, and especially in New York, has exceeded the demand, and for the present has produced no little distress among them. Only two or three weeks ago it was reported by New York correspondents of the London papers that the Italian immigrants then just arrived were astonished to find that no other work was to be had but that of clearing snow from the streets. There is a better chance for labourers in the Southern States, and the cost of conveyance is defrayed by the employers, but there is an unwillingness on the part of immigrants to proceed there. In 1871 the Labour Bureau at Castle Gardens procured employment for 31,384 immigrants, including 85 blacksmiths, 43 bricklayers, 655 cabinetmakers, 94 carpenters, 11 gilders, 125 locksmiths, 57 masons, 11 plasterers, 7 plumbers, 109 painters, 18 stonecutters, 26 turners, and 8 wood-carvers. The following, extracted from the Report of the Emigration Commissioners, are stated to be about the rates obtained for skilled labour at the Bureau during the last year:—

	£	s.	d.	£	s.	d.	Without Board
Blacksmiths	0	8	0	0	10	0	per day
Bricklayers	0	14	0	0	16	0	"
Brassfinishers	2	0	0	3	0	0	per week.
Cabinetmakers	0	8	0	0	10	0	per day.
Carpenters	0	12	0	0	16	0	"
Gliders	2	8	0	3	12	0	per week.
Ironmoulders	3	0	0	4	0	0	"
Locksmiths	2	0	0	3	0	0	"
Machinists	3	0	0	4	0	0	"
Masons	0	12	0	0	14	0	per day.
Paperhangers	2	0	0	3	4	0	per week.
Plasterers	0	12	0	0	16	0	per day.
Plumbers	0	10	0	0	12	0	"
Painters	1	16	0	3	0	0	per week.
Stonemasons	0	10	0	0	16	0	per day.
Woodcarvers	3	0	0	3	18	0	per week.

The practice of employing operatives on piece-work, or by the job, is increasing, compensation being paid according to skill and competency. Now, to look at the other side of the question; let us see what the artisan has to pay for his provisions, and the retail price in New York City, March, 1872, was as under:—Butter, prime table, per lb., 1s. 4d. to 1s. 5½d.; ditto, second quality, 1s. to 1s. 2d.; ditto, cooking, 10d. to 11d.; cheese, 5d. to 9d.; eggs, 8 and 10 for 1s. Meats per lb.—Beef-steak (porter house) 1s. 3d. to 1s. 5½d.; ditto, sirloin, 9d. to 1s.; roasting pieces, rib, 9d. to 1s.; round steak, 9d. to 1s.; cross rib, 5d. to 9d.; mutton, hind-quarters, 7d. to 9d.; ditto, fore-quarters, 5d. to 6d.; ditto chops, 9d. to 1s.; lamb, 8d. to 1s.; pork, 6½d. to 7½d.; ditto, corned, 7d. to 7½d.; veal, hind-quarters, 7d. to 1s.; ditto, forequarters, 5d. to 7d. Fish per lb.—codfish, 5d. to 7½d.; eels, 10d. to 1s.; flounders, 5d. to 7½d.; haddock, 5d. to 6d.; herrings, 1½d. to 5d. each. Vegetables—Onions, 9d. to 10d. per quart; potatoes, 2s. 5d. to 3s. 4d. per bushel. Coals, 26s. to 30s. per ton of 2,000lb.; wood, 20s. to 24s. per load; flour, 5s. to 6s. per 25lb. bag; black tea, 3s. 4d. to 5s. per lb.; ditto green, 4s. 10d. to 5s. 4d.; best coffee, 1s. 8d. per lb.; ditto, second, 1s. 5d.; best sugar, 6d. per lb.; ditto, second, 5½d.; soap, 3½d. to 3¾d. per lb.; milk, 5d. per quart.

House-rent, the Consul-General states, is more than 100 per cent. dearer than in Great Britain; fuel more than 100 per cent. dearer, excepting, perhaps, in London and the south of England (and here it must be remarked that the present rise in the price of coal had not taken place; however, it cannot be regarded as a normal state of matters). Woollen clothing, hats, and shoes are 100 per cent. dearer; cotton clothing 10 per cent.; hardware 60 per cent.; earthenware and glass, 60 per cent.; salt, drugs, and medicines, 100 per cent.; sugar and tea, 10 per cent. On the other hand, salt-pork is 25 per cent. cheaper, and beef, bread, butter and cheese, about the same in both countries. The average cost of living exceeding that of the same mechanic in England by about 70 per cent., it would appear that in very few cases is the skilled labourer better off in the United States than his fellow-labourer in England, and it should be stated that in the above calculations, 4s. is reckoned as the equivalent of a dollar, because this is the normal rate, but at the time they were made, the actual equivalent of a currency dollar was but little more than 3s. 9d. Ordinary labourers work a longer time than in England, and a labourer working overtime and with steady employment is relatively better off in England. More work is got out of labourers, whether skilled or unskilled, than is done in the old country, and the American "boss" is more exacting, whether at sea or on shore, than the British master; and there is generally less of mutual friendly feeling between master and man than in England, and rules are more stringently enforced in keeping men up to their time. It is to be remarked, however, that in New York and generally throughout the Eastern States, men work with more will and energy than the same class of men at home. Speaking of Great Britain, an eminent American ship-builder who has recently visited all the principal shipyards in England and Scotland writes:—"Their joiner-work costs them twice

as much as it does us; and when you take into consideration the difference in time that the men work here and with us, there is not much difference in the cost of labour. The men here work 51 hours for a week, and are demanding a further reduction of three hours, so you see we can get 20 per cent. more work from our men than they do."

Such is a brief summary of the state of things in this part of the United States. A careful study of the whole of these reports leads but to one conclusion, and that is—that the British workman will not better himself in Europe (quite the reverse), and if he does so in the States, he is an exceptional case, and of course there are many. If he has a little capital and turns his attention to agriculture and makes a judicious selection of locality, he may do well there, and also in most of the British colonies. Only he must remember that the faculty of successful farming does not come by intuition. He must be prepared to bide his time, and learn his trade, and also learn to turn his hand to anything.

QUANTITIES. X.

JOINER AND IRONMONGER.

LAST week I completed these Trades, and I now give the Table, which, though dull work to read, will I think be found very valuable for reference.

TABLE VI.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement:—

Inch deal flooring, laid folding	At per square of 100ft. super.	1½in. deal bead butt and square lifting shutters	"
Do. yellow batten flooring, straight joint	"	Do. bead flush and square back flaps	"
Do. do. do. with splayed headings	"	Do. deal moulded shutters, bead butt at back, hung in three heights	"
Do. do. do. with ploughed and tongued headings	"	Do. proper boxing grounds on splay	"
Do. do. do. dowed	"	Deal wrought and moulded rim screwed to door	At per foot run.
Extra to sinking in floor for mat, with straight joint all round	At per foot super.	Fir in proper door cases.	At per foot cube.
Scribing inch floors to walls, &c.	At per foot run.	Inch deal proper ledged door	At per foot super.
Mitred border to slab in inch flooring	"	1½in. do. framed, ledged, and braced doors, filled-in with inch matched and beaded battens	"
Do. do. to door-mat do.	"	2in. do. framed and braced door, filled-in with V-jointed battens, grooved and tongued, to have quadrant and square corners	"
Close joint to old floor ¾in. x 7in. deal square skirting, including backings	At per foot run.	Do. do. four-panel and square door	"
1in. x 7in. do. terus do. and do.	"	Do. do. do. panels moulded one side	"
1½in. x 9in. do. moulded do. and do.	"	Do. do. do. moulded both sides.	"
1½in. x 12in. do. do. and sunk do. and do.	"	Do. do. do. two-panel bead butt and square door	"
Tongued or mitred angles—extra to	At per No.	Do. do. do. three-panel, bead flush both sides doors, with diminished stiles, upper panel open for glass	"
Housings do.	"	2in. deal three panel bolection moulded and bead flush door, the upper panel open for glass, with moulded movable stops	"
Ramps do.	"	Do. do. do. oval sash door, the two lower panels to be moulded both sides	"
Splayed ends do.	"		
Returned do. do.	"		
Inch deal narrow grounds plugged to walls	At per foot run.		
Inch deal wrought and tongued dado	At per foot super.		
1½in. deal plain pilasters, mitred together, glued and blocked	"		
1½in. diminished columns glued up in narrow widths and closely blocked 12in. diameter	"		
1½in. deal moulded fixed sashes	"		
Do. hung on centres	"		

Deal cased frames, oak sunk and weathered sills, and 2in. deal moulded sashes, double hung with brass axle pulleys, patent lines, and iron weights

At per foot super.

Extra only to semi-circular heads to sashes and frames as above, measured square

"

Deal cased frames, oak sunk and weathered sills, and 2½in. deal moulded sashes circular on plan, double hung, with brass axle pulleys, patent lines, and iron weights

"

Extra only to circular heads and sashes and frames, as last, measured square

"

Deal cased frames, oak sunk and weathered sills, and 2in. deal oval sashes to Venetian windows, double hung with brass axle pulleys, patent sash-lines, and iron weights, the side lights to be fixed lights

"

1½in. deal bead butt and square lifting shutters

"

Do. bead flush and square back flaps

"

Do. deal moulded shutters, bead butt at back, hung in three heights

"

Do. proper boxing grounds on splay

"

Deal wrought and moulded rim screwed to door

"

Fir in proper door cases.

"

Inch deal proper ledged door

"

1½in. do. framed, ledged, and braced doors, filled-in with inch matched and beaded battens

"

2in. do. framed and braced door, filled-in with V-jointed battens, grooved and tongued, to have quadrant and square corners

"

Do. do. four-panel and square door

"

Do. do. do. panels moulded one side

"

Do. do. do. moulded both sides.

"

Do. do. do. two-panel bead butt and square door

"

Do. do. do. three-panel, bead flush both sides doors, with diminished stiles, upper panel open for glass

"

2in. deal three panel bolection moulded and bead flush door, the upper panel open for glass, with moulded movable stops

"

Do. do. oval sash door, the two lower panels to be moulded both sides

"

Do. do. rebated folding doors, in four panels each fold, panels moulded both sides	At per foot super.	Do. proper ledged folding flaps to do.	At per foot super.	Screw nut and joint	At per number.
2 1/4 in. do. framed and braced doors, filled in with lin. battens, matched and V-jointed, and the framing stop-chambered	"	2 in. deal framing panels, moulded on both sides, properly secured to floor and ceiling	"	WATER-CLOSETS.	
Do. do. folding doors hung with swing hinges, lower panels bolection moulded and raised on one side, and flat moulded and raised the other, upper panels open for glass, with large bolection moulding one side and brass screws the other	"	Extra to circular corner in do.	At per foot run	Inch deal seat and riser mademovable, with proper bearers	At per foot super.
Inch deal wrought and framed grounds	"	Labour to rounded edge	"	Do. beaded frame and mitre clamped flap	"
Do. do. do. to segmental heads	"	Do. bead	"	Skirting round seat	At per foot run.
Inch deal wrought oneside and beaded linings, including backings	"	Do. rebate	"	Mitred angles to skirting	At per number.
Do. do. do. tongued to frames and do.	"	Do. rebated and mitred angle to lining	"	Returned ends do.	"
Do. do. do. splayed linings and do. do.	"	Do. rebated and mitred angle to lining	"	Holes cut and dished for seat	"
Do. do. and double beaded and cross tongued linings and backings to opening	"	Wrought fillet	"	Do. cut and beaded	"
Do. do. tongued and staff-beaded lining to segmental heads	"	Deal beaded capping	"	Deal paper box (with description)	"
Do. do. tongued and rounded window board and bearers	"	1 1/2 " " plancere	"		
Do. do. two-panel moulded window back and backings	"	Deal moulding 3 in. girth	"	KITCHEN AND SCULLERY.	
Do. do. moulded elbows and do.	"	Do. architrave do. 4 in.	"	Deal dresser (with full description)	At per number.
Do. do. do. on splay	"	Do. do. do. 5 in.	"	Do. plate-rack do.	"
Do. moulded soffit with splayed ends	"	Do. (circular) do. 5 in.	"		
Labour to groove	At per foot run	Mitres to 5 in. moulding	At per number.	IRONMONGERY.	
Do. to cross groove	"	Deal moulded cornice, 6 in. girth	At per foot run.	Including screws and fixing—at per number	
Do. to groove in oak	"	6 in. girth	"	Pairs Butts (according to size, stating the smallest sizes first, and keeping the cast and wrought-iron separate, also the brass)	"
Do. to splayed cutting to inch linings	"	STAIRCASES.	At per foot super.	Do. Rising-butts (do.)	"
Rotched, returned, and rounded ends to window boards	At per number	3 1/4 in. deal wrought risers	"	Do. Back-flaps (do.)	"
		Do. do. and beaded fascia	"	H or L hinges do.	"
		Inch do. do. wrought treads and risers, glued, blocked, and bracketed, with rounded nosings and strong fir carriages	"	Cross garnet hinges	"
		1 1/4 in. do. do. do. with moulded nosings and do.	"	Patent swing hinges for 2 in. doors, and letting in floor	"
		Do. do. do. in winders	"	Pairs steel centres on plates	"
		Do. plain wall string	"	Necked bolts (stating size)	"
		1 1/4 in. do. moulded do.	"	Barrel do., with brass throw (do.)	"
		Do. do. do. cut and mitred outer string	"	Brass flush do. (do.)	"
		2 in. deal moulded nosing	At per foot run.	Gothic cast-iron door-knob	"
		3 in. deal wrought and square framed newel	"	Do. knocker	"
		3 1/2 x 3 in. deal moulded handrail	"	Iron barrel door-chain	"
		lin. deal square bar balusters	"	Norfolk latches	"
		Housings, treads, and risers to close string	At per number.	Brass-cased pulpit latches	"
		Do. do. winders do.	"	Mortice latches	"
		Do. treads and risers to cut and mitred outer string	"	Cupboard locks	"
		Do. do. winders do.	"	Dead locks (stating size)	"
		Do. treads and risers to newel	"	Iron rim-locks and brass furniture (do.)	"
		Do. strings to do.	"	Mortice locks and do.	"
		Do. handrail to do.	"	Rebated do. do. do.	"
		Do. for balusters	"	Two-bolt mortice lock and do. do.	"
		Tongued and mitred angle to wall-string	"	— patent lock, p.c.	"
		Extra to ramp in moulded wall-string	"	21s.	"
		Do. do. in cut and mitred outer string	"	Sets white china furniture	"
		Cut and mitred brackets to steps	"	Do. black and gold do. do.	"
		Returned and mitred moulded nosings to fliers	"	Pairs, porcelain finger plates	"
		Do. do. winders	"	Brass spring sash fastenings	"
		Extra to rounded end to step and riser	"	— patent do. do.	"
		Extra to curtail end to step	"	Brass knob turn-buckles	"
		Do. splayed ends to deal handrail	"	Do. thumbscrews	"
		Do. end of handrail cut and pinned	"	Iron stubs and plates	"
		Do. Mitred cap do.	"	Do. shutter lifts	"
		Turnings to newel	At per number.	Brass do. latches	"
		Cut pendants	"	Brass quadrant regulator - fastenings, with pulleys, lines, and hooks, complete to fanlights	"
		Cut and chamfered caps	"	Leather straps and brass buckles and plates to spring doors	"
		Ornamental newels (with description)	"	Iron tongue and groove	At per foot run
		Do. balusters (do.)	"	Wrought iron balusters	At per number
		Extra to ramp in handrail	"	Do. do. newel (twisted or otherwise)	"
		Do. wreath do.	"		
		Do. scroll end do.	"		

I have now completed seven trades, and propose next week beginning the Mason. I beg to say, in answer to a correspondent, that it is proposed to treat of repairs hereafter; as it is thought advisable to keep the admeasurement of new work separate. Such a method is less confusing to the reader.

B. F.

THE PRICE OF TIMBER.

THERE is no prospect of any decrease in the price of timber. On the contrary, the highest rates have yet to be attained. The recent frost having suspended building operations, there has not been much demand of late, and builders will only buy as they require stock. Advices from the principal ports all agree that the foreign and colonial houses are asking and receiving prices greatly in advance of what was supposed would be asked three months ago, and the stocks being low at the docks, and chiefly in the hands of timber merchants, very few sales here by the cargo, have been effected. But when best bright pine are at from £22. 10s. to £24. 10s., and other deals in proportion, it is certain that in due time matters will rectify themselves by a natural law; for although there is no doubt about the price of European and American timber being yearly increased by the additional expense incurred owing to the forests receding from the ports, &c., still such advances as we are now having seem out of all proportion to the most liberal estimate of such yearly advance in cost. Freights, too, are rising—Dantzic 14s. 9d. to 15s. per load, and Memel, 15s. 9d. to 16s.; Quebec, 82s. 6d. to 85s. per standard. It must be remembered that, for instance, Sweden and Finland export wood to other countries than our own, and if Great Britain gives the highest price (and it looks like it), she will divert the trade from other countries, which really will not be able to afford such prices. Take, for instance, Gothenburg. The latest official reports give the following exports for 1871, no return as yet being at hand for last year. Her exports were 7,367,505 cubic feet, shipped to the following countries:—

England	5,097,111
British Colonies	299,516
France	1,321,370
Spain	340,608
Brazil	114,173
Belgium	74,882
Other Countries,	119,845

7,486,505 cubic feet.

and also about £103,000 worth of square timber and other wood goods. There is no similar return for Finland, but it is a fact that the prices in the interior have gone up at least 30 per cent. within seven years. Last year the value of a red pine tree 9 inches in diameter, 24ft. from the root, was 4d. per fathom; 10 inches diameter, 6d.; 11 inches, 7d.; 12 inches, 8½d., with an advance of 2d. for an additional inch. Towage from Haapakoski to railway station at Lahtis, is 4d. per tree, and railway carriage from Lahtis to Helsingfors about 1s. 8d. per tree. This shows what is meant by the forests receding from the ports, and that in Finland at least there are two carriages incurred before the goods come to the sea. The information is so curious that one would wish to have more of it; but this is all public documents afford, and more of course than could be obtained from any other source. The following is a list of prices for the ordinary timber and deals used by builders and contractors. All per Petersburg standard:

	£	s.	d.	£	s.	d.
Finland first quality deals	12	0	0	13	0	0
Do. battens	10	0	0	11	5	0
Swedish mixed yellow	13	0	0	15	0	0
Do. third	11	10	0	12	15	0
Do. fourth	10	0	0	11	5	0
Christiania best yellow and white	10	10	0	13	10	0
Archangel best yellow	14	15	0	15	10	0
Petersburg best yellow	12	10	0	13	10	0
Wyburg best yellow	10	10	0	11	15	0
Riga White	10	10	0	11	10	0
Pitch pine planks	15	10	0	16	10	0
Quebec best spruce	11	10	0	12	10	0
Do. second	9	10	0	10	10	0
Do. third	9	0	0	10	0	0
Do. best floated pine	20	0	0	21	10	0
Do. second	14	10	0	16	15	0
Do. third	10	10	0			
Do. best bright	22	10	0	24	10	0
Do. second	15	15	0	16	15	0
Do. third	10	10	0	11	5	0
Timber per load.						
Swedish	2	12	0	3	0	0
Riga	4	2	6	4	5	0
Baltic Crown	5	5	0	6	0	0
Do. good middling	4	0	0	5	0	0
Do. common middling	3	15	0	4	15	0

Quebec yellow pine	4	10	0	5	5	0
Do. small	3	5	0	4	0	0
Do. oak	7	0	0	9	5	0
Flooring boards per square of lin.						
Frederickstadt best yellow	0	12	6	0	14	0
Do. white	0	10	6	0	11	9
Do. seconds	0	8	6	0	10	6

There is not much alteration in mahogany. Honduras is quoted (cargo average) at 7½d. to 9d. per foot superficial; Mexican, 7½d. to 8½d.; Tobasco, 8½d. to 9d. Cuba, 8d. to 1s. 0½d.; S. Domingo, 8d. to 1s.; Italian Walnut, 4½d. to 5½d.; Black Sea, 4d. to 5d.; Canadian, 4½d. to 5d.

It is to be hoped that these prices will not fall heavily on builders who have large contracts on hand, and no merchant will guarantee (or seldom will) that the prices shall continue firm if his offer be not closed with in due course. The low figure at which deals went not so long ago no doubt induced many consumers to buy rather largely, and this may see them through their present engagements. In future tenders they must be careful to look forward to a certain advance on present prices, but how matters will stand as to timber at the close of the year no opinion can be formed just at the present moment, when so much uncertainty exists. Prices will have to come down again, and the question is—When?

S. GILES'S CHURCH, EDINBURGH.

S. GILES'S CHURCH, Edinburgh, was reopened on Sunday last. The following notes of the restoration are from the *Scotsman*:—The first step in the process of restoration was the removal of the heavy galleries which encumbered the interior. Then came the discovery that, to crown other atrocities, the solum of the building had been converted into a charnel-house; and a good deal of expense had to be incurred in clearing out the cartloads of human bones which had polluted the air for generations. Under the superintendence of Mr. Wm. Hay, architect, the work of restoration now proceeded in earnest. The whole of the stonework was scraped clean, unsightly holes which had been made in the pillars for the reception of gallery joists were neatly filled up, and the ornamental work about their bases, chipped off long ago, to make room for pews, was restored. The niche in the north wall, which marks the tomb of the Napiers, has shared in the general overhaul. In the north-west corner, an ancient doorway, enriched with carving, has been opened up to give access to the vestry, which has been rearranged and improved. The dais, or raised floor at the east end of the church, has been retained. On the east wall, immediately over the dais, a new feature has been introduced in the shape of an ornamental arcade, which, with its basement, fills up the whole space between the floor and the sill of the great window. This structure, which is wrought for the most part in Caen stone, consists of seven Gothic arches, cusped underneath, and supported on cylindrical shafts of green marble with foliated capitals. The arches are inclosed within angular pediments, whose sides, meeting just over the capitals of the green marble pillars, are supported by richly-carved bosses or figures of winged angels, over each of which, again, is placed a projecting niche flanked with round shafts, and terminating atop in a cluster of crocketed pinnacles. The spandrels are filled in partly with diapered carving, partly with angelic figures blowing trumpets, sculptured in low relief. A foliated cornice runs along the top, and above this rise the pinnacles of the niches and the finials which surmount the pediments, presenting a striking outline against the window light. Against the first pillar on the south side of the dais is placed the pulpit, which is also constructed of Caen stone. Like the arcade, this has been executed by Mr. Rhind, sculptor, from designs furnished by Mr. Hay. Resting on a clustered shaft with detached columns of green marble, the structure is octagonal in form, each corner showing a canopied niche filled in with an angelic figure in the act of unfolding a scroll. The sides are worked into deep Gothic panels with cusped arches, the spandrels, or upper corners, being filled with foliated ornament, in which the leaves of the oak, vine, and thistle afford an agreeable variety of tracery. The pulpit is reached by a short winding staircase supported on pillars.

Within the main entrance has been con-

structed an ornamental porch of carved oak, the east side of which forms the back of the new royal pew. Raised on a platform, the pew comprises a range of seven stalls, that in the centre being considerably larger than the others. The partitions separating the stalls, which rise only to the height of the elbow, exhibit in front a round shaft carved with a diapered pattern. Similar shafts are carried up the back of the pew, and from these spring carved brackets, which project about 12in., and support a range of canopies over the stalls. These canopies take the form of cusped Gothic arches, terminating above in ornate finials. Between the arches are a series of small niches finished off with pinnacles; and the upper part of the frontage is a pierced screen, surmounted by a foliated cornice, bearing a row of *fleurs de lis*. The whole of the woodwork is in oak, and (including the carving, for which all designs were made by Mr. Hay,) has been executed by Messrs. John Taylor and Son, Princes'-street.

THE RECONSTRUCTION OF THE HOTEL DE VILLE.

ON Wednesday week the exhibition of the twenty provisionally-accepted plans for rebuilding the "Hotel de Ville" was thrown open to the public. A correspondent of the *Globe* divides the plans into three classes; the plausible, the effete, and the utterly ridiculous. To begin with the last, M. Gerhard, with his pyramid, bears away the palm. It rises from the centre of the block of buildings, culminating in a small square balcony, on which possibly the senators are expected to take the air; the façade, of course, is dwarfed, and the high-pitched roofs (which are common to all the plans) are annihilated altogether. M. L'Heureux devises three immense blocks, like the Westminster Hospital in London, divided by strips, one story high, over which you are supposed to see great towers behind. The effect is like that of a mediæval village run to seed. M. Crepinet makes a façade much as it was before, with the inevitable fungus growing out of the centre; in this case it takes the form of a gigantic clock-tower, which would be calculated entirely to dwarf the Tour St. Jacques close by, besides reducing the Hotel de Ville proper to the condition of the base of a flat candlestick. Some people approve this plan, as all the offices are intended to communicate with a central hall under the tower, whereby circulation would be facilitated. But why not do this without the superincumbent monstrosity? One gentleman's ideas never rise beyond doors, of which he gives us half-a-dozen, which open and shut for a dozen that do not, whilst another flanks the Boccador block with bare wings, which resemble more the characteristics of a provincial hospital or lunatic asylum than anything else. The two best plans are those by MM. Magne and Vaudremer. The former would raise the entire edifice upon a flight of steps, giving it the grandiose aspect which the former one is said to have possessed before the raising of the soil brought the doors to a common level with the square. The centre would be devoted to a huge covered courtyard, which would be boarded over at a given height on gala nights (as the Opera is treated for masked balls) presenting a magnificent vestibule to the dancers for promenade. Unfortunately, from all sides except the front one, the glass roof is allowed to tower above the walls, as though the hideous *Halles Centrales* had been encased in an ancient monument. It is obvious that the use of iron and glass is incompatible with the architecture of Francis the First, and yet these materials form a concomitant in the ornamentation of nearly every design. M. Vaudremer, less ambitious than M. Magne, reconstructs the old building very much as it was before, minus the Gothic anachronisms of Louis Philippe, who seems to have been to French architecture what the Prince Regent was to ours. M. Vaudremer's estimate is for ten millions only, whilst that of M. Magne is for sixteen, which detail may possibly turn the scale. Almost every architect provides three courtyards. This seems wanton waste of space. One is necessary for business purposes, and possibly another for setting down guests on fete-nights, but what of the third? Where they are all so ugly, surely one might be merged into increasing the width of passages and drawing-rooms. According to the decorative designs, they all look like markets, whether for flowers or for the sale of statuary, and when bare they remind one forcibly of the Paddington terminus.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NORTHCHURCH SCHOOLS, BERKHAMSTEAD.

These schools, which form the subject of one of our lithographic illustrations, were built a few years since, and are constructed of flint walling, with Bath stone dressings. They are covered with plain red roofing tiles. They will accommodate over 150 children on the scale laid down by the Committee of Council. The residence is built in buff and red brickwork. The contract was about £1,450, exclusive of gas-fittings, fences, and other extra work, £200—total, £1,650. The whole of the expense was defrayed by John Loxley, Esq., of Norcott Court. The school-rooms are furnished with open fireplaces and movable desks. The rooms are divided by a wooden partition made movable, so that they may be thrown into one for lectures and meetings. The floors are of Mr. White's special description of wood block. This flooring is dry and noiseless, and has the advantage of being easily replaced in such parts as have the most wear. Mr. W. White, F.S.A. is the architect.

MR. BURGESS'S DESIGN FOR THE CATHEDRAL OF S. MARY, EDINBURGH.

We this week give two other of Mr. Burgess's series of beautiful designs for this cathedral. We gave the west end view on the 14th of February, and transverse sections and details the following week.

MIDDLE-CLASS SCHOOLS FOR GIRLS.

We are again able to accompany our report of the proceedings at the Architectural Association with illustrations exemplifying the paper read. The paper on Friday evening was "On Middle-class Schools for Girls," by Mr. E. C. Robins, F.R.I.B.A. We publish plans of the Camden Middle-class Schools for Girls, which have been prepared by Mr. Robins; and also plans of a boys' school at Lucerne. Both of those buildings will be found described in our report on p. 313, the former at some length, the latter more briefly, being somewhat foreign to the immediate subject of Mr. Robins's paper. A perspective view, and ground and first-floor plans, of another building which was described in Mr. Robins's paper, namely, the College for Daughters of Congregational Ministers, at Milton-next-Gravesend, were published in the BUILDING NEWS of September 29, 1871, Vol. XXI, p. 235.

PRACTICAL DESCRIPTIONS OF FIGURE-SCULPTURE.

In accordance with our promise a fortnight ago, we publish this week a report of the first of Mr. J. F. Redfern's lectures at the Architectural Museum on Figure-sculpture, and, as will be seen, we have reproduced by means of photo-lithography the drawings used by Mr. Redfern in illustration of his lecture. The various figures, &c., and their characteristics will be found described more or less fully in our report on p. 315. We hope to publish reports and illustrations of the remaining two of the interesting course of lectures by Mr. Redfern.

THE HALLAMSHIRE SCHOOL-DESK.

A VERY handy school-desk under the above title is being manufactured by Messrs. Thomas Redmayne and Co., of Sheffield, and is worthy of the attention of all interested in schools and school requirements. It is, we believe, in use in the Sheffield Board schools, and in those of other towns. By a simple and easily-managed arrangement, the desk can be quickly converted from a sloping writing-desk, with form attached, into a comfortable seat with a good support for the back of the sitter, an additional convenience being that the seat can be made to face either way; or to a perfectly flat table, about fourteen inches broad; or, again, into a broad table with seats down each side, suitable for school-treats and similar gatherings. These alterations are easily and quickly made, the use of springs, screws, and other complicated mechanical arrangements being avoided, and a simple movement of the hand all that is necessary. The form and workmanship of the desk are good, and, while neat, it is calculated to withstand rough usage.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—The seventh meeting of the present session of the Liverpool Architectural and Archæological Society was held on Wednesday week, Mr. Barry, president, in the chair. The meeting determined to petition Parliament in favour of Sir John Lubbock's Bill for the preservation of national monuments.—Mr. Joseph Boulton offered some suggestions on the application of dry ashes to constructional purposes, and produced several blocks, apparently of great firmness, produced by the admixture of Portland cement and dry ashes. The substance thus obtained, he showed, was suitable either for walls, lining sinks and cisterns, or for facing dock walls.—Mr. Lewis Hornblower afterwards read a paper describing his proposed fireproof construction of houses.

OXFORD ARCHITECTURAL AND HISTORICAL SOCIETY.—On Saturday week the first walk for the present term was taken by the members of the above Society. Oriel College was first visited, and then S. Mary's Hall, of which the Principal gave an interesting account. The original house was a residence for the Rector of S. Mary's. It was then enlarged by the addition of another hall, called Bedell Hall. The present hall or refectory with the chapel above it, and also the buttery and rooms above it, were erected in the time of Dr. Saunders, who was Principal from 1632 to 1644. Dr. Hudson, Bodley's Librarian and Principal of the Hall from 1712 to 1719, built new lodgings for the Principal, and these were much improved and added to by the celebrated Dr. King, who was Principal for 44 years. Dr. Hampden, Bishop of Hereford, and Dr. Bliss, formerly Registrar of the University, Principals of the Hall, did much to improve the buildings, and the present Principal follows in the same path, and is now enlarging and remodelling the Chapel at a cost of £1,000. The roof is already completed, and so is the east window, which is the work of Mr. Clutterbuck, of Stratford, Essex. The chapel is expected to be completed at Whitsuntide. The first evening meeting of the members took place in the lower room of the Taylor Building on Monday week, the President of the Society occupying the chair. Mr. Trevor Fielder, of S. John's College, read a paper on Llanthony Priory, Monmouthshire. This was succeeded by one on North-Stoke Church, Oxfordshire, read by Mr. W. Scott Champion, architect, of Russell-square, London. Votes of thanks to these gentlemen were unanimously accorded; and after Mr. James Parker had made some interesting remarks, referring to Mr. Champion's paper, the proceedings terminated.

ROYAL ARCHÆOLOGICAL INSTITUTE.—At the monthly meeting on Friday last, Mr. Hankey exhibited a series of playing-cards, on which were engravings of events in the conspiracy of Titus Oates. These had been in the possession of a family in Sussex for about 80 years. Mr. Bernhard Smith exhibited nine words illustrating those shown on a previous occasion, inscribed "Edwardus Prius Angliæ." A paper was read by Mr. J. G. Waller on wall paintings recently found in churches, especially those in South Leigh, Oxfordshire, of which he gave a detailed account, and critically examined the restoration that church had lately undergone. The subject was illustrated by photographs. Supplementary observations upon the silver oar as a type of Admiralty jurisdiction were also read, and was followed by a discussion, in which Sir E. Smirke, the chairman, and other members, took part. The provisional notification of the annual congress this year at Exeter has been prepared, so that the coming event promises interest as high as any of its memorable predecessors. Exeter has long had many special claims on the Institute, not only that the city is one of the most ancient in the kingdom, and of great historic and antiquarian interest, but because also the surrounding district is more than usually attractive to students of the early past. The local secretary is Sir John Maclean, and memoirs have been promised by Mr. G. T. Clark, Archdeacon Freeman, Dr. Guest, Professor Stubbs, Mr. E. A. Freeman, Rev. J. Earle, Sir Gilbert Scott, Sir J. D. Coleridge (her Majesty's Attorney-General), Canon Venables, Rev. Prebendary Scarth, Mr. Ormerod, and others eminent in their respective departments of antiquarian knowledge. The date of the meeting is fixed for the 29th July, and the proceedings will continue until the 5th August. The president of the meeting will be the Earl of Devon.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—At the usual meeting of this Society, on Monday,

Mr. James Drummond, R.S.A., read a paper on Mediæval Processions, which was illustrated by a large and beautiful series of engravings. Mr. Drummond remarked that mediæval triumphal processions illustrated the costume, armour, and habits of the people of different nations and at various dates with a correctness which was often looked for in vain in other quarters. Between triumphs and processions he drew a line of difference—under the former classing such as had not in reality taken place, but which represented correctly the armour, costumes, &c., of the period delineated; the other being much more interesting, as having been a reality, and depicted by one who witnessed, or who perhaps took a share in, the pageant. Of the former class, the best known were the Triumph of Maximilian I., a series of 135 large woodcuts showing forth the glory of the reign of the Emperor. Although these cuts were executed between 1515 and 1519, yet they were not published as a set till 1796, the blocks having been scattered after Maximilian's death, and were only brought together again and deposited beside the original drawings in the Imperial Library at Vienna in the year 1779. A good idea was given of the gorgeousness of the original drawings on vellum, and which are supposed to be by Hans Burgmar, Mr. Drummond's copy of the book having some 50 of the plates painted and emblazoned from the originals. Albert Dürer's triumphal car consists of eight plates. The Emperor is seated on this highly-ornamental car attended by female figures representing Justice, Truth, Clemency, and other virtues, holding towards him triumphal wreaths. The original drawing is in the British Museum. There was also shown De Hooghis' Triumph of John Sobieski as King of Poland in 1614. The triumph of Julius Cæsar by the well-known Italian engraver in wood, Andrea Andreani, after the famous pictures now at Hampton Court by Andrea de Mantegna, was also exhibited. These wood-cuts were published in 1598, and are admirable specimens of "block" printing, a process which gives the effect of clever drawings in monochrome. The original etchings by Mantegna for three of the pictures were shown by Mr. Laing. Next came processions proper, and the one for which Mr. Drummond claimed most attention was the masterly series of etchings by Nicolaus Hogenberg of the pageant at Bologna in 1529, on the occasion of the crowning of Charles V. by Pope Clement VII. as King of Italy and Lombardy. This, it seems, is of the greatest rarity, and claims a high place, not only as an artistic performance, but as a trustworthy record of this important meeting, and presents us with an interesting gallery of historical portraits of many who figured prominently in that stirring period. It also illustrates the armour, costume, and some of the customs of the times. It was dedicated to Charles V., who seems to have paid for its execution. Many other triumphs and processions were exhibited, and some rare and valuable books were kindly sent by Sir William Stirling Maxwell and Mr. D. Laing to illustrate those and tournaments which Mr. Drummond included with these historical pageants, showing among others the rather scarce woodcuts by Lucas Cranach of the great and the small Tournament.

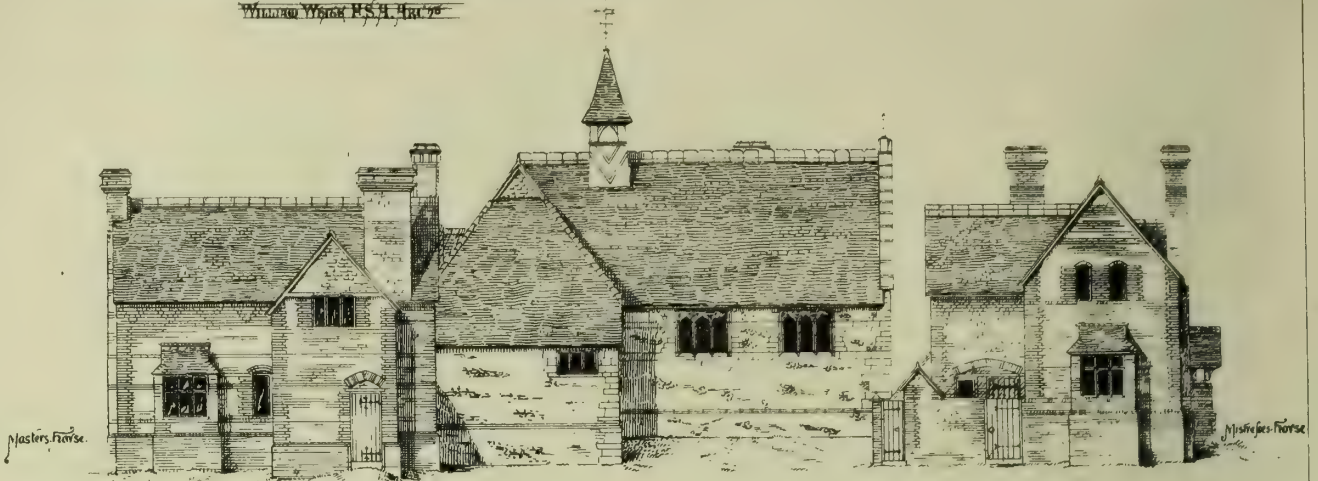
WARWICKSHIRE ARCHÆOLOGICAL FIELD CLUB.

—The annual winter meeting of this Society was held on Thursday week. Mr. J. Tom Burgess read a paper on Roman Warwick, especially with reference to some Sepulchral tablets of the Roman period found in Warwick Castle. The members of the club dined together in the "Woolpack" Inn, after which the routine business of the club was discussed and several new members proposed. The spring meeting was fixed for the Dasset hills, on May the 20th, to meet the Dudley Club. The summer meeting will be held at Northampton, in June. Several places were mentioned as suitable neighbourhoods for the Archæological section. Claverdon, Wootton, Waven, and Beadesert were suggested, subject to the approval of the Archæological secretary. The autumn meeting was fixed for Banbury.

The Board of Trade have reported to Parliament that they have approved applications for provisional orders for the construction of piers at the following places:—Bouldnor, Isle of Wight; Broadstairs, commencing near Chandos-green; Langer-common, Felixstowe, Suffolk; Filey; Fishguard Bay, Pembroke; Newlyn and Tolcarne, Cornwall; East Loch, Tarbert, Island of Harris; Fraserburgh, Aberdeen; Kirk Point, Lochaline, Argyll; Sandhaven, Aberdeen.

SCHOOLS AND TEACHERS' RESIDENCES, DORCHESBOROUGH.

WILLIAM WOOD, R.S.A. ARCHT.

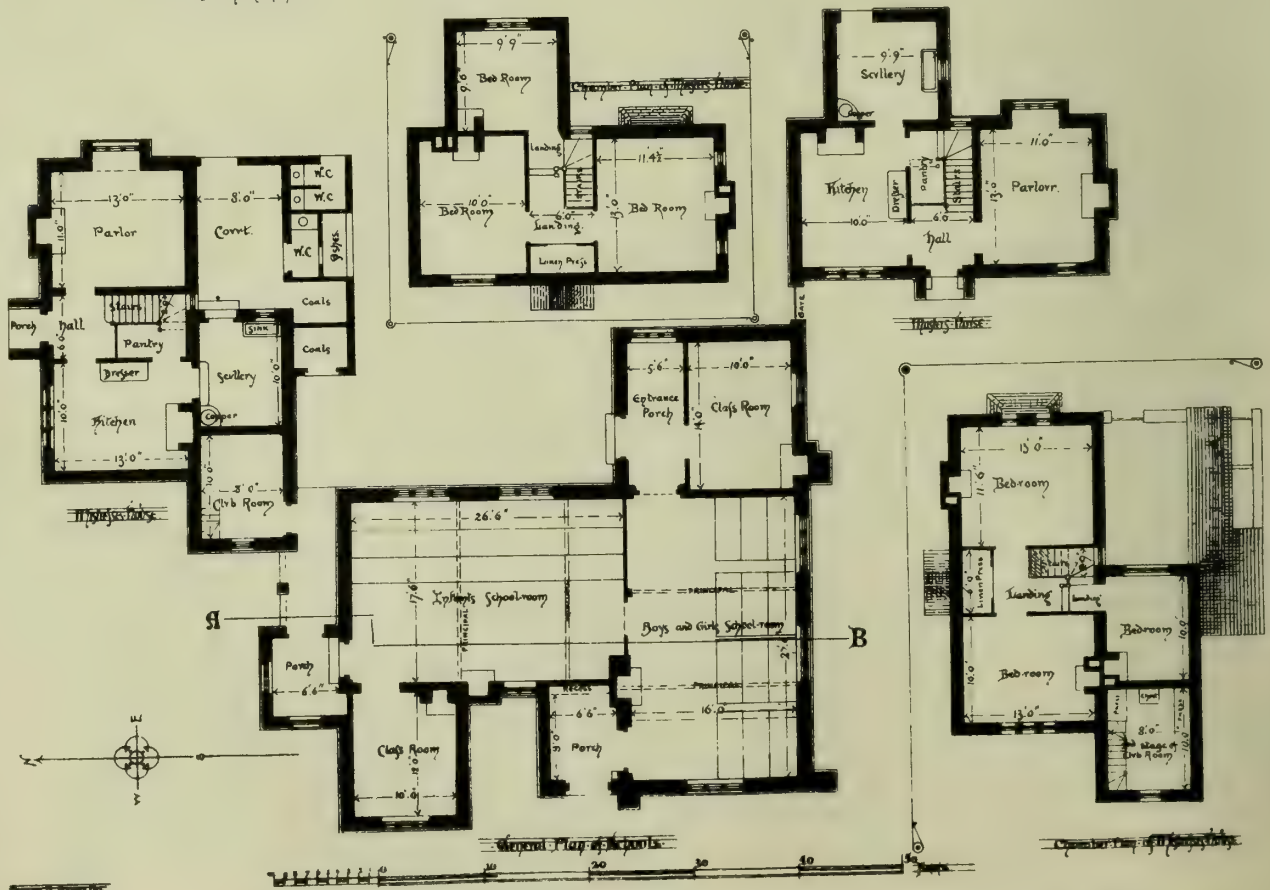


East Elevation



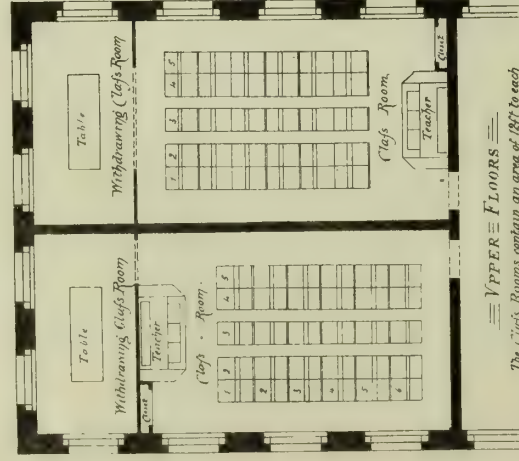
South Elevation

North Elevation



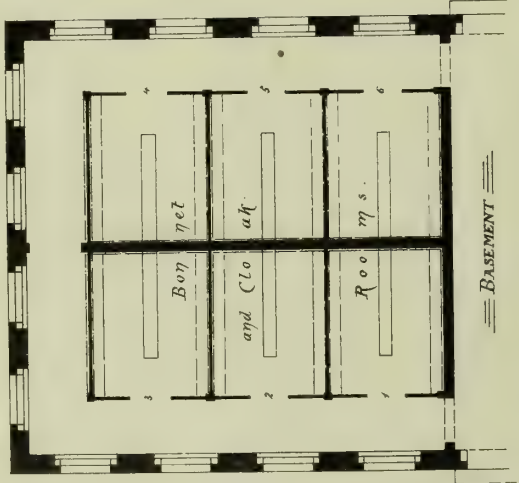
MIDDLE CLASS SCHOOLS FOR GIRLS. E.C. ROBINS ARCHT.
DETAILS OF CLASS AND CLOAK-ROOMS.

== CLASS-ROOMS FOR 50 ==



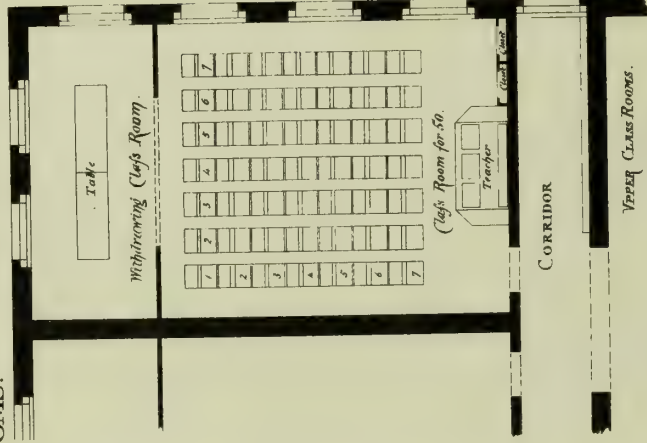
== UPPER FLOORS ==

The Girls Rooms contain an area of 187' each



== BASEMENT ==

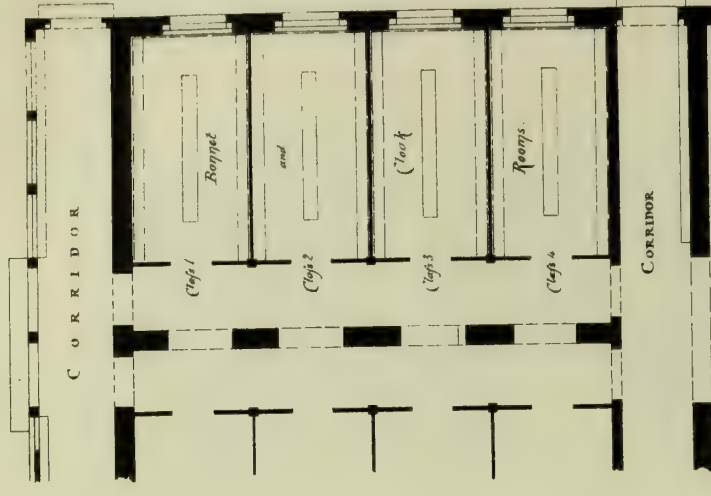
CLASS ROOMS FOR 50



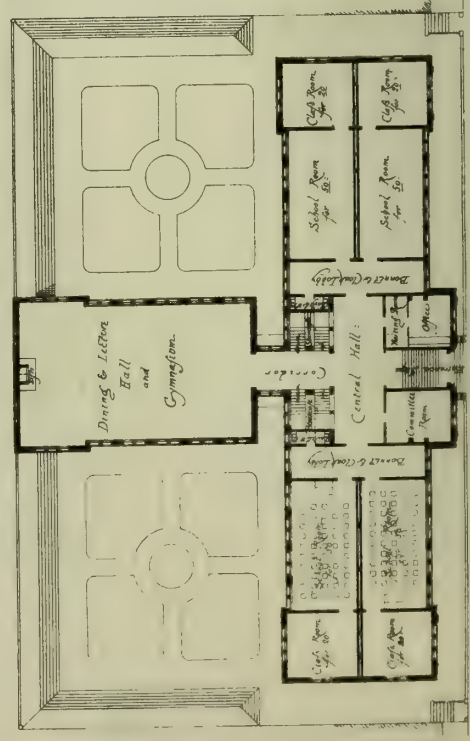
CORRIDOR

Upper Class Rooms.

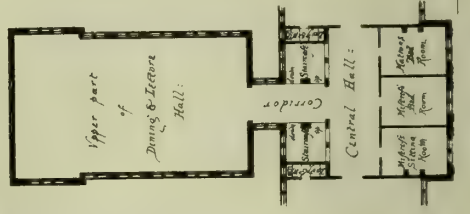
BASEMENT



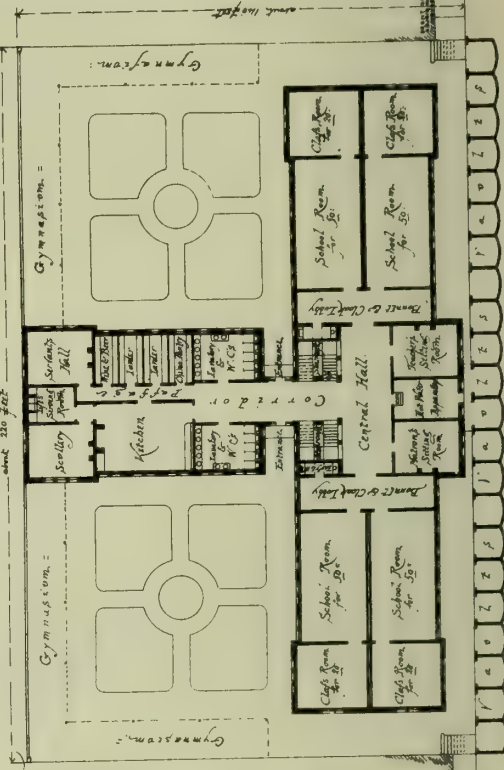
THE CAMDEN SCHOOLS, on the SWEDISH SYSTEM



First Floor Plan



Central portion of Second Floor Plan.

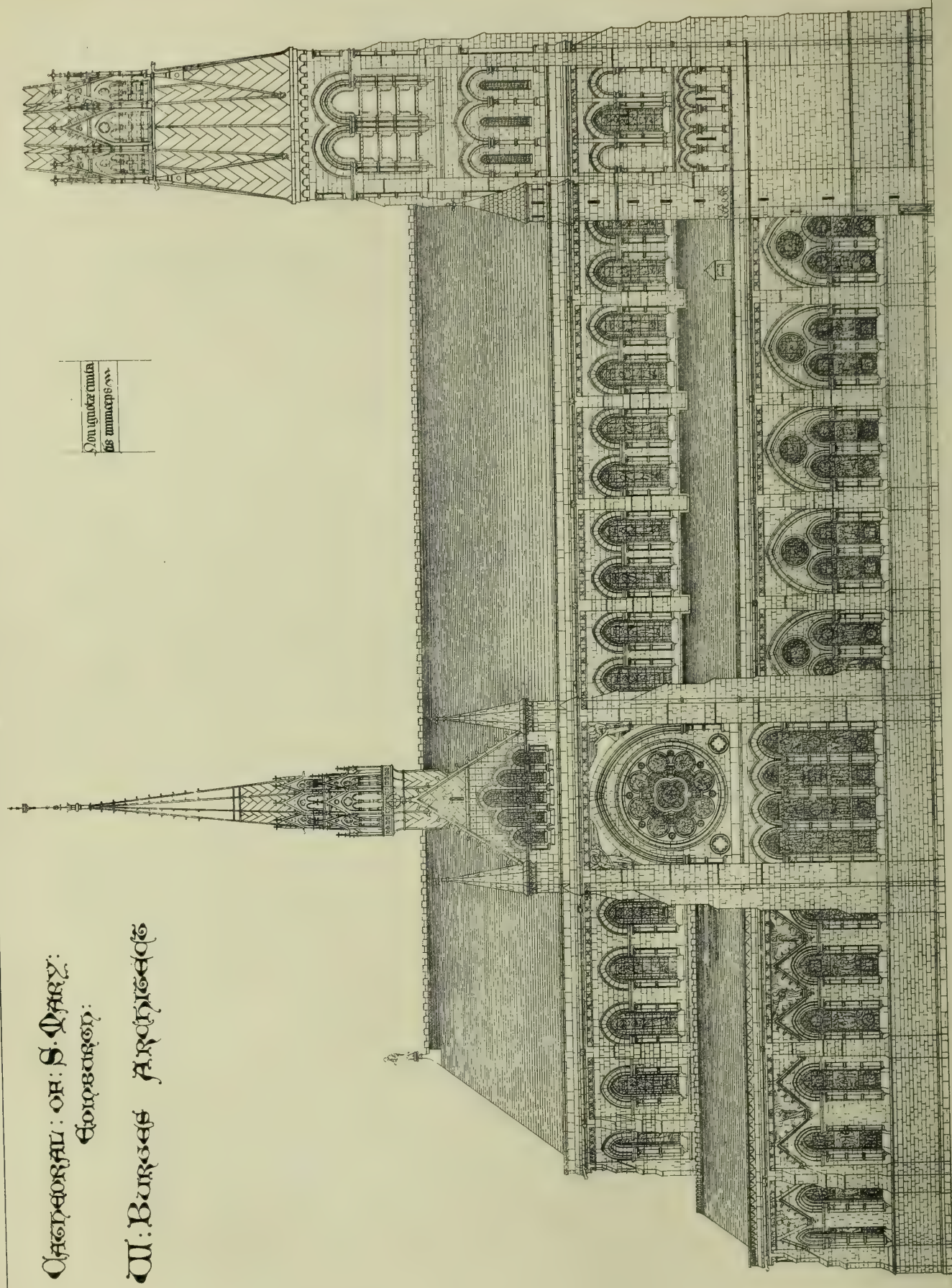


Ground Floor Plan

Boys' School at LIVERNE.

CATHEDRAL OF S. MARY:
 GROSVENOR:
 W. BURGES ARCHT.

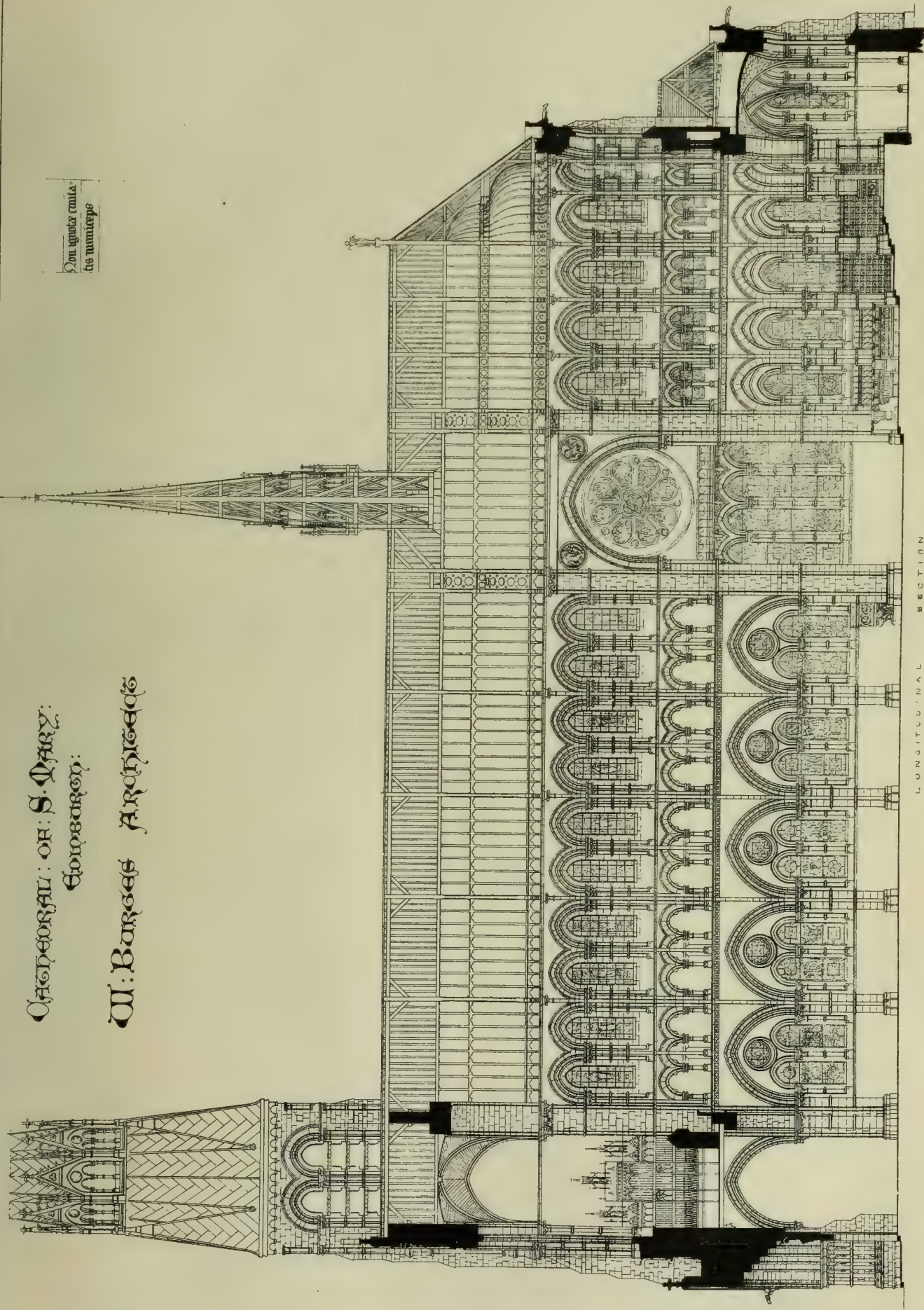
Don quod amia
 de munda



SCALE
 1" = 10'
 NORTH
 ELEVATION

CATHEDRAL OF S. MARY:
GROSVENOR:
W. BARRETT ARCHT.

Don ignota milia
de munitis



LONGITUDINAL SECTION

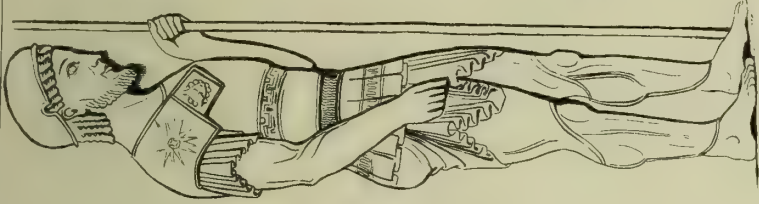


(4)

RELIEF FROM THASOS. LOUVRE



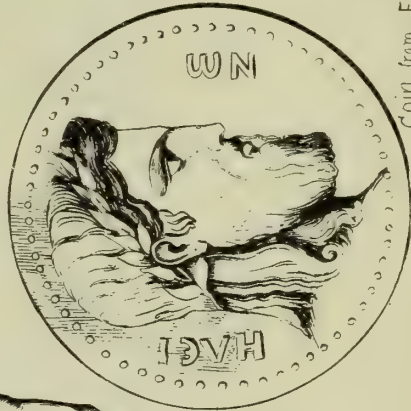
(b)



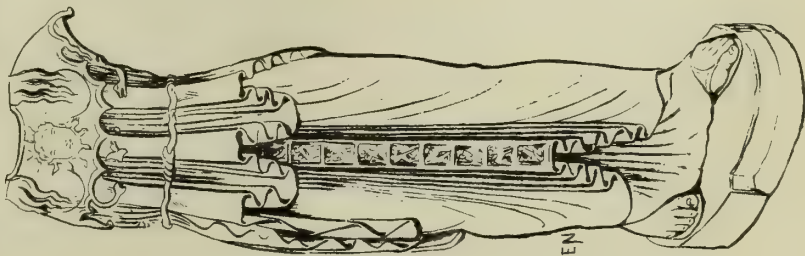
MONUMENT OF
ARISTION.
ATHENS



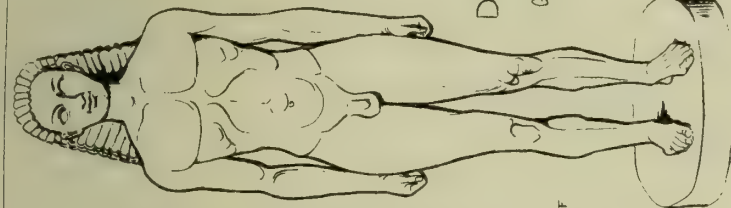
(6) Disk Thrower
after MYRON



Coin from Elis
(7)

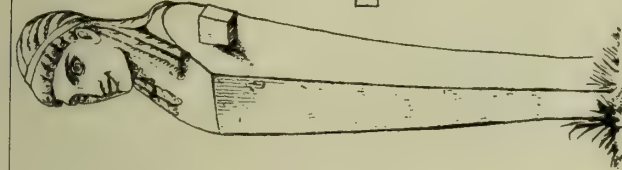


PALLAS
DRESDEN
(5)

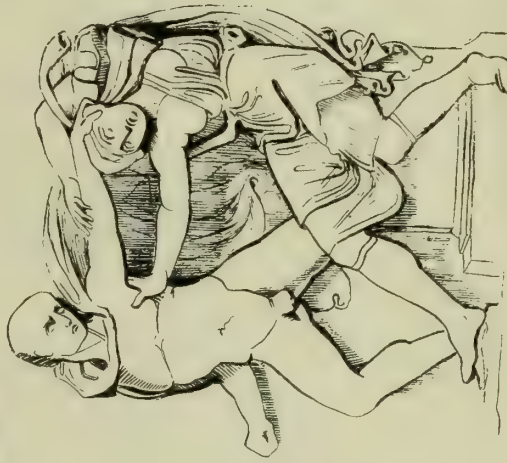


DEDALIAN APOLLO
Glyptothek, Munich

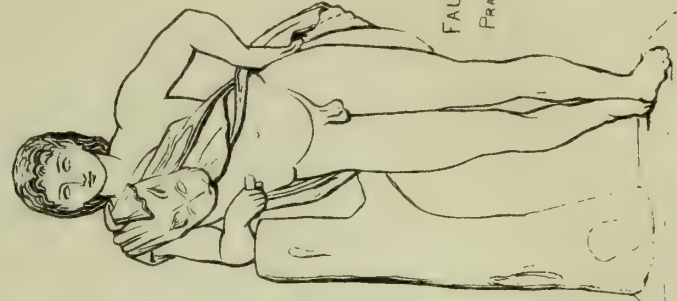
(2)



DEDALIAN
Terminal
(1)



Frieze, Phigalia
(8)



FAUN after
PRAXITELES
(9)

SCHOOLS AND BOYS' RESIDENCES.

Northampton.

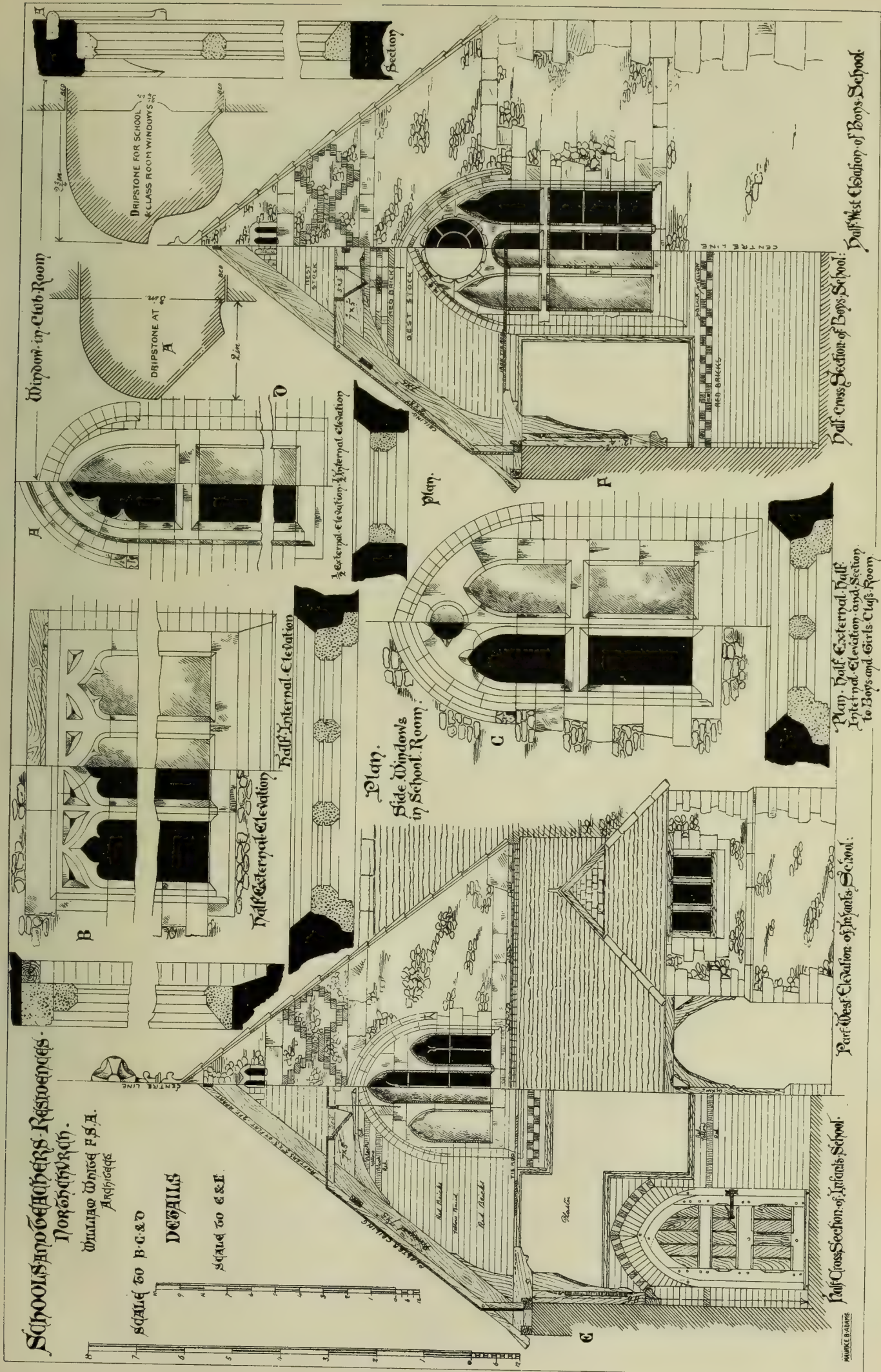
William White F.S.A.

Architect

SCALE TO B.C. & D.

DETAILS

SCALE TO C & E.



Half West Elevation of Boys' School.

Plan. Half External Half Internal Elevation and Section to Boys and Girls' Club Room.

Part West Elevation of Girls' School.

Half Cross Section of Girls' School.

ARCHITECTURAL ASSOCIATION.

ON Friday evening last, at the ordinary fortnightly meeting of this Association, Messrs. T. Maltby, W. P. White, C. J. Köhler, and W. J. Buxton were elected members of the Association. On the motion of Mr. Paice, one of the hon. secretaries, the best thanks of the Association were accorded (1) to Sir G. G. Scott, for his kindness in allowing the members to visit the new Home and Colonial Offices a month ago, and (2) to Mr. Verity, for permitting the members to visit the "Criterion," and for conducting them over the works in person. It was announced that the next visit to buildings in progress would be made to-morrow (Saturday), the 15th inst., to the new buildings now being erected at Burlington House for the learned societies. Votes of thanks were also accorded to the gentlemen who had assisted in making the recent members' *soirée* a success, (especially Mr. Lee, the Secretary of the Entertainment Committee); to the Society of Lady Artists for the use of their gallery on the occasion of the *soirée*; and to Mr. Roger Smith, for his recent course of lectures on Professional Practice.

Mr. E. C. ROBINS, F.R.I.B.A., then read a paper on

MIDDLE-CLASS SCHOOLS FOR GIRLS.

MR. ROBINS, in the course of some prefatory remarks, said that although there was a paucity of examples of importance which could be cited in illustration of his paper, the subject was one which at the present time was engaging the attention of the thoughtful. Having briefly reviewed the great advance that had taken place in the provision for education of the people during the last half century, he pointed out that this advance had been rather in the direction of primary than of secondary education, for while the primary education of the School Boards gave equal advantage to the children of both sexes belonging to the lower classes, the advance in secondary education had been chiefly provided for the benefit of boys, to the comparative exclusion of girls. Thus while the boys of the middle classes were amply provided for, the girls were left entirely to the tender mercies of private tuition, good, bad, or indifferent, as the case might be. We had no Eton, Harrow, or Westminster for girls, and it was only quite lately that a step had been taken in this direction. The college at Hitchin and the Camden Schools were institutions of yesterday, and were but the germs of what should have been a vast system. Of course there was an abundance for girls' schools, so called; indeed, their name was legion, and they exceeded in number those for boys, but they contained fewer pupils and were almost exclusively small private schools. Of the exceptions he proposed to say a few words concerning some of the best, and then to consider what was the fittest form for a building for the purpose in view; also some of the particular conveniences, fittings, and appliances which should distinguish buildings for the economic and healthful prosecution of middle-class girls' education. Before doing so, however, he proceeded briefly to recount what was being done elsewhere. With regard to Sweden, he said that Miss Buss described the *Folk-Skole*, or people's schools, in Stockholm as palaces containing large and lofty rooms, stone staircases, painted walls, complete fittings, and always a gymnasium. Boys and girls were always taught in the same building, the lower classes mixed, the upper separate. Each child had a desk and chair, with space between each row of desks for the teacher to pass. *Elementär* schools were a special provision for boys of the middle-class; they were, however, available for the poor as well as the rich. The buildings were similar to the *Folk-Skole*, but had more comprehensive apparatus. The *Sjydskolan* was an industrial school and school of art, and was a fine building, with every appliance for teaching sculpture, wood-carving, modelling, free-hand drawing from copies and from models, painting in oil and water-colours, engraving on wood, porcelain and wall-painting, and graining, &c. In the suburban schools of Sweden, gardens were cultivated, and shoemaking, tailoring, straw-plaiting, spinning, and knitting were taught. Even yet more practical and economical were the Danish schools, many of which were carried on concurrently with daily work—not simply occasional studies, as at S. Andrew's, in Scotland. It was thus arranged: In a school-building for 1,000 children, the whole of that number were taught in the morning from eight to one, and a second

thousand were taught in the same school from one to six. Both schools worked to one time-table, under one superintendent, who taught three hours a day, and had assistants who taught six hours a day each, the remaining time being occupied by the visiting teachers of the district. The economy of teaching 2,000 children in a school for 1,000 was self-evident, and was a hint to us. By a permanent staff of teachers, and by the visiting teachers, four such schools could be taught by three sets of teachers. In Switzerland (Lucerne) the schools and the college for preparation for the university were upon the same plan. The whole of the scholars were taught in class-rooms, and were never drawn together for simultaneous teaching, except for religious instruction in church. In the College, the classes were arranged in order of capacity, and the scholars were moved up as vacancies occurred in the higher classes. Everything was taught in each class-room, and the professors moved from room to room at stated times, as each subject came on for teaching, the classes being stationary while the professors moved. The college and the girls' school, both located in ancient buildings, were arranged precisely in the manner so lucidly described by Canon Cromwell on the occasion of the discussion* on Mr. Robson's practical paper† on primary schools, namely, a series of class-rooms for about 40 scholars each were connected together by corridors on one side, from which entrance was given to the class rooms on each story, and from which all the stoves were stoked by the attendant without the necessity of entering the class-room. The conveniences were at the end of the corridor, and were abominable nuisances, infecting the air of the corridor, which was drawn into the warm class-rooms, which latter had no ventilation but the windows, not one of which was opened between the morning and afternoon schools on the occasion of Mr. Robson's visit. The boys' school was a new building, in the form of a regular parallelogram, four or five stories in height, and very much resembling the Danish schools in appearance. The hall was wastefully large, since the conveniences were no better than the old ones, but infected the air of the staircases and halls. The halls and class-rooms were heated by tubular *calorifères*, and ventilated by the windows. The class-rooms were larger and loftier than usual; they accommodated 50 or 60 scholars. The desks were arranged in the central and side passages, desks of four on either side of the central passage, and five, six, or seven rows deep. There was a room on the upper floor where about 200 could assemble for lectures. Returning to the immediate subject of his paper, Mr. Robins said that in 1864 a Royal Commission was issued for inquiring into the education given in secondary or middle-class schools—commonly known as Lord Taunton's Commission. In 1869 the reports of the Commission and of the evidence taken before it were published. In the report Mr. Fearon pronounced the buildings and premises of almost all the girls' schools in the metropolitan district, whether day or boarding schools, to be unsatisfactory; and the Commissioners in their general report said:—"We are inclined to the opinion that in the case of girls more than that of boys, the combination of school-teaching with home influence, such as day-schools admit of, is the most promising arrangement." Miss Wolstenholme, in her essay on the education of girls, writes:—"The experiment of large schools for girls has been successfully tried, and the results are conclusive as to the superiority of the system (so far as concerns day-schools) from whatever point of view we regard it. Their superior economy is obvious. Morally, we believe the gain to be also great. We want in every considerable town in England a high school for girls, which should offer the best possible education on moderate terms—one which should serve as a model to all those private establishments for which in future, as at present, there will no doubt be abundant room. To such a school as this, it would be very easy to attach all manner of appliances and apparatus in the way of lectures and special classes, which might be attended by pupils from private families or smaller schools. The schools which at present alone answered this description were the Camden Schools and the North London Collegiate Schools, Camden-road, founded by Miss Buss, each of which had nearly 350 day pupils. By the exertions of Mrs. Gray, similar institutions had been

established at Durham House, Chelsea. Boarding schools of large size, say of not less than 100 pupils, were rare, and were generally partially sustained by private benefactions. The size of the buildings made them very costly, and the number of scholars necessitated small classes and a large number of teachers. The general education of the middle classes would proceed very slowly if it were considered essential to board and lodge as well as teach. Nevertheless, a limited number of such buildings would be required, and the best form for them it was profitable to seriously consider. Of such were the Ladies' College at Cheltenham (under Miss Beall) and at Hitchin—about to be removed to Girton College, Cambridge—(under Miss Davies). Considerable interest attached to Girton College, as the first of women's colleges erected at one of the two great seats of learning upon a similar plan to those already existing for men. This building, now in course of erection from the designs of Mr. Waterhouse, provided the usual study and dormitory for each scholar, with a general dining-room or common hall, mistresses' and lecture-rooms, &c., complete, for twenty students. Milton Mount College, Gravesend, was a building approaching completion under Mr. Robins's superintendence, for the reception of the daughters of Congregational ministers.* It was designed to accommodate 150 girls, each of whom had a separate cubicle or chamber properly fitted up. The cubicles were arranged on both sides of long dormitories, a central corridor giving access to each, the panelled enclosures being 6ft. 6in. high. The main building had a frontage of 200ft. towards the south-east, with north and south wings; in the internal angle of their junction with the main building were the girls' staircases. In the centre was the visitors' staircase, opposite which on each of the two upper floors was a water-closet and housemaids' closet suitably fitted up. Beneath the dormitories, on the ground floor, were the school-rooms, class-rooms, teachers' and visitors' rooms, library, and music-rooms. Book-closets were formed against the dado round each of the schoolrooms in the wings, and in the north school-room a gallery for 60 girls was provided, fitted up with the desk recommended by Dr. Leibrich. There were four class-rooms, each for 20 pupils, besides the head-mistress's and visitors' room on either side of the entrance-hall, the teachers' sitting-room, and the library. The music-rooms were fitted-up with music-shelves and portfolio-lockers, and a range of five separate practising-rooms was provided. Situated at right angles to the main building, and opposite the principal entrance-hall, was the dining-hall, beyond which were the domestic offices, kitchen, scullery, servants' hall, housekeeper's room, and a series of store-rooms, over which were the servants' dormitories. The bonnet and cloak-rooms were situated on the west side of the principal corridor, and were fitted up with separate closets for every three girls. Adjoining the cloak-rooms were the lavatories and conveniences. It was originally intended to have earth-closets, but subsequently McFarlane's latrines had been substituted, galvanised. The building was erected on the side of a hill, and the dining-hall and domestic offices stood 6ft. above the main building and wings. An entrance lodge was in course of erection, and the grounds were being laid out by Mr. Marnock. In a few weeks the building will be opened. The great advantages received by the middle classes in Russia, Germany, Switzerland, Sweden, and Denmark, many of which had been particularised, arose from the adoption in those countries of large public day-schools in preference to small private boarding-schools. And if secondary education for girls were to keep pace with primary education in this country, a similar organisation must be adopted, and to some extent external aid must be sooner or later devoted to its development. Great things were to be expected of the Endowed Schools Commission, through the action of which many ill-used endowments had been, and would be, turned into their right channel of useful beneficence. At the "Edinburgh Educational Institute," the establishment of which was one of the results of the labours of the Commission, 1,200 middle-class girls were taught in separate classes of 40 each, there being 18 senior and twelve junior classes. The basement floor was divided into separate cloak-rooms by partitions 6ft. high. Each class had its cloak-room, locked up by its

* BUILDING NEWS, July 12, 1872. Vol. XXIII., p. 25.

† *Ibid.*, July 5, 1872. Vol. XXIII., p. 4.

* A perspective view and plans of this building appeared in the BUILDING NEWS for Sept. 29, 1871, Vol. XXI p. 235.

mistress, and the rooms were so arranged that the fires might be open to the attendant. Umbrella-stands were placed in the centre of each compartment. There was a large central hall for lectures and exercise. Luncheon was provided at low prices. Without great extraneous assistance, however, much might be done in the way of providing good day schools for girls of the middle classes, as had been proved at Camden Town by the North London Collegiate School, and the Camden School for Middle-Class Girls. These schools had recently been handed over to trustees by the lady who for 20 years had conducted them, and who still remained the principal. Since the establishment of the Trust, considerable success had followed the extension of their operations, and nearly 700 girls were now receiving the best education in them, at most moderate rates, commencing at £1. 1s. per quarter, and reaching £4. 4s. As architect to the trustees, Mr. Robins was able to illustrate his remarks with drawings prepared at various times, in which the buildings required were shown adapted to various sites. These drawings were of two descriptions, some being designs for the accommodation of the Camden School, and nine others for the North London Collegiate School, which it might be sufficient to designate as the Lower and Upperschools, the chief differences in their arrangement being that in the Lower school the classes were for 50 pupils in each, and in the Upper for 30 in each class. The Camden or Lower School at present occupied several ordinary houses in Camden-street, which buildings were unsuitable to the requirements of the school. The North London Collegiate or Upper School occupied a large private house situate at No. 202, Camden-road. The crowded state of this building necessitated further accommodation being found, and the leasehold lately occupied by the "Emporium," a co-operative store, situated in the rear of the Camden-road Station of the Midland Railway, was purchased by the trustees last summer, and under Mr. Robins's direction was altered and fitted up for school purposes. Plans of this building were exhibited, and also a scheme for its enlargement, should it be determined to retain the old building for the exclusive accommodation of the whole upper school, which it was proposed to limit to 400 pupils. The proposed building had a frontage of 220ft. by 140ft. deep. The building was designed to be three stories in height, with a fourth story in the centre for the music rooms and resident housekeeper. It comprised a central or administrative block, with two wings occupied by school and class-rooms on each floor. A lecture-hall and dining-room projected behind the central block, with kitchen, offices, lavatories, and watercloset beneath. There were playgrounds or botanical gardens on either side of dining-hall, with covered grounds for ambulatory and gymnasia. The central portion of the upper floor was entered by a flight of steps leading to the central hall, through which entrance was obtained to the committee room, waiting room, and offices, to the staircases right and left of the corridor, lecture-hall, and to the bonnet and cloak lobbies in each, with class-room for 20 more. The school and class-rooms were fitted up with Ekman's desks and chairs, arranged on the plan adopted in Swedish schools. The school and class-rooms above and below were precisely the same, providing accommodation for 40 scholars each. It was better, however, to consider the class-rooms as retiring-rooms for a portion of the 50 scholars in each schoolroom who were under the care of one teacher. So regarded, the building would accommodate 600. There was a teachers' watercloset and lavatory next the stairs on each floor, but the girls' waterclosets were in the basement, cut off from the main building by a short cross-ventilated corridor. The wall dividing the school and class-rooms was designed to be hollow, and to form a separate ventilating-shaft from the bottom to the top of the building. The building was proposed to be heated with warm water, and pipes were carried the whole length of the space between the roofs, into which the hollow walls exhaled the vitiated air of the apartments below. The kitchen, scullery, store-rooms, servants'-hall, and serving-hall, with lifts to dining-hall over, provided all the accommodation needed for those of the girls who stayed for dinner or refreshment between the morning and afternoon classes. Mr. Robins also described an alternative and more economical design for this building, similar in principle so far as the school and class-rooms are concerned, but omitting the

separate hall and dining-room, and providing for the same by throwing two schoolrooms into one by rising shutters provided between the hollow walls of the lower floor. With reference to the Upper, or North London Collegiate School, Sandall-road, Camden-road, Mr. Robins exhibited plans showing the proposed extension of the present buildings, which, however, might be superseded by an entirely new building. The proposed accommodation was for 400 pupils. On the right-hand side of the hall and staircase were the head mistress's room and great class-room, with three smaller class-rooms. On the left side were a small office, library, reception-room, and the masters' retiring-room, beyond which were two class-rooms for 30 each, and with drawing-class-rooms for 12 each. On the first and second floor on the extreme right was a large class-room and retiring-room for 50, and on the extreme left two class-rooms and retiring-rooms for 30 each. The staircase, music and drawing and teachers' rooms, came between also cross-ventilated lavatories and conveniences. The housekeeper's rooms were in the attic story, over the centre. The basement was devoted to large bonnet-rooms, and to kitchen, offices, and dining-room. The rest of the site was laid out as a garden, with the exception of the portion reserved for a lecture-hall for 800 persons, with a gymnasium underneath. The entrance-hall was paved, and the private school entrance to the same was through one of the class-rooms. A better exposition of the kind of building which Mr. Robins thought most suitable was shown by a design for an entirely new building on the same site. The upper floors would be similar in arrangement to the ground floor (though variously employed) except the attic, wherein were servants' dormitories, &c. The ground plan provided an hexagon entrance-hall and general waiting-room, on one side of which was the head mistress's room and the offices. A general hall and staircase, chiefly lighted from above through an open well-hole, was situated in the centre and opposite the entrance. From the mid-landings of the staircases, lavatories and conveniences were entered through cross-ventilated corridors. From the landings level with each floor, entrance was obtained to the various apartments. On the right-hand was a class-room for 35, and another for 30, with small drawing-class-rooms to each. The upper part of the wall dividing these rooms was fitted with casements hung on pivots, so that between school hours, or at any time desired, cross ventilation might be obtained by the opposite windows. On the left-hand side were smaller class-rooms for 30 pupils each, and between these and the staircase were two rooms, which were music-rooms in the two upper floors, but which on the lower floor provided a teacher's room and library. The seats and benches in the class-rooms were all designed for a left light. There were four smaller class-rooms on each of the two upper floors, the class-rooms providing accommodation on the three stories for 375. On the first-floor, over the hexagon entrance-hall, was another class-room for 25, making the total of 400 required. Above this were two more class-rooms, one of which would be for simultaneous instruction in music, and one for drawing. Over the head-mistress's room and office were masters' retiring-room, and school-apparatus and store, and class-rooms. The building was proposed to be heated by warm-water. A lecture-hall for 600 persons, on the ground-floor, and 200 in an end gallery, was provided for on the extreme left, and formed a detached building, with an inclosed gymnasium underneath on the basement story, level with the suggested botanical garden behind. A general dining-room was provided in the basement for about 160 girls. Excepting the housekeeper's room, the rest of the basement was occupied by bonnet and cloak-rooms, through which the girls would pass on their way to the class-rooms above. Insufficient care was commonly shown in the provision made in this respect, but in girls' schools this was a very important question. The space under each class-room on the ground-floor was so arranged as to give ample accommodation for the bonnets and cloaks of three class-rooms over, so that each class of thirty in the Upper school, or fifty in the Lower school, might have its own cloak-room, locked up by its mistress. The various pins and book-holes were arranged on each side of the dwarf partitioning, and warm-water pipes were to be carried round under each side of the partitions, so that the process of drying might be going on while the children were in class. This plan had been suc-

cessfully introduced by Mr. Clifton, in the City Corporation School for Boys, Cowper-street, City-road. In conclusion, Mr. Robins referred to the desks used in schools, speaking very favourably of Ekman's Swedish School Desk, and also described the desk and seat designed by Dr. Leibrich. Dr. Leibrich, unlike Mr. Ekman, provides the same sized desk for children and adults of all ages, suiting the desk to the requirements of each child or person by raising or lowering the seat and footboard, and by drawing the back of the seat nearer to or further from the edge of the desk. The desk was sloped at an angle of 20° for writing, and of 40° for reading. (Dr. Leibrich at the close of the meeting fully explained the construction and working of his desks and seats, which were exhibited by Mr. Callaghan.)

DISCUSSION.

Mr. QUILTER, in proposing a vote of thanks to Mr. Robins for his paper, said he was sure that all present had learnt a great deal on the subject, from the special point of view which Mr. Robins had brought forward. He (Mr. Quilter) gathered from what Mr. Robins had said that the special requirements of middle class schools for girls were not very peculiar; the conditions seemed to be only those which applied to schools of all classes, and required but little modification. As to what Mr. Robins had said as to the arrangement of the dormitories, having carried out the plan described (*i.e.*, instead of making a number of small rooms arranged along a corridor—which was a dark and unhealthy arrangement—having one large dormitory, divided off into small cubicles by partitions 6ft. or 7ft. high), he was able to testify to its practical advantages, which were that each scholar had a room to herself, and the ventilation of the whole of the dormitory was easily effected. With regard to school-fittings, Mr. Robins had stated that the system (which the London School Board had adopted) of using single or double desks was borrowed from America. That was the case, and he (Mr. Quilter) had known it carried out in two large training colleges some years ago with considerable success. By having the desks arranged in pairs, however, a good deal of gangway space was saved, and the convenience was almost, if not quite, as great as having them arranged singly, with a gangway on each side of each desk, for by having a gangway between every two desks, each child was still able to pass out without disturbing his class.

Mr. PAICE seconded the proposition.

A MEMBER asked what kind of stove was used so that the attendant was able to stoke the fire without entering the room; and how was the attendant to know that the fire required attention unless he entered the room?

Mr. ROBINS replied that the stove referred to, as used in Swiss schools, was inside the class rooms, but the opening to the stove was in the passage or corridor, so that the attendant need not go into the room. It was a close stove—one of the well known pillar-stoves so common in Germany. Cold air was introduced from without, and warmed in its passage over the stove into the room. Still, as a rule, where such stoves were used, the atmosphere was very stuffy; for although warmed fresh air was admitted, generally no provision was made for taking away the vitiated air, and the effect was that there was no ventilation of any consequence, for a room of a given size would only hold a given quantity of air, just the same as a vessel of a given capacity would only contain a certain quantity of water. In answer to a question by another member as to what was the average price of middle-class schools for girls as compared with primary schools, Mr. Robins said he had had no opportunity of making any comparative estimates, but as a matter of course the former would be more expensive than the latter. They were for a higher class of scholar, and required more room and more complete apparatus, large libraries, &c., all these requirements of course involving a greater expenditure. In reply to another member, who ventured an opinion that the plan of dividing the dormitories into cubicles by high partitions would not work well, inasmuch as all kinds of pranks would be carried on by the girls (who, at their age, were not usually the most staid members of society), and that inconvenience would result from the attendant having to stoke the fires in the dormitories, Mr. Robins said there were no fires in such dormitories, and therefore no stoking would be required. The system of dividing off each scholar's sleeping apartment by a partition 6ft. or 7ft. high had been found to work well after a trial of some years in

several large schools, among which he might instance the Officers' Daughters' School at Bath—which building, however, was not quite suitable for a girls' school, having been built for boys, and subsequently converted to its present use.

The PRESIDENT, in putting the vote of thanks to the meeting, remarked that the subject was a most important one, and one to which Mr. Robins had given great attention. It was held by many that it was undesirable to educate girls in the same way as boys by bringing them into large schools; many people preferred smaller schools, and some went to the extreme of having none but private tuition for their children. This, he thought, was a mistake, but whether it was desirable to bring so many as 800 girls together in a school was worth consideration. It should not be forgotten that a (if not *the*) most important part of a girl's education was only to be acquired at home and under home influences; mere school teaching would not fit her for the domestic duties which she would have to fulfil. At the same time, mere private teaching would not be sufficient to educate girls up to the standard which would be rendered necessary (owing to the advanced education of the male sex) if they were to make companionable wives. He thought Mr. Robins was right in advocating large day schools for girls rather than large boarding schools, although in day schools there would be the disadvantage that bad weather would always prevent a large number of girls from attending. He should like to know the area per scholar which Mr. Robins had found it necessary to be given to the schools he had described [Mr. Robins: 12ft.] That, he supposed, was exclusive of the additional classroom? [Mr. Robins: Yes.] That area was not so very much in advance of ordinary schools, 10ft. being a very ordinary area. The proposition having been accorded by acclamation.

Mr. ROBINS briefly acknowledged the compliment, and in doing so again referred to the school-desks exhibited by Mr. Atkinson, agent for Mr. Ekman. These desks, which are the same as those used in Swedish schools, were highly commended for economy and convenience. In response to a request by Mr. Robins, Dr. Leibrich, oculist, at St. Thomas's Hospital, explained some school desks and seats (exhibited by the manufacturer, Mr. Callaghan) which had been constructed from his designs, to suit children and grown persons of various heights equally well, the back of the seat advancing towards or receding from the front of the desk in proportion as the height of the seat was increased or diminished. The proceedings then terminated.

ON THE FIGURE-SCULPTURE IN THE ARCHITECTURAL MUSEUM.

LECTURE I.—ANTIQUE.

MR. J. F. REDFERN delivered the first of a course of three lectures on the architectural figure-sculpture in the above museum on Saturday afternoon, the 22nd ult., when there was a large attendance. Mr. Redfern said his first lecture was to be devoted to the Antique, although he regretted that there were very few casts of antique figure-sculpture in the Museum; but it was necessary to begin with the antique, because no art could be talked of at length and with much profit without reference to antique, and more especially to Greek, art. The latter had infused its beauty more or less into almost every other form of art, whether we looked for it at Rome or Constantinople; or in Persia, Syria, or among the works of the Saracens and Moors in Spain; or those of the middle ages in Europe. Indeed, was not its morning star visible before in Egypt, Assyria, and India? Greek art, like all art of any period that was worth calling art, undoubtedly reflected the contemporary life that surrounded it; and Greek art pre-eminently did this, for the first characteristics of both its painting and its sculpture were that they reflected the life of Greece as seen, felt, and acted by the Greeks themselves. Having given an interesting sketch of Greek life and customs, and traced the origin and development of symbol worship amongst them and the Egyptians, Mr. Redfern stated that the making of rude statues in lieu of symbols had commenced as early as the transition period from the Pelasgic to the Hellenic age—i.e., more than 1,400 years B.C., and now more than 3,000 years ago. Some of the earliest forms of the symbols used by the Greeks were nothing but rough stones, or wooden posts or beams reared on end. Their first attempts at sculp-

ture were rude efforts to transform these logs and blocks into some semblance of the human form; nor could they be otherwise, as the constant exhibition of such perfect human beauty as was to be found in Greece could not fail to inspire some genius early to imitate it. The first work of Greek art of which any direct mention was made, represented a scene which must have been derived from a dance of young men and maidens round one of the upreared and shapeless symbols; and another celebrated work by the same hand could have been little better than the transformed log. The former was a chorus with which Homer compared the dance on the shield of Achilles; the latter was a Venus, which Pausanias described as a wooden figure without feet, standing upon a square block, or rather, growing out of it. (See Fig. 1 in photo-lithographic illustrations.) They were both made for Ariadne by the first sculptor among the Greeks who insured the existence of his name—Daedalus. Many other works by him, were recorded, but in spite of Homer's praise, they must have been but rude productions—at first scarcely better than great wooden dolls. If entire detached figures were attempted at all, they were represented stiff and motionless for the most part, with both feet together, and the hands straight down by their sides. Even the great bronze figure of Apollo, near Sparta, had the appearance of a column, the hands, holding arrows, being so slightly indicated that they were scarcely distinguishable. Daedalus, however, was not the author of this last. His great statue of Hercules was an effort to get something of the movement of life into sculpture. A small bronze in the British Museum was, according to the opinion of Flaxman, a copy of this great work. One leg was advanced; the right hand, holding a club, was raised in the act of striking, while the left was extended, bearing the lion's skin as a shield. But with all this attempt at bold action, the form was expressed with but little knowledge. The chorus of which Homer spoke must have been another attempt on the part of Daedalus to express figures in action. There was no example of that work remaining, but there were other examples of the Dædalian period which must have been in many respects very like it. The author then proceeded to select one or two of these early examples, pointing out the characteristics of each. Taking, firstly, the insulated or standing figure in the round, he said that the British Museum contained several of such so-called Dædalian figures, chiefly small, and in bronze, but the most important one was in the Glyptothek at Munich. (Fig. 2.) It was in marble, and life-sized. It betrayed little Eastern influence, and much of the true Greek mind gleamed in every part of it. One of its characteristics was its turgid or lumpy muscles, showing how power and physical development had become a necessity of the Greek even at that early period. The hair was wavy, beautiful, and refractory but trained to a most rigid arrangement—like the national character, which then knew not the word *law*, but was order itself, and afterwards developed into a political system of the best-ordered freedom that the world ever saw. The expression of the face was that of healthy cheerfulness, the upturning of the corners of the mouth quite showing the effort of the artist to give this expression, which was retained almost to the time of Phidias. It almost seemed like a caricature to see this stereotyped smile on the faces of such figures as those in the west pediment of the Temple of Pallas at Ægina, where the natural form and physical power were portrayed with the most perfect execution, combined with no little idealism, but with an utter want of every other expression in the face than the same smiling character which was found in the earliest Dædalian statues, which were executed five or six hundred years before. Whatever it was that gave to this mode of representing the human face such a charm to the Greek mind, Mr. Redfern said he could not help thinking that it had its origin in that lively and social nature which shone forth in both the religious and domestic life of the Greeks. This happy disposition of the Greeks was naturally reflected in their art, and was the more marked by contrasting it with the religion and habits of the Egyptians and Persians, who loved mystery, dark, and gloom, looking on their deities as hostile powers to be conciliated, and life as but a transient and troublous dream. The Greeks regarded their gods as kind friends, anxious to be asked for favours, and life was to them a bright reality. In

this first early, or Dædalian, work of the Greeks, the national characteristics of strength, order, and cheerfulness were apparent. With regard to the artistic characteristics of the works of the same epoch, the arms were long, the shoulders broad but sloping, the body slender, with rounded but long hips; the thighs were very bulky, but the legs, in anatomical correctness and fineness of execution generally, contrasted strangely with the almost guesswork and feeble rendering of the body. The hands were for the most part clenched, and the feet stood with both soles firmly placed on the ground. The face had a square cut, the brow receded, the eyes were large and open, with projecting lids, the lips sharply defined, the chin largely developed, and the nose prominent, but not at all a Greek nose. The figure shown in No. 3 was from a monument at Athens, and represented a work somewhat more advanced than the first. It showed some attempt at action and composition, and all the characteristics of early work were there, but to these was added another—the drapery, purely made up of close lines and regular zig-zag edges. This kind of drapery was strongly indicative of the archaic period, but was not abandoned in the most triumphant day of Greek art. Indeed, it could not well be abandoned, for the principles that went into its composition were purely the offspring of the simple greatness of the Greek mind; and as in their architecture (which by the combination of a few straight lines achieved a majesty and harmony that was never surpassed), so in the draperies of their sculptures—a few parallel lines produced an effect of the most perfect grace, and great prevailing sweetness. The first example illustrated had no feet; the second had feet, and stood firmly enough on them, but there was no attempt at motion; the third showed quite an effort at movement, but it was very limited and cautious; yet the getting of one foot so much before the other might be considered quite a step in advance. All this was, however, Greek art in its infancy, and of the hundreds of examples of work of the same period which were to be found in the museums of Europe, few betrayed more knowledge in either technical skill or conception than the last figure. The reliefs from Thasos (Fig. 4) brought us to the end of the old, or first period of Greek art. These reliefs were doubly interesting, for they not only illustrated the archaic disposition of drapery, but exhibited some germs of the more perfect and coming art. The three advancing Graces possessed all the constrained characteristics of the period. The straight and zig-zaggy lines of the draperies, the upright attitude of the figures, still equally poised on both legs, the shuffling forward movement, which could not be called a walk, for there was no attempt as yet to lift the heel from the ground. But in the other portion of the relief, which represented Apollo being crowned, there were to be seen a freedom and vigour and truth quite new. The figure of Apollo stood most gracefully and naturally. For the first time in the history of Art, the figure was to be seen standing in the free and graceful pose of balancing the weight of the body on one leg alone, which soon after lent so much grandeur to the attitudes of the standing figures. In the maiden who was crowning Apollo was to be seen (for the first time, perhaps) the heel raised from the ground, while the other was stepping forwards. At last, Art both stood and walked, but, as the child of Greece, she had been nearly 800 years accomplishing this. From 600 to about the fifth century B.C., many great artists sprang up who, although still shackled with the old stiffness and mannerism, succeeded in breathing a new life into their works, and went on advancing till they carried sculpture to the very threshold of the time when Phidias crowned it with his genius. This progress was made very cautiously, almost, indeed, reluctantly, for long after the time when their knowledge was able to give the freest and liveliest expression to sculpture, they chose, from very reverence and love of the old work, to reproduce it in all its dry and compact style. Could anything be more archaic than the figure shown in No. 5, from Dresden? Yet it was executed by a hand that could produce works of a far more advanced and freer style, as was evidenced by the ten battle scenes in relief on the front fold of the peplos, which were characterised by great skill and freedom. It was the same spirit of reverence that conserved the expression and countenance on the statues at Ægina, before referred to. Among the sculptors that brought us to the time of Phidias were three who were

his great forerunners, and belonged both to the old period and the new—viz., Calamis, Pythagoras, and Myron. The first was skilled in every kind of technical art; he worked in marble and bronze and ivory and gold, and carried the art of casting in bronze to great perfection. Pythagoras succeeded in giving rhythm and symmetry to the entire figure that had never been accomplished before, and he was the first to study the nerves and veins, and to consistently adhere to the truthful delineation of the figure in every part. The hair of his figures assumed a free and natural treatment. From the head of the male disappeared the wig-like arrangement, and the crowning glory of the female lost its long and formally-drooping curls, and was henceforth looped-up in that grand and natural way of which the modern chignon was so vile a caricature. Myron was, however, the greatest of this triumvirate of excellence. He succeeded in freeing art entirely from the shackles of the archaic school. His material was chiefly bronze, which was most suitable to the representation of manly vigour and athletic or heroic strength—the subjects of his choice. But his great characteristic was his seizing and depicting a moment of excitement. This could not be better described than in the words of Lucian respecting the Discobolus (Fig. 6): "Thou speakest of the disc-thrower, who is bending forward for the throw, with his face turned away, towards the hand that holds the disc, and with one foot slightly pointed, as if he would raise himself with the action." Looking at this statue, its conception, composition, and execution, it would be concluded that Greek art had now attained the highest perfection in the representation of the physical frame, and in the delineation of bold and difficult actions. There was a daring in the composition of the statue that almost overstepped the limits of the simple grandeur which was the very essence of Greek art. So much was this quiet grandeur valued, that a most elaborate apology was written by a contemporary critic in defence of what was thought to be by some the too-violent action of Myron's statue. Phidias, however, was the name that shone brightest of all in the annals of Greek art. He brought the plastic arts to complete perfection, and by their aid represented the Greek mind in its nobleness as neither poet, philosopher, nor historian could depict it. Art, as he perfected it, represented the thoughts and aspirations of the whole people, because everything was then done for the public good. Afterwards, when everybody began to look out for himself, art began to decline. The great excellence of Phidias consisted in the intellectual depth and thoughtful feeling, almost amounting to the God-like, that he produced in his works; indeed, he is said to have "made gods better than men," and his lofty mind naturally exercised itself in works of a purely ideal character. His skill in representing the beauties of the physical man were not greater than that of other masters of his time, but the infusion of the mental into the general expression of his works was a power peculiarly his own, and it brought his productions to a point of sublimity that had never been surpassed. His two greatest achievements, and representing all his powers in their grandest aspect, were the Athenian Minerva and the Olympian Jupiter. Both were colossal, the Minerva (standing) being 52ft. in height, and the Jupiter (seated) more than 40ft. high. Some idea of the Minerva might be formed from an unfinished statuette preserved at Athens; and a coin from Elis (Fig. 7) gave a juster representation of the Jupiter; but both of them conveyed to us but little of that grandeur and divinity which the originals must have possessed. The great bust in the Vatican (of which there was a cast in the Architectural Museum) might also help to form a conception of Phidias's work, but here the strict solemnity characteristic of him was nearly lost, for the bust was a production of the Roman period, and therefore executed at a time when Nature was more striven after than solemn earnestness. This bent had led to a freedom which almost culminated in bombast in the treatment of the hair. The expression of the face, however, gained nearly all its power from the deep shadows of this crowning mass—a hint which Michael Angelo turned to such marvellous account in after times. It was said of Phidias that he alone had seen the gods, and true it was that he it was who gave a distinctive character to the head of each divinity. Having at some length very ably shown the influence which the athletic games and other incidents of Greek life exercised on the art of the nation, Mr. Redfern

said he regretted that there were so few casts of the works of Phidias in the Museum, and that what there were did but represent minor fragments of the noble sculptures of the Parthenon. The horses' heads (of which there were casts) were the noblest representations in plastic art of the noblest of animals. Some of the great figures which occupied the space in the pediment were to be found in the British Museum, and would well repay study, as they were the greatest works of their kind in the world. Before the time of Phidias the folds of the drapery had generally taken a straight and flat form, winding round the form, something like parallel layers of ribbon; but while Phidias gave them greater lightness and freedom in their flow and curve, he also improved their section so that the folds would hold deep shadow at whatever point the sun was shining. So many great artists now sprung up that the whole Pantheon was ransacked over and over again for subjects. Up to this time the divinities had been represented in adult perfection, but now their childhood, youth, and old age were depicted as well, and consequently, while the choice of subjects became more ideal, the treatment became less so. The geometrical simplicity of form which formerly raised the subject above common nature was now to a great extent abandoned, and a greater attention given to detail, expression, and grace. The Apollo Belvedere was one of the first works that showed this tendency, particularly in the head; and Praxiteles was the first master to lead this school. His Venus, Cupid, Faun, and Bacchus were notable examples of purity, grace, and expression. The Faun (Fig. 9) showed in a marked degree what was perhaps his greatest characteristic, i.e., that rhythmical line of body which was known in modern times as "the line of beauty," and sometimes as "Hogarth's line." This was gained by the graceful posing of the body on one leg, the invention of which was attributed to Polykleitos, but which, in reality, had its origin before the close of the archaic period. Praxiteles' style naturally begat a very close and soft rendering of nature, which, in its turn, simulated individual representation or portraiture; but portrait busts and statues were not generally permitted till near the time of Socrates; and after bidding good-bye to ideal sublimity, Greek art began to decline.

COLOURED DECORATION.*

IN asking you to discuss the question of "Coloured Decoration" this evening, I must request you to pardon me if I appear to detain you unnecessarily with a recital of those natural laws on which its successful practice must ever be founded. We have to deal with a subject which is not dependent on individual taste alone, but which, like every other branch of professional practice, is governed by inflexible rules. It is true that these laws may be unconsciously recognised and their teachings followed—as in the other departments—without a clear apprehension of the matter; still, I submit that much will be gained if we start with a common groundwork for discussion.

We must all desire to see the architect the real director of his works. We are every day urging that not only the building itself, but its decoration and furnishing, should be confided to his care. We are constantly protesting against a work which has been carefully planned and rendered externally pleasing being spoiled internally when its completion is confided to other hands, and this from want of accordance, even although the decoration may be intrinsically good. The sculptor and carver willingly come to the architect's aid, and he is often wisely content to direct and define, generally leaving minor details to their taste and skill. The painter—beset as he has been by chemical and mechanical difficulties—offers his best services. Why should not the decorator and upholsterer also act more frequently with the architect in giving unity to his work, and this not only in great undertakings, where the necessity for unity is acknowledged, but in smaller and apparently unimportant commissions? A client, too, will be more willing to listen to the suggestions of his architect when he finds that they are based on the theory that good taste is not dependent on cost, and that successful decoration and furnishing do not necessarily mean a large additional expenditure.

* By Mr. C. H. BRIEN, A.R.I.A.I. Read at meeting of Architectural Association of Ireland, February 27th, 1873.

I have said that successful decoration in colour must be based on the right apprehension of what appear to be inflexible natural laws. Let us see how these laws are ordinarily defined, and then proceed to apply them to the subject in hand. A beam of light falling on a glass prism in a darkened room is found to be split up into seven coloured rays, or rather bundles of rays, which arrange themselves in the following order—red, orange, yellow, green, blue, indigo, violet. This is further confirmed by the same prism held before the electric lamp, and (more faintly) by the colours in the rainbow. We also learn that these seven colours are capable of being reduced to three—red, yellow, blue,—which we designate primary colours, as we have failed to reduce them further. I am aware that much discussion has lately been caused by an effort to class green as one of the primaries; but I prefer for many reasons to follow the accepted arrangement.

I need scarcely remind you that red and yellow produce orange; blue and yellow, green; and red and blue, violet or purple. These, then, are termed secondary or composite colours; and, with the primaries and the addition of the colour indigo, form the solar spectrum. You perceive they arrange themselves between the colours through whose combination they arise. All further derived colours, as the so-called tertiary colours, may be regarded as coloured greys, as more or less broken colours in which a primary or secondary predominates. Still further, we are taught that, as yellow and blue produce the colour green, that colour is to be spoken of as the complement of red, the red and the two forming green completing the primary trio; and so with blue and orange, and with yellow and violet. These colours, as I have just quoted them, also form our first harmonies, as complete harmony depends on the presence of the three primaries in a composition. On the foregoing simple statement the whole science of colour rests.

If we place red and green side by side, we perceive that they mutually purify each other; this is the result of the law of contrast. It is so with black and white, and with the coloured complementaries, when so placed. If we look upon a bright red wafer for some time, we perceive that the white paper on which it lies seems to be faintly tinted, where it touches the wafer, with the complementary green. If, after gazing on it, we remove the wafer, we find the space it occupied appears to be also tinted with the complementary green. Similar effects will, of course, be observed if we use wafers the colour of the other primaries. We accept it, then, as an axiom that the primaries have a tendency to produce in their surroundings a tint complementary to themselves—red inducing, even in black, a greenish tint.

Again, it is found (as was to be expected) that colours mutually react on each other. Taking even my first example, red and green, should the red have a decided range of tinge the green will look bluer; should the green be bluish, the red will appear orange-tinted—orange, the complementary of blue, will appear to have been added to it. Take a different example: if I have several pieces of scarlet cloth, and look at them in succession, although they be of exactly the same colour, cut from the same piece, they will seem after a time to have lost brilliancy; the fatigued eye has developed the complementary green, and the scarlet has been tarnished, all mixtures of the primaries being broken, dulled, or tarnished colours. We look for some time on a green colour, and find the scarlet has been restored. It is an intuitive appreciation of these laws which causes the blonde to select blue and green to enhance the hair or complexion, and the brunette to prefer red or orange tints. You will perceive at once how a red head-dress will bronze the negro, or an orange enhance the natural blue-black of some races. These considerations will also suggest to you how all colours will gain in purity and distinctness by being separated by black or white, as thereby we neutralise this tendency to tarnish. The colours of the spectrum may be deepened or dulled by black, or lightened by the addition of white, or they may be altered by admixture with each other in varying proportions; thus we get tones and hues—terms often confounded. The tertiary colours illustrate this; they are olive, russet, and citrine:—

	(Blue + Yellow = Green.	Blue pre-
Olive	(Blue + Red = purple.	ponderates.
	(Blue + Red = Purple.	Red pre-
Russet	(Red and Yellow = Orange.	ponderates.

Citrine (Red + Yellow = Orange. Yellow preponderates.
(Blue + Yellow = Green.

As the pigments which we use are never pure, each primary colour being more or less tinged by its fellow primary and so with the rest, no combination of them will return to white or the absence of colour, as in the case of the colours of the spectrum obtained from the solar beam, or by the electric lamp. In theory, the colours red, yellow, blue, should produce white, if combined in the proportion: yellow 3, red 5, blue 8; but painted on a disc caused to revolve rapidly, the grey produced is most frequently tinted by the red and blue, and the resultant colour is generally a violet grey. Indeed, as I have said, all combinations of the primaries produced by pigments are dulled and broken, as you must have often perceived when red has accidentally been present in the mixing of green, and the tendency is towards black rather than white. The tertiary colours then, as they contain the three primaries, consist of greys produced by this admixture, coloured by the primary in excess; and these can, of course, be further combined so as to be distinctly dominated by a secondary. It is owing to this difficulty of admixture, and to save time in preparation, that the palette of the artist is being constantly added to by new pigments ready to his hand.

I would ask your attention to another peculiarity of the primaries and their combinations. The yellow is the most brilliant and obtruding colour; the red warm, and occupies a middle place; the blue cold and receding; hence the yellow is suited for projecting surfaces, the red for hollows and middle distances, and the blue for the mass. In the figures I have quoted, you perceive the blue has an area equal to the two others combined. You see the effect of this brilliancy of yellow in the secondary orange, and its tinge in scarlet; the warm of red in purple, and its tinge towards blue in crimson; the coldness of blue in some greens; and the brilliancy of yellow in the new aniline colour, where we have the luminous leaning towards yellow. In preparing colours it is, therefore, desirable that pigments to be combined should lean towards each other—in orange, for instance, that red should tend towards orange, and the yellow should be free from greenish tint; in green, that the blue should be greenish rather than purple; and so on, the tendency to broken or impure colour being favoured by traces of the absent primary in the pigment, as already stated.

I said that colours are purified by being separated from each other by white or black. Let us see the effect of a ground of white or black on the colours. The general tendency of white will be to exalt colours by contrast of tone—of black to lower them, for the same reason; and yet there are changes respecting individual colours worth noticing. Yellow, for instance, will appear much lighter with black than white, in the former case having acquired a greenish tinge; light blue will contrast most favourably with white, as will light green; red will be subdued by black by contrast of tone; while violet, for the same reason, will be improved. Contrasts of this kind are well seen in some of the national flags—the red, white, and blue of France; the red, gold, and black of United Germany; the white and green of Saxony. Perhaps grey harmonises best with the majority of colours, and, if slightly tinted with the complementary of the colour, has a most pleasing effect: indeed, by the law of simultaneous contrast, this will occur in many cases without the actual addition of the tint. It is further to be noticed that the substitution of gold for yellow in decoration produces a marked change. Gold with black is lowered, whitened by contrast of tone; while with blue it is reddened, enriched by the development of the complementary orange.

Let me now say something on the subject of modes of decoration generally as applied to architectural works, and on the application of these laws, which I have hastily sketched—first, as to public buildings, and then to private dwellings. We have to travel over a large field, and within the limits of a single paper our review must be a cursory one. The grandest modes of coloured decoration are—mosaics, frescoes, stained glass, paintings proper, marble inlays. In private dwellings, colour prevails in painting, hangings, carpets, upholstered furniture. The buildings most susceptible of decoration of the costly class are—churches, picture galleries and museums, theatres and public halls, palaces, and the residences of the wealthy.

There can be no question that mosaic decoration is the most durable and suitable for works on the large scale; combined with coloured marble in great masses, as at Venice and Rome, it leaves nothing to be desired. S. Mark's, at Venice, which may be regarded as a museum of this class of decoration, is admittedly unrivalled. In recent times, through the efforts of Dr. Salviati and others, the ancient schools of mosaicists have been revived; and it is even possible to transport the finished work, and place it on the wall, in the most distant places. We have specimens of Dr. Salviati's work in this room; at the Houses of Parliament; the Wolsey Chapel, Windsor; at S. Paul's; and the Prince Consort Memorial in Hyde Park; as well as in the artists' portraits at South Kensington Museum, which are admirable instances of its revival. In the case of the portraits in the niches of South Kensington you have also an opportunity of comparing the mosaic picture with the original drawing. The great merits of this mode of decoration are: the enamels employed are practically indestructible as regards material and colour, the only possible weak point being the attachment of the component tesserae to their places in the composition. They are capable of the finest or coarsest mode of production, are suited for all points of view, and, by the addition of gold and silver, at what may be regarded nominal cost, they can be of a richness with which no other decoration can compete. Recently the number of colours capable of being used has been largely increased. It has been objected that that they are not capable of as flexible treatment as the various forms of fresco, that their peculiar glitter is unfavourable to distinct view, and that they are costly, and require to be surrounded by accessories as rich as themselves.

Now it must be remembered (taking the last objection first) that all decoration, carved or coloured, is open to this. I admit, when we decorate at all, it is hard to keep the balance—to know when to stop. Witness the panelling and panelled vaulting of the Perpendicular period—this unrest in art work which has made the Saint Chappelle a blaze of colour, and will leave no blank spaces externally or internally in Westminster or the restored crypt of S. Stephen—a difficult problem about to be solved in the proposed completion of S. Paul's. But the principle of decoration in mosaic does not necessitate gorgeousness. The band surrounding the Albert Hall is in principle a mosaic. Its most effective works can be done by inferior hands, whereas in fresco the preparer of the original drawing must also do the completed painting if great excellence is to be reached. Its durability—as I have more than once said, its natural accordance with marble and stone, as terra-cotta ornament with brick—must make us all long for its extension, and hail every effort to place it more within our reach. I don't think its glitter is a disadvantage, as it is peculiarly suited to dimly-lighted positions; on curved surfaces this gives the colour a peculiar charm; and by a system of concentration of ornament, is equally necessary in stained glass and frescoes. Except in the cases of practically unlimited expenditure I have named, this objection need not have place. Generally, it may be stated that figure subjects in mosaic are best placed above the line of vision; that the subjects should be simply treated, and the scale large. I think the objection that Dr. Salviati's mosaic of the "Last Supper," at Westminster, is too small a scale, has considerable force. There is much in common between mosaics and painted glass in these respects.

MASONRY.*

MASONRY we find rather tersely described in dictionaries as "the art of laying bricks and stones in walls." Now it will be plain to the most casual thinker that this description could hardly be more vague and incomplete, as it omits all mention of the equally important art of stone-cutting. It is obvious that the skill and care of the mason is shown no less in the true and economical working of the stone than in the placing of it in its ultimate position in the work. How much of the mechanical perfection of a complicated piece of masonry, such as a groined roof, the arch of a skew bridge, or a traceried window, depends on the accurate working of each stone, needs but little argument to

show. But it will perhaps be thought that this remark as to the meaning of the word as given in ordinary dictionaries is after all only "raising giants to knock them down again," so I will proceed with the immediate business of this paper, which is, firstly, to give a few remarks on the more ancient styles of masonry; secondly, to give as far as I am able, some practical information as to the various classes of masonry in common use at the present day; and, lastly, and more especially for purposes of reference, to give a few extracts from specifications in which the different kinds of work are specified, and which have been actually worked from. As to the first of these, if I were to attempt to give you even a slight sketch of the origin and development of the mason's "craft," as shown by examples of successive ages and nations, it would overtask my ability and the patience of my audience. In this part of the subject, therefore, my remarks have reference generally to work to be found in our own country, and even in this comparatively limited portion of the subject, there is, in an examination and description of the various ancient works in masonry to be found in England, a subject which cannot fail to repay the research of any one who will go into it. Of the few examples to which I shall refer to-night, the first in order, both of importance and date, is the great Roman wall which was built across the Northern part of England, to protect the provinces under Roman rule from the incursions of the Picts and other tribes from the more northerly part of the island. The first of these barriers was built by the Roman Governor Agricola, and was a wall or rampart of earthwork, with nineteen forts or bastions in its length. Severus, finding this earthwork insufficient, constructed the stone wall which still bears his name, and it is also called in the Ordnance maps "the Picts' wall." It stretched from sea to sea, from westward of Carlisle to eastward of Newcastle-on-Tyne, a little to the north of the Newcastle and Carlisle Railway, and, roughly speaking, parallel to it. The face of the wall was of ashlar work, of stone from the immediate neighbourhood, and this was backed by walling of Roman bricks (really flat tiles of about 1ft. square and 1½ in. thick). The wall itself was 8ft. high, 12ft. thick, and about 100 miles in length. Among the other remains of Roman masonry in England, I may mention the ruins of Richborough Castle, Kent; a gateway in the City of Lincoln, and portion of the entablature of a temple which was discovered some years since in excavating for the foundations of a house in Bath. In the year 1869 it will be remembered that the lower portions of some Roman walls and tessellated pavements were discovered in the Poultry, London, the pavement being about 19ft. below the level of the present roadway, and consisting of a parallelogram about 13ft. by 12ft., exclusive of a semi-circular northern end. The portions of the walls then remaining were built of tiles, ragstone, and chalk, resting on a chalk foundation. Under the site of the old East India House, Leadenhall-street, in 1863, some more Roman walling was found, built of chalk and ragstone, with double bonding-courses of Roman bricks. There have been many other portions of pavement and walling discovered of late years, more especially along the course of the old Walbrook; but time will not allow me to say more of them now, except that any one who cares to read about them will find in the description published by the London and Middlesex Archaeological Society the most full and accurate information. Of the masonry remaining from Saxon times, the most reliable is to be found at Coningsborough Castle, Yorkshire; the churches at Earls Barton, Brixworth, and elsewhere in Northamptonshire; Barton-on-the-Humber, in Lincolnshire; Sompington, in Sussex; and Clapham, in Bedfordshire. There are many others in different parts of the country, but they are less important, and of less certain date. The leading idea of Saxon masonry seems to have been the building of the quoins or angles with what is known as "long and short" work, the stones being built, as the name implies, with one long one standing on its end, and then a short one bedded in the natural way to act as bond. The general walling was of rag or common rubble-work, sometimes pointed and left with the stones showing, at other times having the "long and short work" set forward enough to act as stopping for the plastering or "rough-cast" with which the tower or wall was to be finished. The reasons for the use of the "long" stones apparently was that they presented fewer angle-joints

* Paper read before the Civil and Mechanical Engineers' Society, by Mr. C. A. R.W., on Friday, March 7.

to the inroads of the weather, and as they were to serve sometimes as stops and guides for the finishing coat of "rough-cast," it might have been thought desirable to have as many long smooth lengths as possible. In the Saxon tower of Sompting, to which I alluded just now, the tie of the alternate stones is to all outward appearance quite lost; the stones look as if the areas of all the beds were the same, and they look like narrow angle pilasters. Whether they are formed for appearance sake with parts of the faces cut back so as to leave a projecting half-face at the angle, is a point upon which I have never been able to satisfy myself. The next change in architecture and masonry took place in the time succeeding the conquest of this country by the Normans. The older portions of the Tower of London, the ruins of Rochester Castle (by the same architect, Bishop Gundulph); S. Botolph's Priory, Colchester; Ifley Church, Oxfordshire; and portions of the Cathedrals of Canterbury, Lincoln, Winchester, Exeter, and other cities, all afford rich opportunity of study to both architect and mason. In this period the chief point to call for remark is the discovery or introduction of the chisel, in lieu of the axe or stone-hammer. The difference in the work consequent on this change was what might have been expected; for instead of the rough, flat, and chopped effect which characterises Early Norman work, we find the bright and crisp look which only the chisel could give. The difference was indeed so great, that the chronicler Gervase, speaking of the ornaments of the rebuilt Canterbury Cathedral, after it was destroyed by fire, explained it by saying that "There (in the destroyed building) the arches and everything was plain, or sculptured with an axe and not with a chisel." About this time, also, if not actually consequent upon this introduction of the chisel, came about a change in the mode of bedding or setting the stones of ashlar work; for whereas the joints were before this of great thickness, they were then reduced to the thinness now generally adopted. Then followed the gradual transitions from Norman to Early English, from that to Decorated, and so on through Perpendicular to Tudor. But these were more purely architectural changes, the masonry, for all practical purposes, remaining nearly the same. There is one note of warning to be derived from the last mentioned style. The masons of the sixteenth century had certainly reached the highest point in the knowledge of constructive stonework, but they substituted lintels or beams for arches in the spanning of openings, and this was one mark of the debasement of the style. Whether the almost universal introduction of iron girders into bridges, from which we are now suffering, will prove the engineering of our own day to have been fully worthy of the title, must be left to the consideration of those whom it most concerns. I think it is undeniable that the period in which the best work was done, more especially in architecture, was the time in which Early English and Early Decorated work were done—chiefly included in the thirteenth century. It must not be supposed that there was not bad masonry done even then; but the masonry of that period, taken as a whole, was, in its mechanical perfection, in the vast amount of scientific knowledge it displayed, and the true appreciation of the nature of the materials used, about as near perfection as it is given to human work to be. The same may be said of all the art and building work of that time. Architectural decoration and sculpture, stained glass and metal work, all bear the marks of the same true art-instincts; and certain it is that if we want in our own day to produce good work, it must and can only be done by aiming at the same principles, and applying them to practice in the same common-sense way that these great early builders did. With these remarks on the masonry of former times, I will now proceed to treat of the more practical side of the question, and this will be done best by considering it as coming into the three divisions—walls, piers, and arches.

Walls.—The essential conditions of good solid walling are: Firstly, that the stones should be laid on their quarry-beds, *i.e.*, with the natural bed at right angles to the direction of the pressure the finished work will have to bear. Secondly, that every joint and interstice should be absolutely full, and flushed up with mortar, and that, to obviate the too-rapid absorption of the water in the mortar, the stones should not be put into the work too dry. Thirdly, that the work shall be so

built as to get the best bond possible with the materials at command, which is to be obtained most effectually by the frequent use and even distribution of "headers" or through stones over the whole surface of the wall. Some authorities give as the right proportion that one-third of the whole area should consist of the ends of "headers," but in actual practice it is often specified that there shall be one header in every 4ft. or 5ft. run of a course not exceeding 12in. in height. Care should be taken that, so far as possible, every header should go actually through the wall, and not be what are called "shiners," *i.e.*, simply stones set on edge with the natural bed to the face of the work. The largest and best stones should be reserved for exposed parts, such as quoins, reveals, and doors of windows, &c.; not only because they are more exposed to the weather, but because every quoin stone is really a "header" and a "stretcher" too, and every building does benefit greatly by having good strong solid angles. Masonry for walls is either of "ashlar," "block-in-course," or "coursed" or "random" rubble. Of these, "ashlar" consists of masonry in which every stone is wrought on all its sides, and generally to specified dimensions. The top and bottom of the stone are called "bed-joints," the side to be left exposed is the "face," the opposite to it is the "back-joint," and the sides that will be across the wall are called "side-joints," or merely "joints." If the faces of the stone are worked beyond the first cutting it makes what is called "plane ashlar;" if it is figured it becomes "tooled" or "chiselled" ashlar; and if the main faces of the stones project beyond the mortar joint, it is called "rusticated." Whichever of these finishings for the face be adopted, a chisel draught should be carried round the edges, so as to insure straight arrises, and consequently accurate setting of the stones. The way in which "ashlar" work is specified will be seen from the following extract from the contract for the river wall in front of the Palace of Westminster, which is extracted from Donaldson's "Specifications." After specifying the kind of granite to be used, it is specified that:—

"The stones are to be fine-axed on the face to the true curve of the wall, so as to present a fair and perfect surface, at least equal to a sample which will be shown to intending contractors. The beds and joints are to be full and square for their whole depth (particular care being taken to preserve their outer arrises), so that when set the work may be close and solid throughout, without any packing, and no joint exceeding $\frac{1}{4}$ in. in thickness. The backs are to be scappled with a pick, and with a fair surface to receive the brick-work. The courses to be of the heights figured, and to be laid with one header to two stretchers; the heading-stones are not to be less in length of face than the height of the courses of which they are to form part, nor less in depth of top-bed than double the height of the said courses. The stretchers are to be not less in length than twice the height of the courses wherein they are to be inserted, nor less in depth at top than the height of the said courses. The bond in the vertical joints is not to be in any case less than one-half of the height of the course immediately below them."

"Block-in-course" masonry is what is commonly used for the spandrels and wing-walls of bridges and other similar works. It is in some respects similar to ordinary ashlar work, only that the stones are smaller, and the courses are thinner and vary in height. In Donaldson's book, in a specification of dock work, it is described in this way:—

"The whole of the exterior masonry to be of blocked walling, drafted and set close in stone-coloured lime, the stones for the 3ft. walls to average from 9in. to 11in. on the bed, and about one-fourth to be 2ft., so that they may tail into the stones on the opposite side. The wall to have, where requested, a through stone of the full thickness of the wall. The interior to be filled in solidly, and rendered over at each course."

In "coursed rubble" the rule generally is, and always ought to be, to place the headers along the last-finished course, at about the right distance apart, and to see that the headers of one course are not directly over those of the course below, and then to build up the short lengths of wall between with the smaller stones. Each stone should be set with the largest side of its natural bed downwards, and completely bedded in mortar as the work proceeds. The back joint should also be, if possible, of the same area as the face. "Coursed rubble" is described something in this way:—

"The external walls are to be built of the heights and thicknesses shown on the drawings, on proper footings,

and built in random courses varying from 5in. to 17in. deep, well flushed up, and through-stones inserted at intervals of about 5ft. in every course. The external surface about the ground-line to be neatly hammer-dressed, and the joints pointed with black beaten-ash mortar, and close joints formed next the stone-dressings," (*i.e.*, jambs of door and window openings, quoins, &c.).

"Random" or common rubble is simply work obtained by using the stones just as they come from the quarry, with any very shapeless angles or projections struck off with a hammer. In addition to these there is "flint rubble," which is much adopted in chalk neighbourhoods. This is done either with the stones as they come to hand, or just roughly squared, in which latter case it is called "snapped" flint-work. Properly put together, this work is practically everlasting, as many church-towers and other buildings still are standing to testify. Among the sea-defences of Brighton, there is a groyne built of this flint rubble, backed by cement concrete in mass. The casing-blocks were made in moulds of the required shapes. The flints which were specified to be of not less than 6lb. weight, were thoroughly washed, and built into these moulds by hand, set in Portland cement. The blocks of which the interior of the work was mainly formed were of ordinary Portland cement concrete, set as masonry up to the low water of neap tides, the remainder of the core (if I may so term it) being of Roman cement concrete, thrown in from a platform above. It has stood for nearly ten years, without, I believe, costing a shilling to repair; in fact, so far is its success assured, that the Corporation of Brighton have ordered their Engineer, Mr. Philip C. Lockwood, to proceed with the erection of another on the same plan. Having said thus much on the masonry of walls, I come now to that of Piers and Columns.

(To be concluded.)

COMPETITIONS.

FROME.—At a meeting of the committee of the Frome District Agricultural Society, on Wednesday week, it was decided to award the first prize of £20, for the best set of plans for the new Market at Frome, to Mr. W. J. Stent, architect, of Warminster; and the second prize of £5 to Messrs. Wilson, Wilcox & Wilson, architects, of Bath. The prize plans can be seen at the Auction-Mart, Vicarage-street. The proposed cost of the work is £4,000.

HALIFAX SCHOOL BOARD.—About two months ago the local architects were invited to submit competitive designs for the Board School at Booth Town. Eight sets of designs were submitted, and at the fortnightly meeting of the Board, held on Thursday, March 6th, a final decision was announced, Messrs. Leeming and Leeming, of George-street, being the successful competitors.

HENDON INSTITUTION, LONDON.—The design by Mr. William Bakewell, of Leeds, has been selected in competition with those of three other architects.

LOWESTOFT.—Mr. William Clement Williams, architect, Halifax, has obtained the £25 prize, for laying out the new park at Lowestoft.

LYONS.—The Municipal Authorities of Lyons have published the programme of a competition for the new Theatre of the Celestines, which is to accommodate 1,600. The prizes are 1,500, 1,000 and 500 francs.

PARLIAMENTARY NOTES.

VICTORIA EMBANKMENT (SOMERSET HOUSE) BILL.—The Duke of S. Albans, on Monday, in the House of Lords, moved the second reading of this Bill, explaining its objects to be to confirm an agreement between the Commissioner of Works and King's College for a lease to the latter of a waste piece of ground annexed by Act of Parliament to Somerset House.—The Marquis of Salisbury and Lord Redesdale expressed a doubt of the necessity of obtaining Parliamentary sanction to such an agreement. The Bill was read a second time.

CONSTANT WATER SUPPLY.—Colonel Beresford, on Friday last, in withdrawing his motion for a committee in reference to the constant supply of water to the metropolis, explained that he did so because he was not aware, when he gave the notice, that a large mass of evidence had already been taken before a select committee upon the subject. He hoped on a future occasion to select a better mode of proceeding with the matter than by moving for a select committee.

Building Intelligence.

CHURCHES AND CHAPELS.

BRIDGNORTH.—The new tower of the church of S. Lawrence, Bridgnorth, was opened on Wednesday week :—The stone employed in its structure is from the Town's Mills Quarry. The dressings are in red Alveley stone, and the paneling in the belfry windows are of white stone from the same district. The height is 125ft. to the top of the summit of the spire. The embattled cornice at the top is surmounted by eight other pinnacles richly crocketed. Underneath the belfry window, and immediately over the small light which is above the great south window of the tower, there is an elaborate carved niche, within which is placed the statue of the patron saint of the church. The large window in the tower is filled with stained glass, by Messrs. Clayton and Bell. The subject is the types of Baptism, the Saviour being the central figure. On either side are figures of Moses, Noah, John the Baptist, and Nicodemus. Messrs. Slater and Carpenter, of London, were the architects, Mr. Escourt, of Gloucester, the contractor, and Mr. Harry Hems, of Exeter, the sculptor.

MAYFAIR.—Berkeley Chapel, John-street, W, since its erection, has not undergone much alteration in the arrangement of the interior, and recently many important improvements have been made, not the least amongst which is the alteration of the old and cumbersome high-backed pews. The old reading-desk (which was as high and much larger than the pulpit) has been altogether banished; the floor of the sanctuary has been raised and enlarged, and the organ and choir have been removed from the east gallery to the north side on the same level with the floor of the sanctuary. Among the purely decorative improvements may be mentioned the recoloring of the sanctuary in such manner as to show up the pilasters, panels and mouldings; the pendentives of the ceiling are tinted in two shades of grey, with brown and red mouldings, and the panels are painted in encaustic, warm grey, and reddish brown, with slightly floriated diapers. The three panels over the altar are, each of them, painted in the early Italian style, upon a gold ground. In the centre panel is the figure of our Lord ascending to heaven, while a glimpse is given of the distant towers of the holy city; the side subjects are respectively SS. Peter and John. The capitals and bases of the pilasters are brown and gold, the shafts in Etruscan red, with broad bands of ivory colour at the top and bottom, ornamented with bronze-green, marone, and gold. The altar-cloth was supplied by Messrs. Jones and Willis. These improvements have been made from the designs, and under the supervision of, Mr. Pitman, of the firm of Pitman and Cuthbertson, 30, Newgate-street, E.C.

THATCHAM.—A new pulpit has been erected in the parish church of Thatcham, Berks. The pulpit, which is of Early English style of architecture, springs from a central column of Caen stone; this is surrounded by smaller columns of polished grey Devonshire marble. The front of the pulpit is divided into three compartments; the central portion contains a figure of S. Luke, the patron saint of the church, executed in alabaster. The background of this niche, like the rest, is carved in a diaper pattern, and enriched with gilding. In a compartment to the left is carved in bold relief the Evangelistic symbol of S. Luke, viz., the Bull; and in that to the right the "Agnus Dei," on a gold ground. These compartments are separated by shafts of polished red Devonshire marble, having floriated capitals. In the spandrels above, various flowers are beautifully and delicately depicted. The upper ledge consists of a band of conventional foliage of the Early English type, in bold relief, and from this springs a brass desk for the preacher. The pulpit is entered from the south side by a flight of stone steps, surmounted by an ornamental baluster in brass work. The whole of the work was executed by Messrs. Pool, of Lambeth.

BUILDINGS.

ABERDEEN.—The plans of the new Post-office building, prepared by Mr. Matheson, Edinburgh, have at length been issued by Her Majesty's Commissioners of Works, for the purpose of receiving tenders for the execution of the work. The whole building is to be of dressed Aberdeen granite, of a kind to be selected by the architect.

The style of the building, as far as indicated by the principal front, is Italian, and is neat and elegant rather than imposing in appearance. There are only two stories proper, although there is a basement floor with windows. The principal or entrance elevation is broken up into three compartments of equal length by rustic pilasters, and each division has two rows of three openings of uniform design. The windows have panelsills, moulded architraves, and are surmounted by cornices. The centre facade contains elegant triple entrance, and is surmounted by a pediment with plain tympanum. A massive block and space cornice with close parapet conceals the roof round the principal elevations. The front in the quay is somewhat plainer than that to Market-street, and the monotony of wall-surface is only relieved by three rows of windows and cornice, &c., all exact duplicates of those on the Market-street elevation. The elevation to the Shiprow, excepting the end of what might be called the main buildings, is of a plain description. The extreme length of the Market-street or principal elevation is 101ft.; the Shiprow elevation, 102ft. 8in.; and the Regent Quay, 82ft. 2in., leaving 11ft. 5in. of a lane in connection with the back of the sorting room, to allow delivery of the mail bags by the van.

CAMBERWELL.—The new buildings at the corner of High-street, Peckham-road, for the Camberwell vestry, are now so far completed that a portion of them will be opened for business about Lady-day. The Peckham-road elevation is entirely of Bath stone, with the exception of a number of sculptured figures and vases. The elevation is 77ft. in width, and 37ft. in height to the cornice, above which is an ornamental balustrade, making the entire height of the elevation about 40ft. The building is approached by a flight of nine steps through the principal entrance, leading into a vestibule and hall, 20ft. in width by 34ft. in length. Although the cost of the building was originally estimated at £8,000, several extras have since been decided upon, and it is now understood that the structure, when finished, will involve an expenditure of not less than £10,000 to £11,000. Messrs. D. King and Sons are the contractors.

CLERKENWELL WORKHOUSE.—The Guardians of the Holborn Union requested their architect, Mr. H. Saxon Snell, to prepare a design for rebuilding this workhouse, in consequence of the present building being in so decayed a state that a large quantity of timber shoring is necessary for its support. Plans for the accommodation of 500 inmates were accordingly submitted for the approval of the Local Government Board, at an estimated cost of £20,000, but they have requested the Guardians to refrain from building here until the St. Luke's workhouse, also belonging to the Union, has been rebuilt.

OXFORD.—The works of the new college extension, now in progress, have reached about the level of the one-pair floor, or rather more. Sir G. G. Scott is the architect. The amount of the contract in progress, and in the hands of Messrs. Jackson and Shaw, the contractors, of Earl-street, Westminster, is about £23,000, and forms one wing of a larger design, a central tower and another wing being the works in contemplation for its completion. The character of the work will be Mediaeval. The area is 180ft by 45ft., and the height from footings to ridge 75ft. There will be two new lecture-rooms, each about 36ft. by 22ft. and the remainder of the building is planned for the residential accommodation of students, professors, and fellows. The fronts are entirely of stone, obtained from Milton and Taynton, about twenty miles from Oxford.

METROPOLITAN CONVALESCENT INSTITUTION.—The Committee, having purchased a site upon Kingston-hill, determined to erect a building for the reception of the children convalescents now provided for in two old-fashioned houses situated at Mitcham and Hendon. Accordingly they invited four architects to send plans in competition for the proposed building, but upon reconsideration they withdrew their invitation, and called upon Mr. H. Saxon Snell to prepare a design. The working drawings and estimates are being prepared, and tenders will be invited so soon as the legal transfer of the ground has been completed. The building will accommodate 200 children, and the estimated cost is about £17,000.

MIDDLESBROUGH.—The plans for the new North-Eastern station—prepared by Mr. Cudworth, the engineer of the company, and Mr.

Peachey, of Darlington—have been to a certain extent completed. The station will be constructed on Gothic principles, with a spacious porch in front. It will have platforms on each side, 720ft. in length. There will also be a spacious excursion platform a little further west, of about the same length; and separate offices for booking and accommodating excursionists. The entire width of the station within the walls will be 120ft., and the roof will be constructed, chiefly of glass, in three bays. Several collateral improvements of considerable importance are embraced in the new scheme. The cost of carrying out these alterations, including the building of the new station, is approximately stated at from £100,000 to £150,000.

PLYMOUTH.—It is now probable that the northern block of the Guildhall will very soon be entered upon. The rooms to be occupied by the Town Clerk, the Treasurer, the Town Surveyors, and such other officials as are to be provided for in the northern block, will all be in full occupation in the course of a month from the present time. It is proposed to surround the open spaces at the north-western end of the building, abutting on Westwell-street, with an iron railing, similar in its character and style to that which surrounds S. Andrew's churchyard, in a new granite base. The southern block is being proceeded with as well as the weather and other circumstances will permit. It is doubted whether, with all the pushing in the world, the Great Hall could be got ready by June next in time for the Agricultural Show. The police department at the eastern end has work to be done that will take months to complete. There has been no stint of money, for every pound that has been asked for by architects or contractor has been instantly forthcoming. All the sub-contracts that have had to be made have been immediately taken. There has been no "clique" interference whatever to mar the progress of the work; but, if anything, it has been the other way. There has been a great desire to press on the work by those in authority, when they have been told that to do so would be not to give to the building that rest which is essential to the proper settlement of such works as this.

SCHOOLS.

NORTHAMPTON.—The School Board at Northampton have decided on employing a professional adviser to report upon the plans submitted in competition for their two new schools. They have consulted Mr. Roger Smith, who, we understand, has examined the plans and sent in his report.

RINGLEY.—On Saturday week new church schools were opened at Ringley. The style is Gothic. The materials are bricks, with stock-brick facings, and stone dressings. The walls of the rooms internally are tinted in two colours, with stencil ornaments. The architects are Messrs. Maxwell and Tuke, Bury.

THE LONDON SCHOOL BOARD.—It has been determined that the schools at Brockley-road, Greenwich, shall accommodate 750 instead of 600 children, and additional ground having been acquired, the architect, Mr. H. Saxon Snell, has been directed to remodel his designs accordingly.

WARRINGTON SCHOOL OF ART.—The annual meeting of the members of the Warrington School of Art was held on Wednesday week. The report stated that the number of persons receiving instruction in drawing in or through the agency of the School of Art during the year ending June, 1872, has been 349. The school received one gold medal out of the ten gold medals offered for competition to the 110 Schools of Art, ten third grade prizes of books, and 13 second prizes at the Local Examinations. Ninety-four students sent up 364 works to the annual examination in London, last April. Ninety-one candidates presented themselves last April at the annual examinations, of whom 43 were successful in passing one, or more exercises. Free studentships were conferred by the Department of Science and Art on Benjamin Jameson, John A. Sherlock, and William L. Rothwell, for sufficient and satisfactory works during the year.

A new company, with a nominal capital of £15,000, has been formed for the purpose of erecting baths (including a swimming-bath) at Eastbourne. Tenders are already out for the greater part of the work, and the site is being excavated for the swimming-bath.

The western wing of the Taunton and Somerset Hospital is to be extended southwards at a cost of £1,087. Mr. S. Shewbrooks is the contractor.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

To OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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RECEIVED.—W. B.—J. P. S.—E. T. and S.—Intending Competitor.—J. H.—T. K.—K. M.—R. P. O. Co.—D. and Co.—Monumental Mason.—Inquirer.—A. M. and Co.—W. P. B.—J. B.—J. M.—J. and R. H.—S. F. P.—G. W. G.—W. R. W.—J. S.—S. Brass.—J. P. G.—D. and H.—R. C. P.

ERRATUM.—In the letter on "Building Stone," on p. 289 in the last number, the quotations of Yorkshire stone should have been at per hundred superficial feet, and not at per thousand.

A SUBSCRIBER.—Send sixpence to Mudie for a list of his second-hand books on hand.

R. A. HILL.—Sketches to hand.

J. P. CLOSE.—Sketches to hand.

"BUILDING NEWS" CHURCH-PLANNING COMPETITION.—As the time is extended, we have taken a little longer time to answer all inquiries, which we will endeavour to do next week.

A. JOHNSON.—Drawing returned.

Correspondence.

NOTES ON STONEWORK.

To the Editor of the BUILDING NEWS.

SIR,—In pointing out, in article No. IV. on this subject, what I considered to be merely a sort of clerical error of Mr. Hull's, when he said that blocks of stone 18ft. square were sent to London, I did not intend to convey that masses of that size could not be raised from the quarries, if necessary; but that, in the ordinary course of business, blocks of 18 square feet were probably meant. Your correspondent "South Devon" says that even larger masses of stone can be got at the quarries he visits. Many things are possible that yet are not practically useful, and such a mass of stone as 18ft. square would not be practically useful, because it would be difficult to move it, and convey it from place to place. Columns 14ft. high, or even 20ft. high, are different things, and are more easily moved. The block of 15 tons mentioned by "South Devon" was a very big stone, but not an impossible one at many quarries.—I am, Sir, &c.,

THE WRITER OF THE ARTICLE IN QUESTION.

PLYMOUTH TOWN-HALL.

Sir,—Whilst we decline a controversy with your correspondent Mr. James Hicks, permit us to say in reply to his letter, that we have acknowledged, in the most public way, Mr. E. W. Godwin as our consulting architect for this building, and that we frankly recognise his services in that capacity. He would not, however, we are sure, any more than ourselves, wish to monopolise the honour which may attach to the authorship of

the design which is being carried out; and it so happens that "the very piquant circular tower," instanced by your correspondent, was designed by us independently altogether of our friend's suggestions.

Your correspondent speaks of "error and injustice." He may write as many letters as he thinks proper on the subject he has chosen for criticism, but we hold him responsible for every mis-statement he makes.—We are, sir,

NORMAN & HINE.

Plymouth, March 11th.

PROFESSIONAL PRACTICE.

SIR,—Allow me to say that your correspondent, "An Old Subscriber," has misunderstood me, if he supposes that I advised the members of the Architectural Association that architects are entitled to share the commission of quantity surveyors in return for introducing the business. An architect has no right to receive a penny from any one for introducing business. The case which I contemplated was the common case of an architect being competent and willing to do a full share of the work, and I think he then might not unjustly take a share of the pay of the quantity surveyor.—I am, Sir, &c.,

T. ROGER SMITH.

"HOUSEHOLD TASTE."

SIR,—There are few persons at all conversant with decorative art who are, I think, unacquainted with the use of the word "proper" as a term to describe objects tintured in their natural colours; the writer of the letter censuring the illustration of designs issued by Messrs. Cox and Sons appears to be unaware of this usage, and I am happy to offer him the explanation he desires, and to refer him to the "British Compendium" of heraldry, or any rudimentary work on the subject.

"W. W." objects to the use of the word "artist," in connection with this illustration. I cannot describe myself as its draughtsman, and as he says my picture-frame is borrowed from the sacristy of some cathedral, or from Wardour-street, I suppose he will equally object to my signature of a

DESIGNER.

CHEAP ASSISTANCE.

SIR,—The inclosed advertisement, which may be interesting to the profession generally, is cut from a Manchester paper of this date (March 10):—

"An Assistant Architect, twenty years' experience, will undertake to prepare, on commission or otherwise, designs for buildings, drawings, specifications, less than half the usual terms.—F. A., Printer's"—I am, Sir, &c.,

W. B.

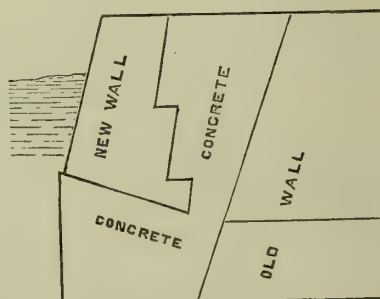
Intercommunication.

QUESTIONS.

[2804.]—Measurement of Joiners' Work.—Two surveyors would ask Mr. Fletcher if he is in the custom of measuring the winders in a staircase as he has described in his article (No. IX.) printed in your last. They are inclined to think that the quantity of stuff in the winders in question is more like 20ft. superficial than 10ft. 10in., and that Mr. Fletcher, in his calculation, has entirely omitted the quantity of material in the risers. Perhaps a little more care is requisite in articles written for the purpose of practical instruction.—L. & T.

[2805.]—Albert Durer.—How can one judge of the genuineness and value of impressions of this artist's works? Are some subjects more scarce than others, or is their worth determined by the early or late date of their working from the plate? Have the plates ever been re-engraved, and spurious impressions published? I saw an account of a recent sale at which one specimen fetched 476—subject, Adam and Eve.—FORTY WINKS.

[2806.]—River Wall.—I have a river wall to build in front of an old river wall for a warehouse, and am persuaded to set the footings on the concrete sloping towards the existing old river wall thus:—



I should like the opinion of your readers, as it strikes me that this is no improvement upon the level footings.—E. P.

[2807.]—Main Drainage of Towns.—What amount of rainfall per hour should be provided for in calculating

the size of trunk or intercepting sewers for towns where the annual rainfall is 36in., and occasionally, about once a year, 4in. rainfall in 24 hours? Or, in other words, how many acres will each cubic foot of water per second discharged, drain, without causing the sewers to be more than full?—LANKY.

[2808.]—Internal Decoration.—Can any of your readers inform me whether there are any classes or other means by which a young man staying in London for a few months can obtain instruction in the internal decoration of houses? He has a partial knowledge of this, but wishes for improvement.—A. K.

[2809.]—Quantities for Cabinetmakers.—I have read with much interest the able remarks by one of your kind correspondents on the art of getting out quantities, measuring up, and estimating for joiner's work. To any one not proficient, like myself, such information is invaluable. I am by trade a cabinetmaker, and being desirous of obtaining a situation as manager or foreman, I heartily wish some equally able man in my trade would explain any good method he has adopted by which I could help myself, for instance, to estimate for a dining or drawing-room suite, and so work up from that to furnishing a house. Any suggestions that may appear from any of our readers will be kindly appreciated.—C. W.

[2810.]—Economy in Use of Fuel.—Can any of the architectural profession supply us with information respecting the applicability of the system of warming cheese-rooms at the Derbyshire cheese-farms to the rooms in ordinary houses? The system which has been in use is somewhat as follows:—Behind the large kitchen fire-places an oven is placed, acted upon immediately by the heat of the kitchen fire at the front. Air is introduced to these ovens by a pipe or channel communicating with the outer air, and other tubes, pipes, or flues are laid from the tops of these ovens, and conducted to the cheese drying-rooms—in some cases as much as 12yds. distant—and the rooms are by this means found to be heated to the required temperature. In what way does this system, which is not patented, differ from the system of the Manchester school-grate, which is a patented invention? And if I employ the cheese-room system, shall I be encroaching upon the rights and privileges of the inventors of the Manchester school-grate? I do not wish to incur any liability of infringing a patent and I shall be much obliged if you or your readers can explain to me of what the difference consists. It may be, that my explanation of the cheese-room system is wrong, and I shall be glad to be set right, if some one of your Derbyshire readers will set me right.—INQUIRER.

REPLIES.

[2797.]—Durability of Stone.—In reply to "Stonemason," I may say that it is my intention by-and-by to state other tests of the durability of stone in addition to that given in the last article; but I think that probably in the mean time the question may be answered by some of the readers of the BUILDING NEWS who have had some experience in the matter. The subject is quite wide enough to admit of different opinions.—AUTHOR OF "NOTES ON STONEWORK."

[2797.]—Durability of Stone.—"Stonemason" desires to be informed of tests to prove the durability of building-stone. I know of none more convincing than the action of the weather on different kinds of stone lying side by side in buildings for many centuries past. If he could favour me with a visit to this locality, I would show him churches and other buildings, built of Plymouth limestone and granite, where it may be seen that the limestone is as good and almost as fresh now as it was when first put in the buildings, whereas the granite shows very great indications of decay. This, no doubt, is in consequence of limestone being more dense, compact, and of finer texture than granite. I take the above (or weathering process) to be as strong evidence and proof as any argument that can be advanced by theory, that limestone is more durable than any other stone that I know of—far superior to millstone grit or sandstones of any kind; and instead of being less than the crushing power of Cornish granite, it is one-eighth more.—JOHN GOAD, Plymouth.

STAINED GLASS.

BURGATE.—A stained-glass window has just been put up in the chancel of Burgate Church, in memory of the late Rev. C. R. Ashfield, who was rector of that parish for 36 years. It is in three compartments, and the subjects, which are placed beneath canopies, illustrate three of our Lord's miracles, viz., the Raising of Jairus's Daughter, of the Widow of Nain's son, and of Lazarus. Under each subject appears an angel bearing a scroll with an explanatory text upon it. In the tracery of the upper portion of the window, emblems of the Holy Trinity and the Alpha and Omega are introduced. At the bottom is an inscription. The window is the work of Messrs. Lavers, Barraud, and Westlake.

WOODDITTON.—A stained-glass window has been inserted at the west end of Woodditton Church, at the cost of Miss Dobito, as a memorial to her father, mother, and two brothers. The window consists of three lights, divided by a transom, and the six openings are filled with representations of the Six Acts of Mercy, enumerated in Matthew xxv. 35, 36. The window was designed and executed by Messrs. Favill and Ellis, of Cambridge.

WATER SUPPLY AND SANITARY MATTERS.

BRIGHTON.—At the last monthly meeting of the Brighton Intercepting and Outfall Sewers Board, the engineer, Mr. J. Hawkshaw, reported that the works were progressing most satisfactorily; 9,800ft. of brickwork had been put into the 5ft. diameter sewer, and in the 7ft. diameter sewer the total length of heading that had been driven was 16,000 lineal feet, of which 16,200ft. had been lined with brickwork.

DONCASTER.—The extensive sewerage works which the Corporation of Doncaster have been carrying out during the last two years, and which have involved an outlay of about £25,000, have just been completed, and the sewage of the town is now being pumped up in a farm at Landall, three miles off, and being utilised in the irrigation of the land. The farm consists of 265 acres, and is the property of the Corporation. It has been let to Mr. Richard Brundell, Burntrood Hall, for a term of fourteen years, at £800 per annum. The whole of the works have been designed and carried out by Mr. B. S. Brundell, C.E., of Doncaster.

DRAINAGE OF THE FENS.—At the general half-yearly meeting of the Middle Level Commissioners, held on Thursday week at March, in the Isle of Ely, a report from Mr. Hawkshaw, engineer, was read, in which he stated that if the effectual drainage was to be by siphons, 48 more than are at present in use would be required, which could not be constructed at less, with the present price of iron, than £2,200 a siphon, or, for the whole additional number, £100,000. To continue the drainage by siphons would involve a greater expense than if a sluice were erected. The siphons had answered the purpose for which they were devised—namely, a temporary provision in a great emergency. Mr. Hawkshaw could not see his way clear to recommend their adoption as a permanent system, and had therefore come to the conclusion to advise the construction of a sluice. The meeting adjourned until the 3rd of April to discuss the subject.

THE PURIFICATION OF THE KELVIN.—The Commissioners appointed by Government to inquire into the pollution of rivers in Scotland have recommended that steps be taken for the purification of the Kelvin with all its tributaries, and the Commissioners are about to issue circulars to the different sanitary inspectors whose jurisdiction embraces any part of the river, to carry this into effect. The order of the Commissioners will embrace the interdicting of all paper, print, dye, and bleachworks, including all the public works between North Wood side, Glasgow, and Campsie, from polluting the river. It will also become illegal for any portion of the town sewage being discharged into the Kelvin. Having this in view, it is understood that the Glasgow authorities have prepared a plan to deal with the Pinkston burn, by taking it through the West End Park, down through Stobeross, and into the Clyde. The burgh of Maryhill will have to expend several thousand pounds in making a common sewer to connect their drainage with the Pinkston burn drainage at the West End Park. Camiesburn, Milngavie, and Campsie, the sewage of which also finds its way into the Kelvin, will also have to adopt measures for otherwise disposing of it; but the population of these places not being large, cesspool drainage may be found sufficient for some years to come.

LAND AND BUILDING SOCIETIES.

BRADFORD THIRD EQUITABLE BENEFIT BUILDING SOCIETY.—On Wednesday week the annual meeting of this society was held. The 19th annual report was read by the secretary, who explained that the reserved fund of £50,000 deposited with the Bradford Banking Company was placed there to be used in the case of emergency, for which 4 per cent. was paid.—The Chairman, in moving the adoption of the report, congratulated the shareholders on the healthy and prosperous state of the society, which at the present moment was doing an immense amount of business and a great deal of good. The society so far had not lost a single shilling, and there was not a doubtful security in its possession.

DRIFFIELD BENEFIT BUILDING SOCIETY.—The eighth annual meeting of the members of the Driffield and East Riding Benefit Building Society was held in the Court-house on Thursday week. The report stated that during the year 167 shares had been taken up, being an advance of 57 on the previous year, and the amount advanced was £4,010, being £1,730 more than in the preceding twelve months. The assets were over £13,000, and the profits of the year were £530. 9s. 8d., which allowed a dividend of 7½ per cent. and £11. 8s. 7d. to be carried to the reserved fund, increasing it to £190. 1s. 10d.

SALISBURY AND SOUTH WILTS BUILDING AND INVESTMENT SOCIETY.—At the annual meeting of this society, held last week, the directors reported that during the past year £1812. 10s. had been advanced on mortgage; that 85½ new shares had been issued, making the present number 473½, viz., 310 held by investing, and 163½ by borrowing members, or 70 more than were in existence at the close of the last year, whilst only £92. 12s. 6d. had been withdrawn by members. The capital account showed that the total receipts of the society since its establishment six years ago had amounted to £15,187. 17s. 10½d., and the payments to £14,843. 8s. 4½d., leaving a balance in hand of £344. 9s. 6d.

LEGAL INTELLIGENCE.

IN RE PETO AND BETTS.—COURT OF BANKRUPTCY, MARCH 6TH (before MR. REGISTRAR ROCHE).—At a dividend sitting under the joint estate of Sir Samuel Morton Peto and Edward Ladd Betts, trading in co-partnership with Thomas Russell Crampton, in Great George-street, Westminster, as contractors, it was stated that a dividend of 2s. 8d. in the pound had already been paid upon proofs which represented a total of £1,119,312. Mr. Paget, the official assignee, also reported that the available assets consisted of Consols, £27,171. 11s. 8d., and cash £20,673, but further funds being anticipated, an adjournment *pro forma* was granted until the 27th March.

THE THAMES CONSERVANCY AND THE SEWAGE OF WINDSOR.—At the Windsor Borough Sessions, Mr. English, on behalf of the Thames Conservators, made an application for a summons against the Windsor Local Board of Health, for neglecting to comply with the notice to discontinue the flow of the sewage into the Thames. It was stated that the local board had laid themselves open to a penalty of £35,400. The summons has been made returnable for Thursday, the 20th inst., when the case will be fully gone into. Mr. H. W. Jones stated that the reason why the notice had not been complied with was that the Crown would not grant them land for the sewage purposes, although three suitable sites had been selected, and the board were unable to obtain land from the Crown by compulsory powers, as they would do if it belonged to private individuals.

Our Office Table.

CAMPHOR WOOD.—The camphor tree belongs to the order *Guttifere*, and grows without cultivation in India in the woods near the sea coast. It is frequently found upwards of 15ft. in circumference, and high in proportion. For carpenters' work the wood is much esteemed, being easy to work, light, durable, and not liable to be injured by insects; and it retains a pleasant and agreeable smell. It is especially suitable for shipbuilding and for the construction of wharves and jetties, as it is not destroyed by sea-worms. Piles of this wood, in a comparatively good state of preservation, exist on the site of the old town of Johore, which was abandoned upwards of 100 years ago. The breaking strain of a piece 3ft. long, by 1½in. broad, and 1½in. wide, has been found to be 1,344 pounds. Its weight is 70 pounds per cubic foot. Large saw mills have been erected in Johore for the purpose of preparing this valuable timber for exportation.

EDINBURGH AND LEITH ENGINEERS' SOCIETY.—A meeting of this society was held on Wednesday week—Mr. Alan Brebner, C.E. president, in the chair. A paper was read by Mr. R. C. Reid, C.E., on mortar and concrete. The writer, having given a brief *résumé* of the different kinds of limes and cements, proceeded to examine in detail the materials required for making mortar, and the reasons for using them. The absence of some guiding principle in the mixing of mortar was pointed out. The great advance in the manufacture of cements Mr. Reid attributed chiefly to the tests which were first introduced in the London Main Drainage Works. Instances were given where concrete is now successfully employed in the construction of sea works, and the communication ended with brief quotations from specifications of mortar by various engineers.

EXETER CATHEDRAL.—What has been hitherto known as the "verger nuisance" at Exeter Cathedral is now abolished. The Dean and Chapter have placed the vergers on what are considered very liberal fixed salaries, and, as will be seen by notices placed in the Cathedral, all fees and perquisites of every kind which they have been in the habit of receiving will be abolished. A payment of sixpence will, however, be expected from every person wishing to see the choir, aisles, chapels, and tombs; but this, instead of going into the pockets of the vergers, will be deposited in boxes placed in the Cathedral, and applied strictly to cathedral purposes. Several portions of the statuary work of the reredos have arrived, and in a short time it is hoped that the works in the Choir and Lady-chapel will be completed.

NATIONAL MONUMENTS.—Sir J. Lubbock's Bill proposes the appointment of a Commission (to be a corporation) for the preservation of ancient national monuments. The majority of the members will be *ex officio*—the Inclosure Commissioners for England, with the persons for the time being holding the offices of Master of the Rolls in England, the President of the Society of Antiquaries of London and Scotland, the President of the Royal Irish Academy, the Keeper of the British Antiquities at the British Museum; and to these are to be added three Commissioners nominated by the Crown. The Act is to apply to any British, Roman, or Saxon remains, or to any monument similar to such as are specified in a schedule, not being situate in any park, garden, or pleasure ground, and not being the ruins of any castle, fortress, abbey, religious house, or ecclesiastical edifice. The Bill is to be applied by giving notices, public and private; and where applied, no person will be allowed to injure or permit in-

jury to the monument. But the owner or occupier of the site may give notice to the Commissioners of his intention to deal with the monument in a way described in the notice, and requiring them to consent thereto, or to purchase the monument or a power of restraint. There is to be a right of appeal to a Court of Law or Equity. The Commissioners may, by agreement, acquire a monument, of whatsoever kind and wheresoever situate, or a power of restraint. The Commissioners may, with a power of consent of the Treasury and the owners, do works necessary for the preservation of a monument.

THE MODEL OF THE THAMES EMBANKMENT.—Lord Elcho, in his letter with reference to Northumberland House, which appeared in the *Times* last week, stated that the great model of the Thames Embankment, some time since exhibited in the Houses of Parliament, has been banished he knows not whither. A correspondent writes to us that the model is now deposited in a refreshment saloon of the Bethnal-green Museum, where it may be seen by those who desire to make use of it as a ready means of forming a judgment on the proposals made with reference to an opening into it from Trafalgar-square. Our correspondent mentions that when he saw it the Middle Temple Library had been reversed, so as to make the great south window face Garden-court.

THE LEICESTER MUNICIPAL BUILDINGS.—At the meeting of the Leicester Town Council last week, the following report of the Municipal Buildings Committee was adopted:—The Municipal Buildings Committee have to report that many inquiries having been made by intended competitors for designs of municipal buildings as to the mode of selection, and resolutions received from the Society of British Architects, London, and from the Leicester Society of Architects, expressing their views on the subject, they have considered the question, and are of opinion that it is desirable that the mode of selection should be determined upon at an early period, and at once made known to competitors. Considering the difference of opinion which exists in the profession as to the best way of reducing, classifying, and finally selecting competitive designs, your Committee feel a great responsibility in recommending the mode of selection, but they have given the matter their most careful consideration, and submit the following proposals to the Council:—That the Municipal Buildings Committee shall, in the first place, reduce the number of designs to ten, and refer such ten designs to some competent professional man, who shall select five out of the number so referred to him, and report upon each, placing them in their relative order of merit; the final decision as to the award of the first, second, and third prizes, being left to the Council. The Municipal Buildings Committee shall select their professional men, and refer the election, out of the three so chosen, to the authors of the ten plans.

THE CHELSEA WHARF.—The Metropolitan Board of Works sanctioned on Friday last the purchase by the vestry of Chelsea of the Cremorne Wharf, for the sum of £13,000, subject to the works being carried out in a satisfactory manner. General Sir W. Codrington asked if the Conservators of the Thames had been consulted in the matter. Mr. Rogers replied that the Board had nothing to do with the Conservators, that being the business of the vestry.

THE METROPOLITAN BOARD AND THANKSGIVING DAY.—We are glad to learn that the objections to the extravagance of the Board of Works are not likely to be so speedily silenced as might have been imagined from Colonel Hogg's answer last week in the House of Commons. The ratepayers generally have reason to be grateful to those of their fellows who, having the means and leisure, have determined upon seeking the restitution of the £3,579 which was illegally expended on Thanksgiving-day. A fund is being subscribed to meet the expenses of filing a bill in Chancery, and it has already amounted to a very considerable sum.

TRAMWAYS IN LONDON.—Two Bills have been laid before the House of Commons by the Board of Trade for confirming provisional orders made by that Board for the construction of metropolitan tramways. One of the Bills includes tramways in the heart of London, and authorises a line from the south, running along Waterloo-road, over Waterloo-bridge, and to a point 90 yards north of the northern tollgate on that bridge. The Bill

includes also a line from the south, crossing Blackfriars-bridge, and then passing along New Earl-street, and terminating at the lamp standard and safety-crossing in Queen Victoria-street, at the junction of that street with the Poultry; also a line from the north along Farringdon-street, passing over Blackfriars-bridge and along Southwark-street to the Borough High-street.

A NEW ARTIFICIAL STONE.—A patent has been granted in the United States for a new artificial stone, produced by treating asbestos, either ground or in fibre, with silicate of potash or soda, then pressing the same into moulds of the desired form or shape, saturating the mass with chloride of calcium, either pure or mixed with chloride of magnesium, and finally washing it in pure water. The result is a compound claimed to be fire-proof and impervious to water, which can be used with great advantage for many different purposes. By preference, the bittern, or mother water, from salt works, is used to saturate the blocks after they are pressed. The action of chloride of calcium and magnesium upon the alkaline silicate previously mixed with asbestos, is to decompose the silicate and form insoluble silicate of lime and magnesia, with soluble chlorides of potassium or sodium, the latter being readily removed by washing with water. The principal advantage claimed for the compound is that it preserves a certain degree of elasticity, mainly due to the fibrous nature of the asbestos, which cannot be attained if, in place of the asbestos, clay or other material of a similar character is employed.

A FIREPROOF PAINT.—Mr. C. P. Crossman, West Warren, Massachusetts, has invented a paint said to be fireproof. Take of common lime, freshly slaked, of hydraulic lime, and of silicious or argillaceous matter (sand or pulverised slate), equal parts, to which add cow's milk in sufficient quantity to give the whole, when thoroughly mixed, the proper consistency for laying and spreading with the ordinary brush. Any desired colouring matter may be added. For roofs, shingles, tin-work, or iron-work, the inventor proposes to use "Brandon brown," a pulverised mineral obtained at Brandon, Rutland County, Vermont. When this material is used, the proportions should be one part Brandon brown, ten parts common lime, ten hydraulic lime, ten of sand or pulverised slate, and milk enough to give the requisite consistency. The addition of glue or resin may in some cases be of value. The proportions may vary considerably, but those above given are considered to produce the best result.

THE LATE R. W. THOMSON, C.E.—Mr. R. W. Thomson, best known as the inventor of the road-steamer, died at his house, No. 3, Moray-place, Edinburgh, on Saturday evening last, in the fiftieth year of his age. He was born in 1822 at Stonehaven, and was by his father destined for the pulpit, but an invincible hatred of Latin barred this path at an early age, and at fourteen he was sent to a brother at Charleston, U.S., to be made a merchant of. He returned to Scotland, where he resided till 1852, when he went out to Java to erect some sugar-machinery. In 1862 he returned to settle in Edinburgh and to perfect his best-known invention—the road-steamer—a traction-engine with thick indiarubber wheels on the driving-wheels. Four or five years ago, when busying himself about his invention, he was smitten with *locomotary*, and lost the power of walking. Since then he has been an invalid, constantly confined to the sofa or his bed, and afflicted with all the diseases that result from inability to take exercise. Even under terrible pain he never repined, but worked to the last hour, not with mere resignation, but with a noble contentment.

THE LATE SIR FREDERICK MADDEN, K.H.—The antiquarian world will regret the death of Sir Frederick Madden, who was for many years officially connected with the British Museum as Keeper of the Department of Manuscripts. The seventh son of Captain Madden, of the Royal Marines, he was born in 1801 at Portsmouth. About the year 1825 he was engaged to assist the late Mr. Roscoe in compiling the catalogue of the MSS. at Holkham; and the skill and ability which he displayed in making and annotating the catalogue led to his employment at the British Museum to assist in compiling the classified catalogue of printed books which was then in progress. In 1828 he was appointed Assistant Keeper, and in 1837 Keeper of the MSS. In this capacity his services were most efficient, as the gradual increase of the magnificent collection of

MSS. in the Museum abundantly testifies. In 1832 he was honoured by the late King with the Knighthood of the Royal Hanoverian Guelphic Order. Sir Frederick was also a diligent author, and his numerous works have generally a bearing on English history and the early progress of English language and literature.

CHIPS.

Mr. Christopher Thwaites, C.E., son of the late chairman of the Metropolitan Board of Works, has been elected to the office of city engineer and surveyor for Norwich.

The Princess of Wales has consented to preside at the distribution of medals gained by the students of the Female School of Art, Queen-square, Bloomsbury, on Wednesday, the 26th instant, in the theatre of the University of London, Burlington-gardens.

Sir George Gilbert Scott's final lecture previous to his retirement from the Professorship of Architecture at the Royal Academy, will be delivered on Thursday next.

Trade News.

WAGES MOVEMENT.

BIRMINGHAM.—An important meeting was held on Friday last of employers and operatives in the Birmingham building trades for the purpose of choosing arbitrators to decide on the notices tendered on both sides for important changes in the hours of working and wages. The time rules have been in force since May, 1872, and the last advance in wages was made in September. The present hours of work, in the case of the carpenters and joiners, are from six o'clock to five (with an hour and a half for meals) on each of the first five work-days of the week, except for six weeks before and six weeks after Christmas, when, where artificial light is not furnished, the hours are from seven to five, with one hour for meals. The men propose that the hours shall be from seven to five all the year round. The employers have given notice that the hours shall be from six to five from March to October inclusive, and seven to five from November to February inclusive. The carpenters have given notice of several important changes in regard to overtime, the effect of which, it is urged by the masters, would be to discourage overtime. The present rate of carpenters' wages is 7½d. per hour, which the men propose shall be raised to 8½d. An important alteration in the rules is also proposed by the carpenters. The rule on "the authority of the employers" reads thus, "Each employer shall have power to conduct his own business in any way he thinks advantageous in the matter of letting piecework, in taking apprentices, in using machinery and implements, and in all details of management not infringing the direct liberty of the workman." The men propose to abolish this rule, substituting nothing in its place. The employers contend that if they accede to this they will cease to have any control over their businesses. The bricklayers have given notice for an advance from 7½d. to 8½d. an hour.

GLASGOW.—A largely attended meeting of the Glasgow joiners was held in the Choral Hall on Saturday, for the purpose of "forwarding arrangements for carrying out the present demand." Mr. James Main moved:—"That we, the joiners of the Glasgow district, still adhere to our demand of one halfpenny per hour of advance, to come into force on the 1st April, 1873." Mr. Fulton moved as an amendment—"That they do not go in for an increase of pay at the present time." Only five hands were held up in favour of the amendment, while the motion was carried almost unanimously. Mr. Manson moved "That in accordance with the previous resolution, we call upon all shops and squads to appoint deputations to wait upon their employers and get an answer to our demand; said deputation to meet on Saturday, 29th March, to give in their reports." The motion was carried by acclamation. A motion was also carried to the effect that all those who had not joined the association should be called upon to do so without delay, as the new branch in Bath-street would be open for a short time to receive members at half the ordinary entrance money.

HUDDERSFIELD.—The painters of Huddersfield have demanded an increase of ½d. per hour in their wages.

LONDON.—A memorial from the carpenters and joiners of London has been addressed to the Central Association of Master Builders asking for an advance of ½d. per hour. It is expected that a general meeting of masters will be held to consider the demand.

SMETHWICK.—At a meeting of the operative bricklayers, held at Woods' Stores, Smethwick, last week, it was resolved "to inform the masters of West Bromwich, Oldbury, and district, that the men who are now working by the day wish to be paid by the hour, and at the rate of 7½ per hour; that is, those not ranging in the Birmingham district. All those in Birmingham district to adhere to their code and rules. To come into operation on the 1st May, 1873."

THE MEASUREMENT OF TIMBER AT LIVERPOOL.

An influential meeting of builders and timber merchants was held in the Clarence Hotel, Spring Gardens, Manchester, on Friday, the 7th March, 1873, when the following resolutions were passed unanimously:—

(1) That this meeting has learned with surprise and regret that an attempt is being made in Liverpool to abandon the long-established custom of measuring timber by string, with a view to substitute measurement by calliper, thereby compelling the purchaser to pay for more than he receives, both in respect of timber and the carriage of same.

(2) That this meeting pledges itself to oppose, by every means in its power, any attempt to change the old legitimate mode of measuring so long practised in the port of Liverpool.

(3) That all parties who are in the habit of purchasing timber in Liverpool be requested to communicate the foregoing resolutions to the merchants with whom they do business, and protest against the introduction of a system so unfair and uncalled for; requesting that before any steps are taken in the matter, an opportunity be given to the consumers to state their reasons for disagreeing with the proposal.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.

24 by 12	22 by 12	20 by 10	18 by 10	18 by 9
420s.	370s.	285s.	215s.	222s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8½
222s. 6d.	170s.	212s. 6d.	130s.	77s. 6d.

Per m. of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pipes, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Bed Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BARROW-IN-FURNESS.—For main sewerage works. Contract No. 2. Mr. Arthur Jacob, engineer.

Bulmer	£14,000	0	0
Morgan	13,500	0	0
Chappell	11,823	0	0
Winter	10,650	0	0
Dovener	10,500	0	0
Naylor	10,500	0	0
Helm	10,014	0	0
Moore	9,984	0	0
Dawson	8,500	0	0
Fishburn	6,990	0	0
Ritson	6,698	0	0

BIRMINGHAM.—For warehouse and shopping, Freeman-street, Birmingham, for Messrs. Hassall and Singleton, ironfounders and engineers. Quantities supplied. Mr. W. Hale, architect.

Charley	£1,290	0	0
Parker and Son	1,235	0	0
Parton	1,235	0	0
Barnsley and Sons	1,228	0	0
Jeffery and Pritchard	1,200	0	0
Partridge	1,200	0	0
Matthews	1,197	0	0
Bennett	1,195	0	0
Wilson and Son	1,195	0	0
Moffatt	1,193	15	0
Surman and Son	1,190	0	0
Barker and Son	1,155	0	0
Ravenscroft and Son	1,155	0	0
Davies Bros.	1,125	0	0
Preece	1,079	0	0
Horsley Bros. (accepted)	1,075	0	0

CHARTHAM HATCH (near Canterbury).—For the erection of school and residence at Chartham Hatch. Mr. W. Elsmore, architect:—

Eismore, architect:—		School	School Residence
		and Offices.	and Offices.
Wiltshier	£287	10 0...	£515 0 0
Cozens	280	0 0...	499 0 0
Gentry	281	0 0...	495 0 0
Foad	272	10 0...	487 0 0

DOVER.—For two farm-labourers' cottages at Lydden, near Dover, exclusive of carriage of materials. Messrs. Whitley and Fry, architects, Dover.

Tunbridge and Denne	£410	0	0
Tipler	380	0	0
Pain	379	0	0
Tucker (too late)	366	0	0
Bourne (accepted)	360	0	0

GODSTONE.—For new tramp cells, receiving wards, and porter's lodge at the workhouse, Bletchingley. Mr. Alex. R. Stenning, architect, 157, Fenchurch-street. Quantities by Mr. W. R. Gritten.

Ansonbe	£1,678	0	0
Cook	1,673	16	0
Coles	1,645	0	0
Crossley	1,635	0	0
Smethurst	1,567	0	0
Wallis and Son	1,518	6	6
Woodward	1,500	0	0
Jarrett	1,480	0	0
Sutton	1,450	0	0
Hickinbotham	1,440	0	0
Lacy	1,401	0	0
Worsell	1,375	0	0
Galyer	1,350	0	0
Morris	1,332	0	0
Wright Bros. and Goodchild	1,325	0	0

FOR ENGINEER'S WORK TO THE ABOVE.

May	£201	13	0
Rosser and Russell	197	5	0
Clark (too late)	193	7	0
Fraser Bros. (Hot-water only)	170	0	0
E. Dye	147	1	3

LIMEHOUSE.—For providing illuminating dials to parish church. Mr. A. H. Harston, architect. Blundell and Sons (accepted)..... £750 0 0

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 21, 1873.

THE MANCHESTER CONSERVATIVE CLUB COMPETITION.

FORTY-NINE sets of drawings were received by the Directors of the Manchester Conservative Club Company, Limited, on the first day of this month, in reply to a general invitation to architects issued by them in December last. From this number six designs were selected for the final consideration of the Directors by their professional adjudicator, Mr. Murgatroyd, of Manchester. On Saturday last the Directors, in accordance with their offer, awarded premiums of one hundred guineas each to the authors of the three designs bearing the mottoes respectively of "Experientia" (design three), "Stanley," and "Conservative." The design marked "Experientia" is the production of Mr. Walker, of London; "Stanley" is the work of Mr. Salomons, of Manchester; and "Conservative," which has received the highest consideration, is the design of Messrs. Pennington and Bridgen, of Manchester. All the drawings submitted to the Directors have been exhibited during the present week in the drawing-room of the Free Trade Hall. The Directors reserved to themselves the right to exercise the fullest discretion in their choice of an architect to conduct the erection of the proposed building. Should either of the gentlemen to whom the premiums have been awarded be chosen for that purpose, his remuneration as architect will be paid according to the Institute scale of charges (which is identical with that of the Manchester Society of Architects), in addition to the premium; but in the event of no approved contractor being found to undertake the work for a sum not exceeding 10 per cent. more than the stipulated sum of £23,500, then the architect, although chosen, is not to be further employed, or remunerated beyond the payment of his premium.

The subject of the competition presented three leading conditions—a corner frontage in two principal thoroughfares, capable of high artistic treatment—a site (about 40yds. by 22yds. in area) of too great value for any considerable portion to be left uncovered, yet affording no means of obtaining light or ventilation on two sides; and, paramountly, a financial condition—a maximum number of business premises to produce a remunerative return for the outlay of the building being required, in addition to the Club accommodation.

In the first of these conditions—the treatment of the elevations—the three premiated designs do not stand conspicuously above some others. All three, in style, conform to the desire of the directors, who stipulated that "they would prefer one of the so-called Italian or Classic styles" for the exterior of their building. Mr. Walker's design is a symmetrical, Barry-like, well-proportioned block, five stories in height, with dormers and an open parapet. Its square cubical outlines are repetitions of a similar character to those which abound in unpicturesque Manchester. In the coarsely drawn perspective view of Mr. Salomons's design the dwarfed lower story, and the overhung upper cornice, with its superimposed tall heavy dormers and high roof, show a disproportion of parts that mars the whole composition. In the delicately-drawn elevations these defects are less apparent, still they exist. As a composition, it relies upon beauty of details, and not upon dignity of conception. Messrs. Pennington and Bridgen's elevations are partially conceived in the spirit of the instructions issued by the directors, who required that the

"exterior of the building should be characterised by simplicity and dignity." "Simplicity" has not been understood by these designers as implying Classic severity, but rather as a limit to the prevailing taste displayed in the best Manchester warehouses. The design, in Manchester, would present no indications of the building being a speciality apart from the ordinary run of imposing structures in the principal streets. It has no club or palatial features. It has a good central entrance, with slightly projecting breaks on each flank of the principal frontage, and a level parapet whereto the principal chimney stacks are brought. A mansard roof, evident in the sections, is not shown in the elevations or the perspective. A serious drawback to the required "dignity" of the edifice arises from the fact that the windows of the first, or principal floor, on the longest elevation to Cross-street, only light ordinary offices. For utilitarian reasons these windows, which ought to have been the predominating features, are made subservient. They have the appearance of being dropped down in too close proximity to the lower story, forming a confusion of parts out of keeping with the breadth and isolation of the details in the upper portion.

The design with the motto, "Honour the King," has simple, freely-treated Italian elevations, both symmetrical and picturesque. The building has four principal stories and an attic story. The windows of the three lower stories are contained under semicircular arches. There are no meretricious, or mere ornamental features, in the design. Its picturesqueness is obtained by raising the centre of the longest elevation, by the judicious management of the angle of the building, and the happy projections and prominence given to important parts. It is a chaste and harmonious composition.

"Pelham" is the motto of a design conceived in the spirit of Vanbrugh, of whom Sir Joshua Reynolds said, that "he composed like a painter." It is bold, vigorous, and picturesque in plan as well as in elevation.

"Hinc Spes Effulget" deserves attention. It is a clever, well-proportioned building, three stories and an attic-story in height, of the ordinary Manchester type.

"Utility."—The elevations of this design inclose a plan, probably one of the most complete and well-arranged in the whole competition. The elevations—to which alone reference is now being made—are worthy of the plan. A picturesque cupola at the angle, open vaulted terminals, ornamental dormers, with an intermediate solid-pannelled parapet, give an animated "sky-line" to the building. Polished red granite shafts, pannelled pilasters and spandrels, somewhat liberally introduced, rather destroy the repose of an otherwise dignified and well-proportioned Italian building.

"Queen and Constitution."—This is a clever design. It grapples with the palatial character of a club edifice, and is a conception which might rely on its architectural power without the sculptural accessories introduced upon the first story. Its height of six stories, and the encroachment of a majestic bay-window over the pavement in S. Ann's-street, with some other features, are points against the prospect of its realisation in stone.

"BB."—This design, Parisian in feeling, presents a compact elevation to S. Ann's-street, but the longer elevation, to Cross-street, has the appearance of two buildings, one four stories, and the other six stories in height, with an attic-story to each. The designer evidently intended that his frontage should one day be completed by the addition of a corresponding flank to that portion four stories in height next to S. Ann's-street.

"Manchester" and a Maltese Cross.—This is another of the few designs which realise the public and palatial character of a club edifice, as distinct from an ordinary large building with a mere imposing front. The

bold and well-conceived intention of a building of three proportionately-graduated stories, with an attic-story, relieved by a central cupola, and a central, boldly projecting, semicircular bay-window, is indicated, but not so well expressed as it would have been in less coarsely-executed drawings.

"Audi Alteram Partem."—The author of the design with this motto has made a splendid protest against the exclusive adoption of one of the "so-called Italian or Classic styles" for this proposed building. His design shows a cleverly-composed and beautifully-drawn Gothic building, of the latest Victorian character. Unfortunately for his chance of success, as well as for his idea of fitness, he chose to place the required shops under a series of dwarfed pointed arches, with heavy intermediate piers. The true interests of art do not require such a slavish regard for unfitness; nor is there any reasonable pretext for consigning a shopkeeper in a dull manufacturing city to premises from which one-half of the scanty light of day is excluded. It is surprising that this unwise introduction of the pointed arch, which is rarely or never met with in actual practice, incessantly recurs in competition designs. The preceding remarks apply to the elevations and perspective views of the various designs mentioned. The higher consideration in this competition has been directed to the planning.

In regarding the majority of the plans—in this instance required for Classic elevations—it becomes painfully apparent that the vulgar emulation excited by competitions is destructive of true art-feeling. Had any one of the competent architects engaged in this competition been commissioned in a legitimate manner to design a Classic building, his instinctive, as well as his cultivated, feeling for unity in his work, would have led him to prepare a Classic plan for his Classic elevations. Instead of working in that homogeneous spirit, the great bulk of the competitors for this Manchester Club House have submitted eccentric plans, just as a shrewd linen-draper submits patterns to his fickle customers. Very few of them have any claim to be called Classic plans; and among those having no such claim are the three premiated.

Mr. Walker provides five shops and twelve offices for sources of revenue, in addition to the Club accommodation. Mr. Salomons introduces an arcade, whereby he provides 17 small shops on the ground floor. In his basement there are cellars which may be let, but he has no offices, all the upper floors being required for his club accommodation. The space over the arcade forms an open area above the ground-floor, giving adequate means of lighting and ventilating, but, to some extent, destroying the grouping and connection of the club-rooms. The closets and urinals for the seventeen shops are inadvertently placed in the centre of the basement, with lights from the floor of the arcade only, and an approach through a narrow dark passage. The principal club-rooms and the kitchens, of themselves elegant and spacious, appear inconveniently placed for serving. The subordinate rooms, and those for servants, are very complete. Messrs. Pennington and Bridgen's plan has many good points, but, at the same time, the kitchen arrangements are most inadequate. The kitchen itself is small, and the scullery, wherein is the hoist which may be used for supplying "400 or 500 persons during three hours in the middle of the day," is only 16ft. by 15ft. These gentlemen place their reading-room on the ground-floor, and provide a cart-way at the back of their building with an open court-yard, for access to the cellarage and the supply-department of the Club. They provide four shops and two offices on the ground-floor, and ten offices on the first and mezzanine floors, for supplying a revenue.

The best plan in the competition, taken as a whole, is that with the motto "Utility." The club-rooms are well grouped; the

kitchens ample; by the introduction of two irregular open areas at the back, light and ventilation are secured for every apartment; and there are six shops and sixteen offices provided to supply a revenue. Other good plans, in some respects, are those with the mottoes "Honour the King," "Manchester," "Audi Alteram Partem"; "Lux in Tenebris," and "Treu und Fest," the serving arrangements in the three last named are far superior to those in the three premiated. "Treu und Fest" provides 8 shops, 23 offices, and, in the basement, a wine-store and a restaurant, each with separate entrances.

Interior views of the proposed building were prohibited. The drawings were to a scale of one-eighth of an inch to a foot, on imperial paper, mounted, without frames. The instructions prohibited colour on the perspectives and elevations, and also on the plans, except for denoting the materials of the floors. The elevations were in sepia. Among the number of designs were several by junior hands, who, so long as their seniors set the example of undertaking competitions, must be congratulated for their industry and courage in putting their power to the test; and, at the same time, reminded that not one, but many, failures bring perfection.

ART EDUCATION.

IT is some satisfaction to find that the observations made recently in these pages on the modern system of art-training have created a certain amount of interest among some of the readers of the BUILDING NEWS; and the adverse strictures passed by a contributor under the initials "W. S." on the principles I there laid down, are so far satisfactory as they indicate the current ideas among professors of art, and—unwittingly perhaps—the necessity of uprooting them. "W. S." decisively shows in his opening remarks, in which he speaks of the "fondled art" of the fashionable, or that art which helps to relieve the ennui of the lazy, well-to-do part of society, that, as at present understood and regarded, "Art" is merely a name for anything in which the "taste" of the public, however bad that may be, can be exercised. It may mean a great deal more, and may be expanded to the higher definition of "W. S." as the sister of religion, or what else he likes to call it; but what, I ask, is the use of trying to exalt the sphere and character of art, or any function of the mind, so long as the professors of art become mere tools and drudges, and neglect the means of rendering art what it once was, and what it ought to be again—a noble and free impulse and expression of the higher powers of the mind, whether in words, sound, or form? There is a good deal of foolish boast with many who are always proclaiming the dignity of art in the public ear, but who fail to see in what it consists. They point with a great deal of self-gratulation to the temples and sculptured marbles of Greece and Rome, or to the works of ancient masters, and believe art is there to be found, only to be rekindled by the modern spirit. What blindness! As well might they imagine that the poetic genius is to be acquired by carefully studying Homer or any of the ancient poets. They forget that for the purpose or aim of modern life, instruction in such art is dead and as effete as the trunk of an old tree. It is useful as a record only. Beauty, it is true, is to be found still in the curves and proportions, the massing, and grouping, and colouring—a beauty which still lives and impresses us; but this beauty—the product—does not give us the producing principles, the elements, frame, or temper of mind out of which the beautiful result grew. Then of the ancient masters, we have their works only. Admirable as they are, however, they do not afford us what we want. If we knew the training of these great artists of the past, their manner of working, we should

possess something more valuable than all their works. The principles—the process of art—thought and expression are what we need, not the petrified results. It is here there is such a mistake made; under modern art-teaching the student is taught from the wrong end.

"W. S." says: "With regard to the general study of the ancients, Nature truly is ever the same, but we and our knowledge of her are continually changing, so that to no one generation will she appear in all respects the same as to the preceding," &c. Again, he says: "Now, one of the numerous ways of seeing man's views of Nature in the past is to follow up the study of those who had read her well in their day. From them we learn both how Nature manifested herself, and how they regarded and realised her manifestations." The inference from these remarks is clear—namely, that we should be content, not with our own advanced views of Nature, but that we should read her only through the spectacles of the ancients; in other words, that though she is worthy of all study as unchanging in her attributes, we should, nevertheless, not trust our faculties, but read and understand her only in a secondhand sort of way, or by the (dim) light of those who had "read her well in their day." The question suggests itself, Why should we want to measure our own views by man's views of Nature in the past? Have we lost the perception or intellect of our forefathers? Are our natural powers to be disused? But, again, "W. S." assumes our perception and knowledge of Nature to be always the same when he tells us to "look upon the past as so much realised to us." Where would our knowledge of facts be if we had taken for granted all our forefathers' fictions and idle chimeras? Where, alas! would our philosophy have been? The superiority of much of ancient over modern art is no exception to the law here involved. Its superiority is the result of a free and unfettered appeal to Nature and intellect, but does not in the slightest claim on that account to be regarded as "realised results" for us, from which we are to start. Far from it. Our notions of beauty and fitness are modified by various circumstances of thought and the age we live in. If all the past is to be regarded as so much realised to us, and if, as "W. S." says, "the work is actually done so far, and our business is to take it up at the point which it has reached," where would be the boasted and oft-prated spirit and nobility of art?—where its flexibility, its response to the dictates of reason and the emotions? It would, on the other hand, be chained to models; there would be no life in it. It is a farce to speak of "studying the spirit of the past;" it is a phrase, I know, often used, but it is simply a sentimental one. How can the "spirit" of the past be infused into the modern spirit? It is a contradiction in terms. But if by it is meant a study of the principles of the action or the process of creation of art, then surely it is simply nonsense to think we arrive at it by studying old works.

I am glad to find "W. S." although he differs from me in reasoning, accepts the conclusions I arrive at. After all, the points of disagreement may ultimately be reduced to one or two simple propositions. The remarks of "W. S." on my second paper (Jan. 3, p. 7) have reference to the fundamental principle I started upon, or the natural order in which knowledge is acquired. "W. S." says it is proved untrue by observation; but he unconsciously admits its truth all through his remarks. He denies Macaulay's remark that poetic genius flourished most in rude and unscientific times, and yet he exhorts us to study and repeat the works of those periods. We are led, after all, to the fundamental question, "How art is to be studied?"—or whether we are to employ our own faculties in the study of Nature, and in the deductions of laws which shall govern our modern requirements; or whether we are to study and repeat the works of the ancients, with the

idea of imbibing and preserving the spirit of their art? Which is the noblest occupation? Schiller, in the passage quoted by "W. S.," seems to support the former idea. He says: "The artist, it is true, is the son of his age; but pity for him if he is its pupil or its favourite. . . . The matter of his works he will take from the present, but their form he will derive from a nobler time; nay, from beyond all time, from the unchanging unity of his own nature."

In conclusion, by the term "Nature," I mean, not the contracted or sensuous idea which "W. S." appears to think I intend, nor the very expansive and latitudinarian one sometimes attached to that term, but that order of things as established by immutable laws which prevails in the constitution of the universe, or that simple law of cause and effect—the native state and principle of anything by which it is distinguished from mere artifice and conventional custom.

G. HUSKISSON GUILLAUME.

ON THE PRODUCTION OF ARTISTIC IRONWORK.

LECTURE I.

MR. THOMAS PEARD delivered the first of a course of two lectures on this subject at the Royal Architectural Museum on Saturday afternoon last. In commencing, Mr. Peard said that in this and the succeeding lecture he should endeavour to say something upon the art of producing art metal-work rather than upon art metal-work as such, and should confine his attention principally to such matters as were adjuncts to architectural art. The subject was surrounded with many difficulties—difficulties such as, if he mistook not, his friends Messrs. Brindley and Redfern scarcely had to contend with. The art of producing architectural carving and sculpture might be summed up in the old maxim of "Cut and contrive," or, perhaps, more properly, "Contrive and cut," because, given the stone and the design, and the conception in the mind of the art-workman of the thing to be produced, there was nothing to do but to go to work. But in the case of metal-work there was a number of separate processes which must be tolerably well mastered, either by intuitive perception and comprehension, or by patient application and careful study, before the art-workman could be efficient in the art of working in metal, apart altogether from the capability of producing artistic ironwork. Before proceeding to enter upon the technical details of his immediate subject, Mr. Peard gave a brief historical account of the rise and progress of the iron manufacture, and quoted the following remarks by Dr. Ure as to the varied and important uses to which that metal is put:—"Every person knows the uses of this truly precious metal; it is capable of being cast in moulds of any form—of being drawn out into wires of any desired strength or fineness—of being extended into plates or sheets—of being bent in every direction—of being sharpened, hardened, and softened at pleasure. Iron accommodates itself to all our wants, our desires, and even our caprices; it is equally serviceable to the arts, the sciences, to agriculture, and war; the same ore furnishes the sword, the ploughshare, the scythe, the pruning-hook, the needle, the graver, the spring of a watch or of a carriage, the chisel, the chain, the anchor, the compass, the cannon, and the bomb. It is a medicine of much virtue, and the only metal friendly to the human frame." The lecturer mentioned that up to the time of Elizabeth charcoal was the only fuel used by the iron-smelters of this country; but the increase of the manufacture caused such a demand upon the forests of the country that in this reign it was prohibited to cut down wood for the use of iron-works. James I. granted patents to iron-masters for using "pit-coals" and "sea-coal" in the manufacture of iron, the Earl of Dudley being the first person to whom such a patent was granted. The smoke was found to be a serious obstacle, and coke was tried with better results, coke being more analogous to charcoal as a fuel. The introduction of the steam-engine gave a great impetus to their iron manufacture, principally through the inventions of a Mr. Cort, a wealthy man residing at Gosport. He introduced the processes of "puddling" and "rolling," and from that time

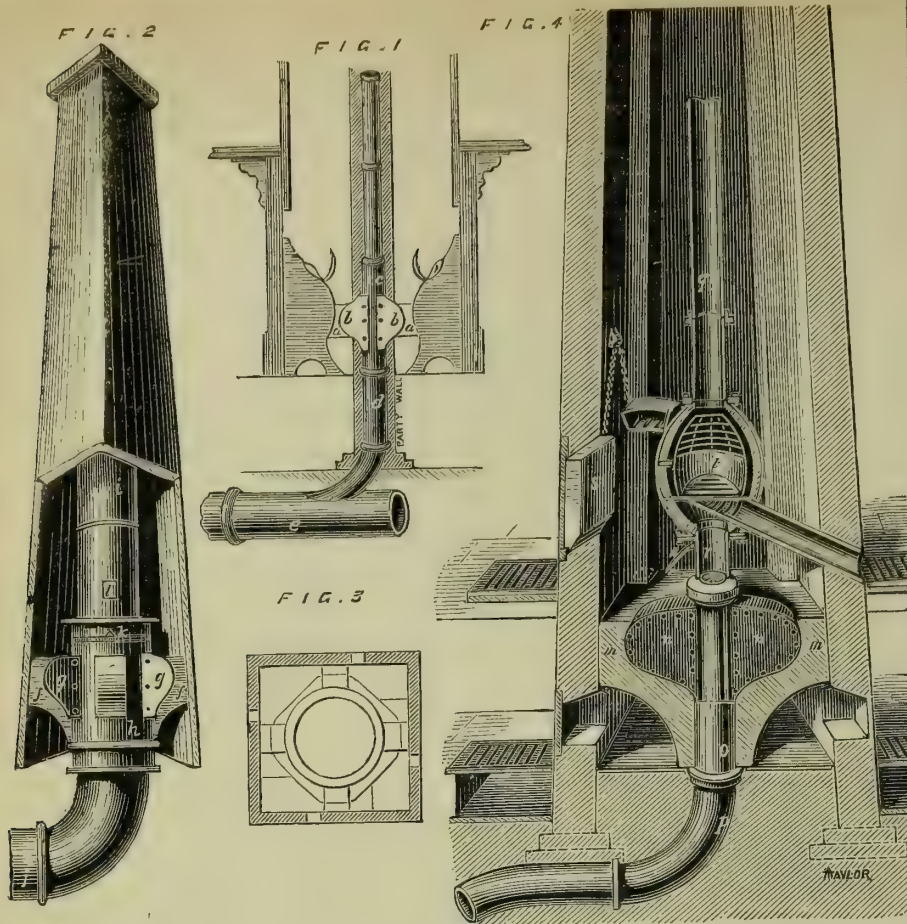
the great iron manufacture of this country really dated its progress and development. Cort spent £20,000 in perfecting his inventions, and in the erection of proper machinery for carrying them into effect; but his patents were rendered quite valueless to him by the dishonesty of Government officials, and he died penniless. Some few years ago, however, his descendants were awarded a pension in recognition of the services which their ancestor had rendered to the country. Court's inventions gave the first great stimulus to an industry which had enriched this country by something like £600,000,000 sterling, and which gave employment to at least 600,000 persons. These remarks of course applied only to the manufacture of iron for industrial and engineering purposes. All the ornamental ironwork produced in Mediæval times was purely the result of hand-work—aided, perhaps, sometimes, by the tilt-hammer. At that time only iron of the best quality, tough and fibrous, was obtainable, and that to a very limited extent, although the only demands made upon the iron manufacture were for weapons of warfare, agricultural implements, and for such work as was required in connection with architecture. The demand for iron for the two former purposes (but especially the first), together with the large demand for smiths in the army, greatly limited the production of artistic ironwork for architectural purposes, and precluded its use wherever it could be dispensed with. The large demand for ironwork in the industrial arts and for shipbuilding in the present day also had a tendency in this direction, inasmuch as large numbers of smiths preferred the comparatively "plain-sailing" of heavier and commoner work to the more delicate and complicated occupation of the art metal-worker. At the same time the more cultivated tastes of the people generally were bringing into greater requisition every day, among the other arts formerly so intimately associated with architecture, the art of the worker in iron and brass. The disinclination of smiths to strive to excel in artistic work was the more to be regretted, as by the general adoption of machinery in the preparation of the raw material, the art metal-worker was now relieved of much of the heavy labour which the Mediæval metal worker had to perform, and was thus left free to bestow more thought upon the shapes which his metal was to assume in order to produce artistic ironwork in the best sense. It was of the first importance that every design for ironwork should be not only harmonious and consistent in itself, but also in accord with the particular kind and quality of the metal or material in which it was intended to be executed, and fitted for the position for which it was destined. In connection with this thought, Sir Digby Wyatt had the following, in his "Theory of Metal-work":—"No successful result can be obtained in the production of beautiful ironwork or beautiful anything else, until one of three things takes place—either first, until the manufacturer and designer are one individual, doubly gifted; or, secondly, until the manufacturer takes the pains to investigate and master so much of the elements of design as shall enable him to judiciously control the artist; or, thirdly, until the artist by a careful study of the material and its manufacture shall elaborate and employ a system of design in harmony with, and special to, the peculiarities so evolved." Since the date at which that opinion was expressed much improvement had taken place in each of the directions indicated, but, unfortunately, upon no settled practice. Scarcely could there be found two architects of any note who would agree upon even the general principles upon which ironwork should be designed, while the young gentlemen of the profession, almost as soon as they had learnt to sketch, became so fascinated by the subject of metal work that they considered themselves competent to design ironwork and to teach smiths their business. Some smiths, too, thought themselves capable of executing ironwork in any style without the slightest knowledge of Gothic, Greek, or any other variety of detail. The workmen, again, who were afflicted with the belief that they were capable of producing any piece of ornamental work that was put into their hands were generally almost quite innocent of the nature and properties of the material in which they had to work. It was, however, but right to say that the influence of wealthy persons, with a smattering of knowledge on the subject, combined with the ill-informed taste of the general body of the public, had operated greatly to the detriment of

the modern revival of art metal-work, and there were few competent persons connected with the art who had not been driven to do at times work which their own judgment told them was wrong in principle. How and in what quarter was further improvement to be sought? Firstly, he thought, by architects and others who had the designing of ornamental iron-work in their hands laying down such general principles of design as (after careful study and examination of the iron-work of the Middle Ages) they should find to have actuated the Mediæval ironworkers. How wonderfully and naturally a piece of Mediæval metal-work seemed to grow and be developed! To many students of such work it appeared certain at times that the smith who executed the work must himself have been the designer, or, at any rate, that the designer left the smith very much to himself in carrying the work into execution. Mr. Peard said he had been very much struck with this in looking at some of the casts of iron-work which were to be seen in the Museum, notably those from the beautiful grille on the tomb of Queen Eleanor in Westminster Abbey. There was scarcely a part of this work but what was done just as a smith would do it if he did not know he was making a design; it began at one end and grew naturally. He was free to confess that he had seen a great number of designs for ironwork which it would be difficult—nay, impossible for any smith of decent ability to join at all—designs that would do very well for execution in wood or cast-iron, but which were utterly unsuited to the requirements and methods of treatment of wrought-iron. Careful study of the true principles of design in wrought-iron work would not fail to assert itself in vigorous handling and a refined mastery of detail on the part of the smith. Secondly, for the workman, the first thing needed was a higher elementary education—proficiency not only in reading, writing, and arithmetic, but, above all, in geometry. A thorough knowledge of geometry would enable many workmen who now plodded on through their work in a listless, uninterested sort of way, to take it up in a thoroughly intelligible manner, so that their intercourse with the designer of the work would be mutually pleasant and profitable. To those workmen who made it the business of their lives to aim at a high standard of excellence in their work there should be extended a more generous recognition of their efforts by such as had it within their power. Why should all grades of ability be treated as being pretty much on a par? and why should every village blacksmith be expected to be an artist? Proceeding to speak of some of the practical details of the art of producing artistic ironwork, Mr. Peard began with the lowest type of such work, viz.—cast-iron. This was a material unknown when the thirteenth and fourteenth-century ironwork was produced, but it was a material which, on account of many useful qualities, it would be unwise to exclude from use altogether. Its chief characteristics were rigidity and great strength under compression. Hence it was that iron columns were so largely used, and unfortunately it was in this feature that constructors in iron mostly offended. In the treatment of cast-iron columns, the ornamentation should not be made the dominant feature; and in the preparation of any design for cast-iron work this should always be taken into account. No feature whatever of cast-iron work should be so designed or treated as to admit of the slightest doubt whether it was cast or wrought-iron, or wood or stone. Each of these materials had its own appropriate and peculiar treatment, and to attempt to make one of them look like any of the others was clear evidence of bad taste. The chief characteristic of all woodwork and stonework was that it could be cut, but although it was allowable to cut or model a pattern for cast-iron work, it was impossible to produce in cast-iron work the same effect as if the metal could be cut in the same way as wood or stone. It was essential, in preparing designs for cast-iron work, to bear in mind what the moulder, as well as the pattern-carver, could do. The pattern should always be so cut that it would lift readily out of the sand without breaking or disturbing the mould. Alluding to the spindle-like cast-iron columns so largely used to carry the façades of houses over shop-fronts, Mr. Peard said it would be a great deal better if architects and builders would put the same quantity of iron which was contained in such slender columns into a column of much larger diameter, but hollow; this would give greater rigidity, and the use of the column would be more apparent.

The ornamentation of the cap of such a column should be of such a nature that there would be no difficulty in taking the cap out of the sand; this practical necessity would render it an impossibility to clothe the cap of a cast-iron column in the same foliage as could be cut in stone by the stone-carver. Ornament in faint relief was the most appropriate for cast-iron. Perhaps cast-iron showed to the most advantage in large rather than in small works. Sir Digby Wyatt had expressed the opinion that the cast-iron balustrade surrounding S. Paul's Cathedral was the finest thing of its kind in the world. Mr. Peard did not quite agree with Sir Digby, but thought that the iron railings in front of the British Museum far excelled those at S. Paul's in every respect. Some other notable specimens of cast-iron work had been recently put up in London, but as they were by living men he declined to criticise them. He might say, however, that in some of them not only had the work been pierced, but considerable surfaces were smothered over with ornament. This work must have been a constant source of annoyance to the iron-founder. Such designs for cast-iron work were quite out of place, for they necessitated great trouble and expense in keeping the moulds clean. Alluding to some fine casts in the Museum gallery of the incomparable hinges at Notre Dame, Paris, the lecturer said the use of such hinges was not merely to make the door swing, but to hold the door itself together. But the pernicious practice that had sprung up of late years of plastering the doors of a church with cast-iron work in imitation of the wrought-iron hinges of the Mediæval period, was greatly to be condemned; this practice was resorted to even when the door was framed, cased, and battened, and carried by 4in. butts. It was the height of folly to load a door of that kind with a weight of iron ornament unless such ornament was made to contribute to the strength of the door. Before quitting the subject of cast-iron, he might say that the patterns or models should be carefully made and finished in a fine-grained wood—pine or mahogany—and afterwards carefully varnished over, so as to present such a smooth surface as would prevent the adhesion of any atoms of sand from the moulds. Unless the surfaces of the patterns were perfectly smooth and clean, fragments of sand would be brought away from the mould, thus impairing the accuracy of the casting. Another object sought in using varnish was to prevent the grain of the wood in the pattern being impressed on the mould, and thus shown in the casting. Varnish made of shellac and spirits was the best for patterns. Some pattern-makers preferred to coat their patterns or models with common red sealing-wax, as they could the better ascertain that the wood was well-covered, but Mr. Peard said he thought the advantage of its use was more fancied than real. Two important points should always be borne in mind in pattern-making. Firstly, the pattern should always be made so as to readily leave the sand, and therefore should not be made perfectly square. If an ordinary joiner was given a pattern to make, he would make it quite square, but a regular "pattern-joiner" would know that according to the depth of the model he must vary the dimensions at top and bottom, so as to allow the pattern to be removed without breaking the mould. For deep things, 1 in 24 would probably be found a sufficient variation between the top and bottom dimensions. In shallow things, the "drift" was made considerably more, so that by very little loosening the model came away freely from the sand. The necessity of designing cast-iron in a manner appropriate to the material was enforced by the fact that all cast-iron bore upon its face certain unmistakeable indications of the manner of its production. Having said thus much, Mr. Peard said he would reserve what was by far the most interesting portion of his subject for the next lecture, which will be given to-morrow (Saturday) afternoon.

A qualified assent was given on Tuesday by the City Commissioners of Sewers to two schemes for introducing tramways into the City—namely, a line in High-street, Aldgate, as far as Church-row, and another along Moorgate-street as far as Fore-street. The City Commissioner of Police wrote very adversely on the subject.

A member of the congregation of S. James's, Brighton, writes "We hope soon to build a church to the memory of the late John Purchas, at the East-end of Brighton."



SEWER AND HOUSE-DRAIN VENTILATION.

THE free ventilation of sewers into the open air, and the prevention of the escape of noxious gases into houses from the drains by means of which communication with the sewers is effected, has for many years past engaged the attention of all interested in sanitary science. Parliamentary Committees have inquired into the matter. The engineer of the Board of Works published a careful report on the subject seven years since. Our own columns at frequent intervals have been freely open to suggestions thereon, but it has not yet been so successfully dealt with as to render unwelcome any well-planned improvement in the manner of effecting so desirable an object.

The specification has just been published which describes an improved method of sewer ventilation, and apparatus therefor, recently patented by Mr. R. J. Johnson, of Peckham, which seems well worth attention, and we reproduce so much thereof, with the drawings, as may serve to convey a clear idea of his plan.

Fig. 1 has reference to his system as applied to ordinary house drains in connection with sewers. *a* shows fire-brick forming back of stove or range; *b*, portable condenser; *c* shows a pipe composed of iron or other metal heated by fire-brick and condenser as shown at *a* and *b*, so as to rarefy the air; *d* shows a pipe leading from the house drain to top of house; *e* shows house drain leading into sewer. Fig. 2 illustrates the system as applied to sewers. *f* shows fire-brick attached to furnace and portable condenser; *g* shows portable condenser; *h* shows pipe composed of iron or other metal heated by fire-brick and portable condenser so as to rarefy the air; *i* shows pipe in connection with iron or other metal pipe leading to top of shaft; *j* shows pipe leading from shaft into sewer; *k* shows frame consisting of copper or other metal gauze to prevent the flame entering into the sewer; *l* shows stoke-hole of the furnace for condensing the gases by means of coke, charcoal, gas jets, or any other suitable fuel. Fig. 3 represents the ground plan of shaft or flue (Fig. 2). Fig. 4 further illustrates the system as applied to sewers. *m* shows fire-brick heated by furnace for consuming the gases arising from the sewers by means of coke, charcoal, gas jets, or any other suitable fuel; *n* shows chamber for rarefying the gases which ascend from sewer; *o* and *p* show pipe leading to sewer; *q* shows flue

for carrying off the gases which have been consumed; *r* shows box containing the copper or other metal gauze to prevent the flame entering the sewer; *s* shows the stoke-hole; *t* shows furnace for combustion of the sewer gases by means of coke, charcoal, gas jets, or any other suitable fuel.

There is, we think, little doubt that the adoption of the sewer ventilator, as shown in Fig. 1, in all new houses would greatly diminish the accumulation of foul air in the metropolitan sewers, and do away with the pernicious practice now frequently carried out of letting the stack pipes to back additions enter the sewers without being properly trapped, thereby allowing the foul air freely to ascend and enter the staircases and back chambers of houses. The additional cost would be trifling, and the result the prevention of much sickness in large cities.

We referred above to Mr. Bazalgette's report on the subject of sewer ventilation made seven years since to the Board of Works. The difference in cost of the system recommended by him and that now described is worth noting. Mr. Bazalgette proposed to erect 230 shafts at a cost of £2,000 each, or a total cost of £462,000. He also calculated that it would cost £876 per annum for fuel for each of these chimneys or shafts, exclusive of labour; thus rendering necessary an annual expenditure of £200,580. Mr. Johnson proposes to erect 700 shafts at a cost of £300 each, or a total cost of £217,700, and is prepared to find each of them in fuel at a yearly charge of £40, inclusive of labour; total, £28,700. The difference is at any rate worth inquiring into.

COLOURED DECORATION.*

(Continued from p. 317.)

IN fresco painting the artist has had considerable difficulties, principally chemical; and the history of this art in England and Germany has been somewhat disheartening. The first paintings at the Houses of Parliament, like those at Munich by Cornelius, began to suffer almost as soon as completed; and the panels filled by the late Mr. Dyce at Mr. Butterfield's church in Margaret-street, London, have been already renewed. The great difficulty has been to so chemically com-

bine the silicates of potash or soda with the lime and sand of the mortar and the pigments employed as to defy the influences of a climate like ours: indeed I would be more correct in saying certain changes which occur in every climate, although with greater force in ours. The recent pictures by MacIise at Westminster, and by Baron Kaulbach, at the Museum at Berlin, styled the "water-glass process" or "stereochromy," approach nearer to success, although we are not yet in a position to state this with certainty. You are of course aware that the principal object of fresco painting has been to enable a finely-executed picture from the artist's own hand to take its place in an architectural decoration, and be viewed from every point without glitter. The pictures at Berlin are grand conceptions (the series when I saw them was not complete); they did not show any signs of change to the casual observer. Those at Westminster we know show signs of decay, although not so much as the earlier works. The recent ones by Cornelius and his pupils at Munich have also approached perfect freedom from change; but, as I have said, this—like the kindred subject of the induration and the preservation of stone—requires a longer time to enable a report with confidence to be made on the results. Should the more recent processes be a success, painting in distemper can also be added to the list of durable decorations. Fresco painting in its simplest form was merely executed with water-colours on wet plaster; this was succeeded by syringing with water-glass, and finally the application of the soluble silicates was extended to the mixing and the medium of the colours themselves.

Stained or painted glass is, of course, confined to the windows of a building, and will have again to be referred to. I would merely allude to some of the controversies it has generated. Like mosaic, it owes much of its beauty to the gem-like effect produced by the play of light (in this case in transmission). I need not remind you that inferior glass in the technical sense is so superior to that which is perfectly transparent, that the "pot metal," as it has been called, with its splendid colours, and unequal and mixed powers of transmission, is the true source towards which we are to look for colour effects. The questions raised are principally:—1st. Grotesqueness in treatment of the human figure. 2nd. The management of the necessary leading. 3rd. Are pictures, properly so called, allowable—i.e., finished transparencies? The Munich glass generally, and such windows as those at Glasgow Cathedral particularly, would exemplify this last question. I cannot help thinking that crowded and involved figure-subjects are a mistake; that stained glass, as I have already said, is allied to mosaic, and if you are to regard it as to group with frescoes, the finer treatment is allowable. In any case it is unpardonable to appear, in the treatment of the human figure, to ignore the fact of the great advances we have made. In the management of the leads, glass should be treated as a mosaic where figures are absent; and where they are present, we should not go out of our way to intrude the leading on the view. Instead of confused figure-subjects, where the arrangement of colours seems designed so as to aid that confusion, the most beautiful effects can be obtained by colour alone—I mean pure colour—judiciously separated by complementary greys and the necessary leading; and if the figure is to be used, I am bold enough to urge that it shall not take on it a non-natural form of colouring, even although the work be then open to the odious charge of being a transparency. In domestic buildings there is less reason for perpetuating traditions of the kind to which I have referred, and improvements in the manufacture of stained and coloured glass are paving the way for reforms.

I have lingered rather long on these questions. We have three great types of church decoration—those adorned with mosaics and marble, or with frescoes and clear windows; those with stained-glass and little other coloured decoration; and those, like the Sainte Chapelle, where the whole interior is one blaze of colour. You will at once perceive that such a building as S. Peter's at Rome is best seen without the interferences caused by coloured light. In the Sainte Chapelle, however, distinctness is sacrificed to the general effect. In buildings where stained windows are the only coloured decoration, it is a question whether the key in colour is not generally too high—I mean the total amount of positive colour. I have already urged that the proportion of positive colour to the coloured greys should be less. In

* By MR. C. H. BRIEN, A.R.I.A.I. Read at meeting of Architectural Association of Ireland, February 27th, 1873.

the case of the great Roman Catholic churches abroad, where pictures of great value and age are to be found, it is essential that they should not suffer by contrast with the decorations of wall or window.

As respects the decoration of picture-galleries, three or four types occur to me where the treatment as respects colour somewhat differs, and which illustrate what I have to say—the Louvre at Paris, the museums at Dresden and Berlin, and our new galleries at Burlington House (I have never seen the Italian galleries). The last, I think, is in many important respects the best. In a picture-gallery, whether for the old masters or for recent works, it must be remembered the gallery is mainly meant to exhibit the works contained with the least possible interference with their peculiar merits. I know it will be urged that in a permanent gallery—one where the same pictures are meant to hold always the same positions—the decorations of the gallery should be toned up to the key of the pictures; this evidently has been the theory at the Louvre, and still I think the pictorial decoration of the ceilings is a mistake—indeed, I look upon most of the recent work at Paris of this kind, and all figure-subjects on ceilings, as a mistake; the brilliant colours take from the pictures below, and even when years have passed, they will fail to harmonise. At Dresden, if I remember rightly, the entrances to the galleries are tinted a grey, in which blue dominates in the decorations, representing subjects as if in relief, and seem shaded most admirably to suit the light to which they are exposed, and with peculiar German skill the mouldings and other architectural members are so simulated as, even when examined with an opera-glass, to appear in relief; indeed I could not decide whether or not some of the pateræ were painted or really moulded. At Berlin you pass up a staircase lined with the splendid frescoes I have already referred to, but the gallery divisions are badly lighted. In our new gallery in London (as you are, no doubt, aware) simple colours, gilding, and marbles of red, black, and grey do not interfere with the pictures. The maroon so much used in galleries of old paintings has not only an harmonious effect as to tone, but by contrast will brighten the dulled greens, as the sage greens on water-colour rooms heighten the bright colours of the drawings exhibited. As respects objects of sculpture, a pearl grey on the walls will increase their whiteness (if that be desired, a green grey gives them a rosy tinge), a blue an ivory tone (really a faint orange). In the case of bronzes, by the same law of contrast, the red bronzes will be improved by green-tinted walls, looking redder, and the green by a reddish tint, looking greener.

In the case of the annual exhibitions of modern paintings, where freshness and brilliancy of colour must abound, it is a pity that the artists themselves, in seeking foremost places, so often forget that by not aiding in the classification of their works, they often mutually damage each other: paintings appearing side by side which would be the better for considerable separation. As respects museums of natural history, &c., it is apparent that, like conservatories, they cannot be tinted with too much care, to prevent interference with the colour of natural objects, and for purposes of study. Whites or greys can be the only correct backgrounds. I would not always say whites only, because I think the very violence of the contrast prevents distinct and satisfied vision. Indeed, in the case of conservatories, both green and brilliant white should be avoided internally.

In the case of theatres, concert halls, and other buildings, where numbers assemble in brilliant dress, the two very different schemes of decoration I have referred to have been adopted—that of brilliant colour, and that of a quiet but rich foil, especially to the audience in the boxes. I think the latter the more successful. Care is especially required in the fronts of the boxes, their linings and hangings. Nothing is better than lace hangings, as the grey foil to colour is obtained in its most pleasing form. The fronts of the box or balcony should not spoil the brilliant and varied array of colour above, nor should the background intrude itself and prevent distinct vision. All who visit our places of amusement must mark the vast change which has come over their decoration. Of course the garish still lingers in lower places; but in those of the better class much chaste and thoughtful colouring may be found.

The decoration of domestic buildings generally,

whether of the superior or inferior class, really rests on similar principles, and can be conveniently considered together. The natural laws which govern what is called good taste do not lend themselves to wealth alone. In cheaper materials the same satisfactory results are possible.

It is, perhaps, in the decoration of these buildings that the laws I have been explaining have most weight, and at the same time present the greatest difficulties in their application. We cannot conceal from ourselves the fact that the variety of objects and the differences in material involved, render well-nigh impossible that satisfactory balance which to the educated eye can alone bring content. I think these difficulties for the most part lie rather in the direction of tone than in positive differences of colour. In ordinary dwellings these disorders can only be removed by proceeding on a settled plan in dealing with colour, very much as the refined seek to deal with similar difficulties in their personal adornment. In the decoration of public buildings the large areas involved make interferences so little felt, that the influence of coloured glass, for instance, with other decorations in colour, is comparatively easy of adjustment. In domestic buildings, it is apparent, stained glass can only be very sparingly used, and that quite irrespective of the questions of light and prospect. Hangings, carpets, and furniture have to be provided for, and colour to be employed under circumstances in which daylight and artificial light hold in their influences nearly an equal place. Such colours as yellow and violet are so affected by artificial light that a new balance has to be maintained. The theatre and concert-hall are, for the most part, to be considered as buildings the decoration of which supposes the use of artificial light, and the presence, as I have shown, of large assemblies in gay and brilliant costumes. In domestic buildings the provision must be a mixed one; and the uses of the rooms to be decorated being diverse, different treatments are required. You have, no doubt, often observed the effect caused by admitting the morning beams into a room in which artificial lights are still burning—how the former are blued (violet-tinted), and the latter appear yellow. This explains simply the differences which obtain. Before pursuing the matter in detail, I would wish to say a word on some questions which, like the use of mosaic, fresco, marble, stained-glass, and decoration in flat tints in the case of public buildings, have given rise to considerable debate. They are the imitation of costly woods and marbles—the use of stains on inferior woods and of varnishes. The simulation of oak, maple, &c., and of marbles and granites, I think, should be discarded, some of them on the low ground of cost alone; they can never be satisfactory as a decoration, unless executed by superior workmen; and then a scrutiny of price and result will not leave much in their favour, especially when it is considered that we are bound to show that successful adornment can be obtained by cheaper means. As in dress, we require consistency, and I submit that no portion of the decoration should differ widely in quality from its neighbours, allowance, of course, always being made for its position and uses. As respects stains on inferior woods, they seem to be quite consistent and in place, provided they be pure and clear. They have the great merits, in my eyes, in necessitating good workmanship and carefully-selected material, and differ completely in effect from painted woodwork used in a legitimate manner. They are frequently much more consistent with their surroundings than the same woods merely varnished or oiled; and I think it quite allowable to use stains of different shades, separated, or even stencilled, with dense colour, provided these colours follow harmonies of analogy rather than contrast. Still, flat tints of colour to harmonise with hangings and furniture (where the latter are of superior woods) will, in the majority of positions, be more consistent. As regards varnishes, I think these are often used unnecessarily, so as to increase cost, where the desired end can be otherwise attained, as in the use of metals; matting and burnishing afford valuable contrasts, so varnished and flatted surfaces may be judiciously used to enhance approximating tints, or to mark more strongly structural differences. The Germans use enamelled colours for their great durability, especially light tints and white, and think them worth the additional expense. There are some other matters which affect colour and light in the decoration of domestic buildings which I may mention.

I think the use of the French window, of the verandah, and of the conservatory or flower-porch, worthy of extension. These may not seem, at first sight, to have much to do with internal decoration; but I think you will admit, that to bring the highest examples of decoration, these which are natural, into direct contact and consistency with our works is a matter of some moment. At a time when so much attention is given to the arrangement of "bedding-out" and what are called "foliage plants" on the natural principles of harmony and contrast we are considering, it is worth while seeing how we can best make the exterior and interior of our dwellings consistent. The window-gardening of the citizen, high and low, and the flower-plot of the cottager, have received great attention of late, and must, in the future, have considerable influence in improving the national taste. I know we have to deplore garishness in decoration, excess in dress, and perhaps formality, and repetition, to weariness, in the pleasure-ground; but these are often the natural results of excess, want of balance in a direction which is in itself certainly right and commendable.

MASONRY.*

(Concluded from p. 318.)

PIERS AND COLUMNS.—Of these, so far as the piers of bridges and viaducts are concerned, it may be considered that they are but short pieces of walling placed transversely to the main line of the structure, with the top courses bevelled to form skew backs for the arches, and with ends either square, pointed, or circular, as the case of the designer may dictate, or the circumstances of the case demand. But as far as their masonry is concerned, they require no elaborate description. Where they take the form of columns, very great additional care is required to guard against accidents, such as befell the granite columns of the Holborn Viaduct. The most important point is that the bed-joints should be dressed to perfectly true and horizontal surfaces, as, if the joint is not in a plane, it must be either concave or convex; if the former, the pressure is brought solely on the edges, with the only possible result that the edges get fractured by the scaling of one or both of the stones; and if the latter happens to be the case, the stone, instead of bearing the weight equally over its area, is carrying it on one or more projecting portions, involving crushing and consequent settlement. It is a very common prejudice that every pier or column should, if possible, be built in single-stone courses; but there are those who hold that even stronger work may be obtained by making the courses to consist of two or more stones, with a single-stone course here and there. In some cases, such as the pillars between the nave and aisles of a church (where single stones are mostly used), seatings of sheet-lead are often inserted, or the joint is widened by means of a draft being sunk round the circumference of the bed of each stone. The danger of building large piers and columns is that the work in the interior will be "scamped." As an instance of this, I need only refer to the tower and spire of Chichester Cathedral, which "came down with a run" some few years since. The large angle piers were of apparently good facework, but the internal portion was built of rubble, and "scamped." In the church at New Shoreham, the columns were, I believe, cylindrical and octagonal, and so remain on the north side; but for some reason—apparently the desire to substitute a waved line for the cylinder—a ring or casing of masonry was built round those on the south side. This averages about 6in. thick. Whether there is any bond between the original and the addition is not clear, but the last time I was in the church some of the stones were so loose that one could remove them and see the old face inside. These are examples of old work which are more valuable as warnings than anything else, for they go to impress upon us the vital importance of proper bond and solid backing, more especially in detached portions of our work. From the pier or column our attention turns naturally to

The Arch.—The masonry of a square stone arch is, of course, just so much ashlar, built of stones whose beds converge to a common centre, and the soffits and back joints of which are worked as segments of circles struck from the centre. It

* Paper read before the Civil and Mechanical Engineers' Society, by Mr. C. H. REW, Vice-President, on Friday, March 7.

is a good rule in stone-cutting to work the largest face of the stone first; and this, as we have seen, is generally one of the beds; so, in the arch stone, this bed being worked, the ends or heading joints are squared from it, then the section of the stone is marked on the ends from a template, and the workman can then cut the other bed of the stone. Having got so far, he sinks drafts at each end of the soffits, then works the soffits to these drafts, and the stone is ready to be built into position. This description refers more to the working of the ordinary voussoirs of an arch; but in those for the face there is also the consideration whether the back-joint as well as the soffit shall follow the curve of the arch, and so all the stones show similar forms on the face (as is always the manner in Gothic work), or whether they are to be stepped (as is often the case in Classic work). In the latter case the spandrel must be worked in diminishing courses, the heights coinciding with the steps before-mentioned. In arches forming an arcade it is common to bed one or two of the stones with level beds, but this does not do after the arris gets of too acute an angle. They are sometimes done with level beds up to the point at which the extrados of the arch crosses a line set up perpendicularly from the point of the soffit-springing; but I think this is a defective construction. So far we have been considering only the building of the plain cylindrical or pointed arch; but there are two complications of these which would, either of them, form quite a sufficient subject for a paper—I mean the construction of skew arches and that of groined vaulting. Oblique or skew arches were comparatively unknown in England until the development of the railway system obliged engineers to turn their attention to a means of carrying their new lines of communication over and under old ones that they might have to cross, and this at any angle such crossing might happen to be. Some clumsy attempts were made to meet the difficulty by making the abutments of sufficient length at alternate ends to give a square arch so long that the lines of rail fell within those of its ends. This sort of thing could hardly be expected to be the rule for any length of time, and to a Mr. Storey belonged the honour of being one of the first to build a real skew bridge. He built in the year 1830 a bridge near Durham, of which the direct span was 12ft. and the oblique span 42ft., so that the bridge was at a very acute angle. It is necessary in building skew arches that the coursing joints shall be square with the face of the arch, as they naturally would be in a square one; and here arose the problem of how to work the winding of the courses spirally over the centre, for the coursing joints must revolve, as it were, round the cylinder of which the centre formed part, just as a straight slip of paper will go round a cylindrical ruler or a roll of plans. The problem was worked out and investigated in the first instance by Mr. Peter Nicholson, but the best and most concise book is that published in 1839 by Mr. Buck. In small arches, a practical way of setting out the work is to have a long pliable strip of wood of sufficient length to bend over the centre along the line of the face of the arch, and to divide this line into as many equal parts as you mean to have courses of masonry. Then, with a T-square having a long flexible blade, the coursing-joints can be set out with quite sufficient accuracy. For arches of more considerable span, a much more scientific mode of procedure than this is needed, but the principle still is that the coursing-joints are lines square with the face and revolving spirally over the centre, and that the heading-joints are portions of spirals revolving at right angles to them. The chief difficulty is in finding the proper forms of the face-stones, for as the lines of the heading-joints are not *exactly* parallel to the face-line, all the face-stones vary from a rectangular plan, which fact also produces another curious effect—viz., that the face-joints are not straight, but very slightly curved lines. There are other plans and rules for building arches of this kind, but they all start more or less from the principles I have alluded to. In considering the subject of vaulting and groining, it may be remarked that however much the Greeks have towered above all other nations in beauty of form in sculpture and decoration, they have left but few remains to show that they possessed much knowledge of the theory of arch-building, unless we conclude that they did know, and that the severe horizontal character of their architecture was entirely contrary to the vertical and aspiring nature of the arch—and with the

mastery they did possess of all subtleties of curvature, it seems that this, rather than want of knowledge, was the reason. There is another argument which points also in this direction, which is that all architecture where the lintel is a prominent feature is an architecture of large stones; and where the arch is made much of it is an architecture of small stones; and the former of these was essentially the condition of Grecian architecture. There is still standing a building of about 50ft. diameter, covered with a dome of about the same height. This is built entirely of horizontal courses, the soffit being formed by cutting away the face of each stone to a template worked to the radius of the vault. The Romans, on the contrary, made features of the arch and the dome. There are in Rome groined vaults of 70ft. span, and one dome of nearly 140ft. diameter. The ordinary form of Roman vaulting was a main cylindrical vault, crossed by transverse bays of equal or less span. The rule often was to make the main vault a semicircle, and to stilt the lesser ones until the two crowns were on the same level. The centres were probably made by forming a complete centre for the main vault, and "planting on," as it were, for the transverse bays. This plan is in many ways defective, and gives a waved instead of a straight line of intersection. It was found that the proper mode of construction was by means of regular groin-ribs, and very early examples of this plan are to be found in the rude Norman work in this country. In this there was still the same difficulty of the right form of the diagonal rib still unsolved. The Norman builders tried to manage it by making the diagonal rib a segment, which had a rise equal to the semicircular main rib, but still it was not right; for, as in semicircular vaulting the profile of the intersection is a semi-ellipse, there were little spandrel-pieces to be filled up, which gave the diagonal ribs rather the effect of having settled on their haunches. Then those wonderful thirteenth century people adopted the plan called "plain ribbed vaulting," in which the ribs were first arranged, and then the panels filled in either with thin slabs of stone cut to the ribs, or with small stones in regular courses. In the case of the slabs the panels were horizontal at any line parallel to the axis of the vault; but in the case of the masonry each panel was built slightly concave, thus making every panel an arch which rested on the upper side of the ribs. After a time began the custom of multiplying the ribs, until the panels became so many and so small, that the masons of the sixteenth century reverted to the old plan of building solid groining only, using jointed masonry instead of rubble; and then the ribs and tracery were cut up into the soffits, being sunk into the solid stone. In actual practice, a good way to set out rib and panel vaulting is first to draw the diagonal rib, making that a semicircle; then, with the same radius, draw the transverse and wall ribs. This makes each bay become a domed vault, with the ridge rib rising from the crown or point of the cross-rib to that of the diagonal ribs over the centre of the bay. In English vaulting, the ridge ribs are generally kept horizontal, and in this case it is wise to draw the transverse rib first, and then make the diagonal rib a three-centred arch, struck from the springing with the radius of the cross-rib, and then with such other radius as will give a curve tangential to those so struck, and a complete arch of the same rise as that of the transverse rib. It is very desirable that all the ribs should spring with curves of the same radius, except in cases where the wall-rib is carried vertically to a sufficient height for the introduction of windows of proper form and proportion. The springing should be built up as high as convenient in single stones, and the upper bed finished so as to present skew backs for the different ribs. The mouldings can then be worked down from the ribs, mitring and losing themselves one in the other. The intersections of any of the ribs are generally keyed with a large stone, so worked that it will drop far enough through the vault to allow of the carving of the boss, and with proper butt-ends on which to work the rib-mouldings, until they are lost in the foliage or other decoration of the boss. Then the panels are filled in, and the bay is complete. Before concluding I would direct attention to two special examples of masonry, designed for particular conditions, and each doing its work most admirably. The first is a sea-wall, erected at the mouth of the Exe by the father of our President,

Mr. Whitaker. It stands in a most exposed situation, not many miles from the unfortunate wall at Dawlish, on the South Devon Railway. There is this great difference between the two walls—viz., that the Exmouth wall stands, while the South Devon wall is generally washed away in parts once or twice in the course of every rough winter. The one is nearly perpendicular, with a bold projecting coping-course. The masonry is built in the ordinary way, the stones having their quarry-beds downwards, and they are set in mortar and pointed. The result is that the mortar gets started from the joints, and allows portions of the waves to drive into the middle or even back of the work, and a kind of lifting or explosive action takes place, which goes on at nearly each wave, and this at the back, with the coping to afford a hold for every extra-strong wave in front. Is it to be wondered at that this wall is a constant source of amusement to spectators, and of expense to the shareholders? The wall at Exmouth is the very opposite of all this, its curved face permitting the easy flow of the water, which runs up and falls back harmless when it does not do actual service by breaking the force of the succeeding wave. This wall has cost hardly a single shilling in repairs since its completion some thirty years ago. The stone used was limestone, from the neighbourhood of Plymouth. The courses are placed vertically instead of horizontally, and the stones are united only by pebble dowels, no cement or mortar of any kind having been used. The result of placing the stones on their ends was that only the smallest possible superficial area was presented to the lifting action of the sea. Judging by the test of actual experience, there can be no doubt that this system of walling, for sea-work, leaves nothing to be desired, for it has stood, without the starting of a single stone, through storms that have swept clean away walls built with ordinary masonry. The other special instance to which I would refer is that of the beautiful system of dovetailing pursued by Smeaton at the Eddystone lighthouse. It must be plain to all how exactly fitted to its purpose it is, and how perfect and complete in itself is each course. I have tried to analyse the system on which the joints are planned. Smeaton divided the circumference of the lighthouse into sixteen equal parts, and then the face of each alternate stone into five. By drawing radii through the edge of the stone and the outer fifths, the lines are found which give the width of the dovetailed joints. The diameter he divided into nine parts; the central ninth forms the well-hole. The depths of the stones from front to back are, as near as I can measure, exactly ninths of the diameter also. The single stone surrounding the well-hole has the extreme points of its dovetails on a circle whose diameter is one-third of that of the course. It is formed by getting the largest square possible into this circle, and then, by bisecting the four bounding segments, the other points are found; these are joined alternately by lines parallel to the sides of the square, and the dovetails are formed by lines converging to the centre. What this should show us is that in all good engineering, as in all right architecture, it is on the careful study and mastery of detail, no less than to the first general conception of the work as a whole, that its real and ultimate success must depend.

A CITY GARDEN.—It is a curious fact, remarks the *Graphic*, that the Drapers' Company have for some years been indulging in the luxury of a garden within a stone's throw of the Bank of England, at a cost of at least, £12,000 per annum. Such is, indeed, the necessary inference from the announcement that there are negotiations in progress for letting the garden in question for building purposes at something more than that rent. Of course, if this garden were an ornament to the city of London, we should have nothing to do but to praise the Drapers for their past munificence, and regret that circumstances have now compelled them to exchange flower-beds for bricks and mortar; but the Drapers' garden has always been studiously shrouded from the public gaze, and probably few of the busy thousands who daily traverse Throgmorton-street have even suspected its existence. In fact, neither the Drapers nor the City of London generally seem to lose much by the disappearance of this mysterious pleasure-ground, so that if we could only discover the slightest benefit resulting to the world from the enormous revenues of the old city guilds, we might, perhaps, have ground for congratulating the Drapers upon this increase in their income of £12,000 a-year.

Civil Engineering.

AMERICAN SOCIETY OF CIVIL ENGINEERS. [COMMUNICATED.]

A REGULAR meeting of this Society was held at its rooms in New York, January 15th, 1873.

A paper by Casimir Constable, C.E., of New York, "On Retaining Walls; an attempt to reconcile Theory with Experiment," illustrated by a model, was read. A retaining wall is stable when the moment of its weight about the point of rotation exceeds the moment of a certain triangular prism of material back of the wall about the same point—the intersection of the line of rupture of the wall, and the resultant thrust of the prism. Many formulae and tables for retaining walls are presented for use, without a factor of safety, since walls proportioned therewith, well-built and carefully "back-filled," have been permanent. Experiments made on a small scale, in which the theoretic conditions were more nearly fulfilled than in practice, show that such walls are more than stable, and point out the reason why. The problem having been thus solved, a factor of safety may be introduced in the formulas, which will allow for shocks, irregular workmanship, and uncertain material. The problem may be considered under these several heads:—The angle of rupture, the height of the prism of rupture, and the direction and point of application of the pressure of the prism.

Angle of Rupture.—This was first supposed to be the angle of repose with the vertical; the thrust was assumed to be horizontal, and at two-thirds the height of the wall. Belidor assumed the angle at 45°, and that the earth moved in layers parallel to the line of rupture. Coulomb first considered the slope of earth, with the attendant physical conditions; his theory, as amplified by M. de Prouy, is discussed by M. Gauthey, who gives a clear analysis of the angle of rupture. Supposing the resistance of cohesion is proportional to the surface of rupture, and the friction to the normal pressure, the pressure against a retaining wall is that of the prism of earth, which would at once fall, if the wall were removed. The inclination of the plane of separation of this prism will vary with the cohesion and friction of different earths. If a series of planes be conceived less inclined than that of repose, and originating from the same point, one of them will have such a position that the separating prism will have need of a greater opposing force to its sliding motion than any other.

Upon this hypothesis it is proved, the prism of greatest pressure is given by the place which bisects the angle of repose, and that:—

$$P = \frac{1}{2} w, h^2 \tan^2 \frac{i}{2}$$

in which P = the horizontal force which sustains the prism— w , the weight per cubic foot— h , the height, and i the angle of repose, of the prism. Lieutenant Hope found, with layers of coloured sand, the average angle of rupture to be 24°, and of repose 54°. This small difference in practice from theory is probably due to the cohesion of particles, an element which, from lack of sufficient data, is generally disregarded.

Height of Prism of Rupture.—From the first it has been assumed that the wall turned over as a solid mass about the bed joint at its base. In practice it is not so; the line of rupture is a stepped line, in or near the natural slope, and leaving a part of the wall undisturbed. For experiment, a box, 16ft. high and wide, and 24ft. long, with glass sides, was made. A miniature wall of pine blocks or "bricks," 1in. square, 2in. and 3in. long, with a bank of oats or peas instead of earth, in eight trials turned over as stated. When the wall began to move, the face bulged out, the centre of the curve being at about one half the height, and would continue thus, until started forward by a jar. This, due to cohesion of the backing, doubtless adds materially to the stability of walls of long standing, which, it is often noticed, stand, although bulging outward. (This and subsequent statements were illustrated by experiment.)

A solid wall with a joint at the place of separation was more stable than one of "bricks," for although each began to move at the same time, the first did not continue to give way, and required to be continually started. Navies seem first to have noticed that walls rupture in this manner. It is reasonable that the prism of pres-

sure should start at a point above the foot of the wall, for by rotation of the wall about the outer point in the base, the lowermost portion of the backing must be lifted. Experiments made in the case of surcharged walls gave heights agreeing very closely with those calculated upon this basis: while assuming the prism of pressure to start from the foot of the wall, would give a height far below that sustained.

Direction of Thrust.—If the weight of prism of greatest pressure be resolved into two components—one normal to the slope of rupture, and the other to the back of the wall—the first will resist by its friction the tendency to slip along the slope. The second is expressed by the formula given, and may be resolved into two other components—one inclined, the actual thrust against the wall; and one vertical, to overcome the friction along the wall. This latter, from the indefinite knowledge of the value of the coefficient, is generally neglected. The point of application of thrust, at first assumed to be at one-third the height of the prism of pressure, which gave too great thickness to the wall, has been shown by Rankine and others to be at one-third the height from the foot. The height of the prism of pressure will be from .70 to .75 of height of wall. The conditions of the problem are now determined, from which follow these formulae.

$$\frac{t}{p} = - \left(n + \frac{n_1}{2} \right) + \sqrt{2 \tan^2 \frac{a}{2} \left(w_1 + \frac{8p}{3} \right) + \frac{n^2}{3} - \frac{n^2}{12}}$$

in which t = thickness at top of wall, p = any weight per square foot of surface distributed over the bank — n = batter per foot in height of outside; n_1 = same of inside of wall; a = angle of repose; w = weight per cubic foot of masonry, and w_1 = same of earth. If n and n_1 = 0

$$\frac{t}{p} = \sqrt{w + \frac{8p}{3} \tan \frac{a}{2}}$$

and if p = 0

$$\frac{t}{p} = 53 \tan \frac{a}{2} \sqrt{\frac{w_1}{w}}$$

This would have been .57 instead of .53 instead of .53, in case the prism was assumed to start from foot of wall.

Rankine's theory of earth-pressures makes the thrust parallel to the surface of the bank. Accepting this and these results

$\frac{p}{t} = .57 \sin \frac{a}{2} \sqrt{\frac{w_1}{w}}$ differing from the usual formula in substituting $\sin \frac{a}{2}$ for $\tan \frac{a}{2}$

This gave results very close to those obtained by experiment—and considerably less than those from the formula last given; which, perhaps, accounts for the general omission to employ a factor of safety.

Transformation of profiles.—Vauban's rule—that a rectangular wall may be transformed into one of equal stability with a batter on the face, having the same thickness at one-ninth the height, is true within 1-120th when the batter exceeds one-sixth.

Now it is usual to give a less batter, and by taking the common thickness at one tenth the height, the error is inconsiderable. [This was proved by experiment.]

In a surcharged wall, if the surcharge starts from the back of the wall

$$\frac{t}{h} = .38 \cos a \sqrt{\frac{w_1}{w}}$$

and experiment verifies this. Uniformly, when the experimental wall first gave way, the filling did not revolve, as stated by some writers, but settled suddenly, and then rested until another shock started it again. This seems to show the advisability of stepping the back of walls. Much depends upon the manner in which the work is done after the profile has been fixed; inattention to the details of construction may jeopardise the safety of a structure well proportioned.

For several years pains have been taken to collect data of walls in existence, with a view to establish a co-efficient safe under ordinary conditions—and which may be modified by the engineer to suit particular cases.

DISCUSSION.

Mr. J. DUTTON STEELE gave a practical rule, verified by his experience, for surcharged walls

of dry masonry less than 18ft. high—namely, a width of 3ft. at top, a batter of $\frac{1}{8}$ outside, and none inside. In one case, for a mortared wall 18ft. high, he reduced the thickness at the top to 2½ feet, and gave a batter to both sides. Engineers who, from lack of room, have been compelled to lay walls upon narrowed or stepped foundations, will be pleased to know from Mr. Constable's experiments that such conform to theory, and are safe in practice.

Mr. COLLINGWOOD inquired whether it was not best to step the back of a wall, rather than give it a batter.

Mr. CONSTABLE said it was more a matter of practice than of theory; by thus stepping a wall, the back filling upon settlement did not act as a wedge.

Mr. STEELE said that generally now the back of a wall is not stepped as formerly, but made vertical; often in railway practice it is counter-sloped or under-cut, and the stability thereby increased. The back should have a "frost" batter at top, where the earth is likely to freeze, so that it may be lifted from the wall. Care should always be taken in back filling to slope the packed earth from the wall rather than towards it.

Mr. COLMAN said that in filling behind the masonry of New York State canal locks, broken stone 1ft. in thickness had been placed between the wall and embankment.

A communication was submitted from a prominent Canadian engineer, in which he said: "In practice I have always made my walls heavier than theory demanded, on account of the severe operations of frost in this northern latitude, where it strikes from 3 to 4ft. into the ground, and yet without giving a slope or 'frost' batter to the back of the wall where the frozen earth presses against it, our strongest walls could not stand. It has been my rule to make the base of the wall equal to two-fifths its height, but this is for first-class masonry laid in hydraulic cement."

Mr. CONSTABLE, by experiment with the model, demonstrated that two walls of same area of section, one rectangular, and the other with batter on the face of 22-100ths, were equally stable; and also that the saving in material by giving much batter is but little. A wall battered on the back less than on the face evidently is less economical than if all the batter was on the face.

Attention was called to the difference in resistance to crushing per square inch of section, of stones lin. and 1½in. cube, as stated in Mr. C. B. Richards' paper, recording "Experiments on the Resistance of Stones to Crushing," read before the Society January 8th last: thus white marble gave a mean resistance in the first of 5,812, and in the second of 8,294 pounds per square inch of section. The question was raised, what relation was there between the size and the resistance of specimens, and whether tests upon blocks proportioned like those used in any particular work, would better enable the engineer to determine how much the latter could withstand.

Tests of the strength of any material are of greatest value when conducted under conditions most like those governing actual use. The difficulty of making such upon large specimens was pointed out, and a brief comparative account of testing machines was given.

It was proposed to take up the latter, as a subject of discussion, at a future meeting of the Society.

GRIFFITHS'S PATENT ENAMELLING PAINT.—A new enamelling paint has been introduced by Mr. Thomas Griffiths, of Liverpool, for rendering buildings, however damp, thoroughly waterproof. It is prepared ready for use, and can be applied by any ordinary labourer, and one coat is sufficient for all waterproofing purposes. For ships' bottoms, porous tile roofs, concrete blocks, gable ends, and walls of houses, it will be found especially suitable. In India and similar climates, wood may be protected from the ravages of the white ant by its use. The enamel is extremely light in weight, the bulk being more than three times that of ordinary paint, and the body far greater; its use is consequently much more economical.

On Tuesday morning, between eight and nine o'clock, a fire occurred at the Church of S. Mary Magdalene, in Clarendon-street, Harrow-road, which, as will be remembered, was very seriously damaged by fire in July last. Fortunately, however, on this occasion the roof of the chantry was but very slightly damaged. The cause of the outbreak was, as usual, an act of carelessness on the part of a workman.

OUR LITHOGRAPHIC ILLUSTRATIONS.

HERALDIC WORK FOR THE PARISH CHURCH OF
S. OÜEN, ISLAND OF JERSEY.

The parish of S. Ouen, which may almost be said to have been the appanage of the De Carteret family, of which its members were seigneurs for more than six centuries, is the largest of the twelve parochial divisions of the island. As presumptive evidence that the seigneur was ground-lord of his entire parish, may be mentioned the fact that while the eleven others are divided into *vingtaines*, S. Ouen's is parcelled out into *ceuilletes*, or "gatherings," manifestly for the readier collection of manorial dues. One of these "gatherings" is the *Ceuillette de Miltais*, the ancestors of our pre-Raffaellite painter having been hereditary tax-gatherers to the lordly owners of the manor. This family of De Carteret is, by reason of its antiquity and its national services, one of the most prominent of the illustrious roll of Anglo-Norman nobility. Mrs. Tuohy, the daughter and eventual sole heiress of the late Colonel J. D. de Carteret, and widow of Edward Tuohy, Esq., is the twenty-eighth in direct lineal descent from Guy de Carteret, the first on record of the family. Mrs. Tuohy, upon the recent restoration of her parish church, determined to present it some lasting memorial of her family, which has for so many centuries made it a place of sepulture, and of which she is, as has been before observed, the sole surviving direct descendant. These consist of a monumental brass and elaborate carved oak-work. The former is in the style of the fifteenth century (the period at which the manor was acquired by Richard de Carteret), and represents a mailed figure, the armour and accoutrements of which are all emblematically enriched. On the dexter side of the brass are given the arms of the manor; and on the sinister and on the surcoat of the figure are the bearings of De Carteret, properly differentiated. The feet of the effigy rest on a winged stag at rest, the supporters of the house. In the four angles of the inscription are delineated the shields of as many manorial families of Jersey, all of which are represented by the donor. An experiment has been essayed which has given this brass exceptional effect and brilliancy, by an admixture of red with the black enamel in the enrichments of the figure. This brass is to be erected on the right of the chancel window.

The full heraldic insignia of the lords of the manor of Vinchelès de Bas are carved in heart of oak on the façade of the manorial pew, which faces the altar. The centre compartment of this pew is filled with a richly-pierced carving of the shield of Mrs. Tuohy, surmounted with a knight's helmet, and ensigned with two distaffs (a manor being said, by the *Coustumier de Normandie*, to be *en quenouille* when possessed by a lady), and supported by the winged stags of the De Carterets. The inescutcheon of the shield is of brass, on which is portrayed the thirty-two quarterings of the families of which Mrs. Tuohy is co-representative. Above are the crests of De Carteret and Dumaresq, and beneath is the proud motto which this family has richly earned by its lavish expenditure of blood and treasure in the service of its country—"Loyal devoir." The side compartments of the pew are filled with eight shields and labels, on which are respectively depicted the arms and names of the chief alliances of the knights of Vincheles de Bas.

The whole of this work, of which we give illustrations, has been executed from the designs and under the immediate superintendence of Captain Bertrand Payne, M.R.I., F.R.S.L., F.R.G.S., one of the highest living authorities in genealogy and Gothic heraldry.

The Church of S. Ouen has been recently re-pewed and generally restored, under the directions of an English architect, and has already been adorned with several stained-glass windows and mural monuments, which are, however, of very inferior artistic pretensions. This church, according to the *Livre Noir de Coutances*, was consecrated September 4, 1130, and originally consisted of one small chapel, which now forms the chancel. To this, additions on the north, south, and west have been made at various times, rendering the structure nearly square. The stonework presents few, if any, objects of interest to the architect, except that of demonstrating how little the early attempts of Anglo-Norman builders resemble that magnificent style known through the world as Gothic, and for excellence in which Normandy and England, together and divided, have borne the palm from all comers.

THE "CRITERION," PICCADILLY.

Our double-page illustration represents "The Criterion," as now erected in Piccadilly for Messrs. Spiers & Pond. A fortnight since, when the members of the Architectural Association visited the building, we gave a full and special report of it, which renders it unnecessary for us to say more now. The architect is Mr. Thomas Verity, who, it will be remembered, won the first premium of £150. We criticised the various designs in the BUILDING NEWS for March 24, 1871, Vol. XX., p. 214.

MR. ROSS'S DESIGN FOR THE EDINBURGH CATHEDRAL.

We give this week the design for the east end of this cathedral, as submitted by Mr. Alex. Ross. For further particulars see descriptions and criticisms which have appeared in the BUILDING NEWS since the commencement of the year. We gave the south elevation of this design on Jan. 24 last, and view of west end on February 14th.

DROMORE CASTLE.

One of our lithographic pages represents two characteristic medallions of painted glass for the drawing-room of Dromore Castle, as designed by Mr. Ed. W. Godwin, F.S.A., the architect of the building.

EDINBURGH ARCHITECTURAL ASSOCIATION.

ON Wednesday evening a meeting of this Association was held in the rooms, 37, George-street. In the absence of the president, Mr. Alex. Ballantine was voted to the chair. After ordinary preliminary business, Mr. R. T. Shiells called attention to the very commonplace character of the buildings in progress on the south side of the Castle Rock, and after exhibiting the plans thereof, the following resolution was passed:—"That the Edinburgh Architectural Association highly approve of the steps taken by the Town Council regarding the Government new barrack building on the Castle Rock, as they are of opinion that if executed according to the drawings, the building will be quite out of harmony with the site and surroundings." A paper was then read by Mr. Thomas Henderson on "Some Causes affecting the Development of Architecture in Scotland," in which the relations between the history of the Scottish people and certain features of the national architecture were traced and illustrated. The points principally referred to were the influence of the mixture of races of which the Scottish nation consists, the isolated situation of the country, and the absence of great wealth among the people. Above all, the intercourse with Ireland in the early ages, and with England and France at a later period, was shown to have left marked traces on Scottish art; while the influence of the national religion, both embodied in the primitive Church of the Caldees, and in that of the Reformation, favoured a simplicity of ritual not conducive to magnificence in the ecclesiastical buildings of the country as a whole, though there were many noble and notable exceptions. Mr. Thomas P. Marwick afterwards read a paper on "Architectural Sketching," in the course of which he recommended students, as had often before been done, to sketch not only the dainty bits of architecture, but to carefully study the whole compositions, observing effects produced purely by the balance and contrast of line as being the more durable sources of architectural effect. Seeing that a Gothic design had been selected in almost every important competition during the last few years, he advocated the study of Gothic, and as a strong proclivity existed in architectural circles towards the thirteenth-century work, nothing but early work, and one particular application of it as the student's taste dictated, ecclesiastical or domestic, because so much energy was lost in the endeavour to master a variety of styles that it generally resulted in learning none. He advocated Gothic on the ground of its greater adaptability over Classic for universal and miscellaneous application, and as being more conducive to the propagation of a healthy spirit in design. He proceeded to give instructions "How to sketch," and "What to sketch," the materials necessary, the manner most likely to lead to a successful and beneficial result, and the necessity of incessant inquiry and observation to all students in their sketching tours. In the benefits of sketching reference was made to perspective, the education of the eye to form and proportion, and the preservation of details and characteristics

of old buildings, which in the words of Viollet le Duc were "fast disappearing like the leaves in autumn." Both papers were freely discussed by the members present, and after passing votes of thanks to the authors the meeting separated.

An interesting number of competition drawings of Fortrose Cathedral, Dunfermline, Linlithgow, Elgin, &c., were exhibited in the rooms.

SALVAGE CORPS.*

SALVAGE CORPS as at present constituted are quite recent institutions, and have originated since the transfer of the old London Fire Engine Establishment to the control of the Metropolitan Board of Works. The Act of Parliament which regulated this change contained a clause providing that if the insurance companies saw fit to establish a force of men charged with the duty of saving insured property, it should be part of the duty of the Fire Brigade to render, free of charge, all assistance in its power to the members of such a force.

In 1865, on the joint suggestion of Mr. L. M. Becker, some time superintendent of the late Lambeth Fire Brigade, and a Frenchman named Lemaitre, an association of twenty insurance companies was formed, to carry out the idea of a salvage corps. Four stations were established in the metropolis, each provided with a large four-wheeled carriage or conveyance and other appliances, and the corps placed under the superintendence of Mr. William Swanton. It then mustered only forty-two men—the total strength has since nearly doubled, there now being seventy-nine men on the roll. The number of stations has not been increased, but the organisation has been improved so far as minor details are concerned.

A salvage brigade had been established in Liverpool as far back as 1848, by the chief constable of that borough. This body was reorganised in 1866, and now consists of twelve men, distributed at two stations, each equipped in a similar manner to those of the metropolis. The maintenance of the whole establishment costs about £2,000 per annum. The cost of the Metropolitan Salvage Corps during the six years ending December 31, 1871, has been about £25,000, while during that period about £200,000 worth of property has been saved as salvage. The little agricultural town of Horsham, which, thanks to the liberality of its inhabitants and the zeal and energy of one of its inhabitants, is far more completely protected from fire than many of our great centres of trade and commerce, has a salvage corps attached to its volunteer brigade.

The work of salvage corps is fourfold—preservation of salvage, discovery of theft or fraud, the detection of arson, and the prevention of fire. To a certain extent the salvage-man's work is a continuation of the fireman's duty. In all cases, as soon as the brigade have extinguished a fire they leave the premises in charge of the salvage corps, who remove uninjured goods to a place of safety, prevent as much as possible further damage to property from the water thrown into the building, and extinguish any fresh outbursts of fire. In the detection of arson—a crime prevalent in England to an extent which few persons unconnected either with an insurance office or a fire-brigade have any idea—the salvage corps are especially useful. As a proof of this, reference may be made to the detection and punishment, through the exertions of the London Salvage Corps, of the incendiary William Anthony, who in three years caused no less than 125 fires for the sake of the rewards paid by the water companies and the brigade to persons giving the first alarm of fire. In the fulfilment of his duty as preventer, as far as possible, of fires, the salvage man, as he quietly goes about among wharves, docks, and warehouses, though then more immediately performing his work as the servant of the insurance companies, is none the less a public benefactor, for, as Mr. Barber observes, however a man whose property has been well insured may be individually compensated for his loss by fire, yet the danger, loss, and inconvenience accruing therefrom to the general public meet with no compensation, and all attempts to prevent fire are, therefore, worthy of general support. The practical utility of salvage corps has now been established beyond a doubt, and it may be hoped that ere long one may be established in every large town in the kingdom.

* "Salvage Corps: Their Origin and Use," &c., &c. By H. J. BARBER. Brighouse: A. H. Bayes.

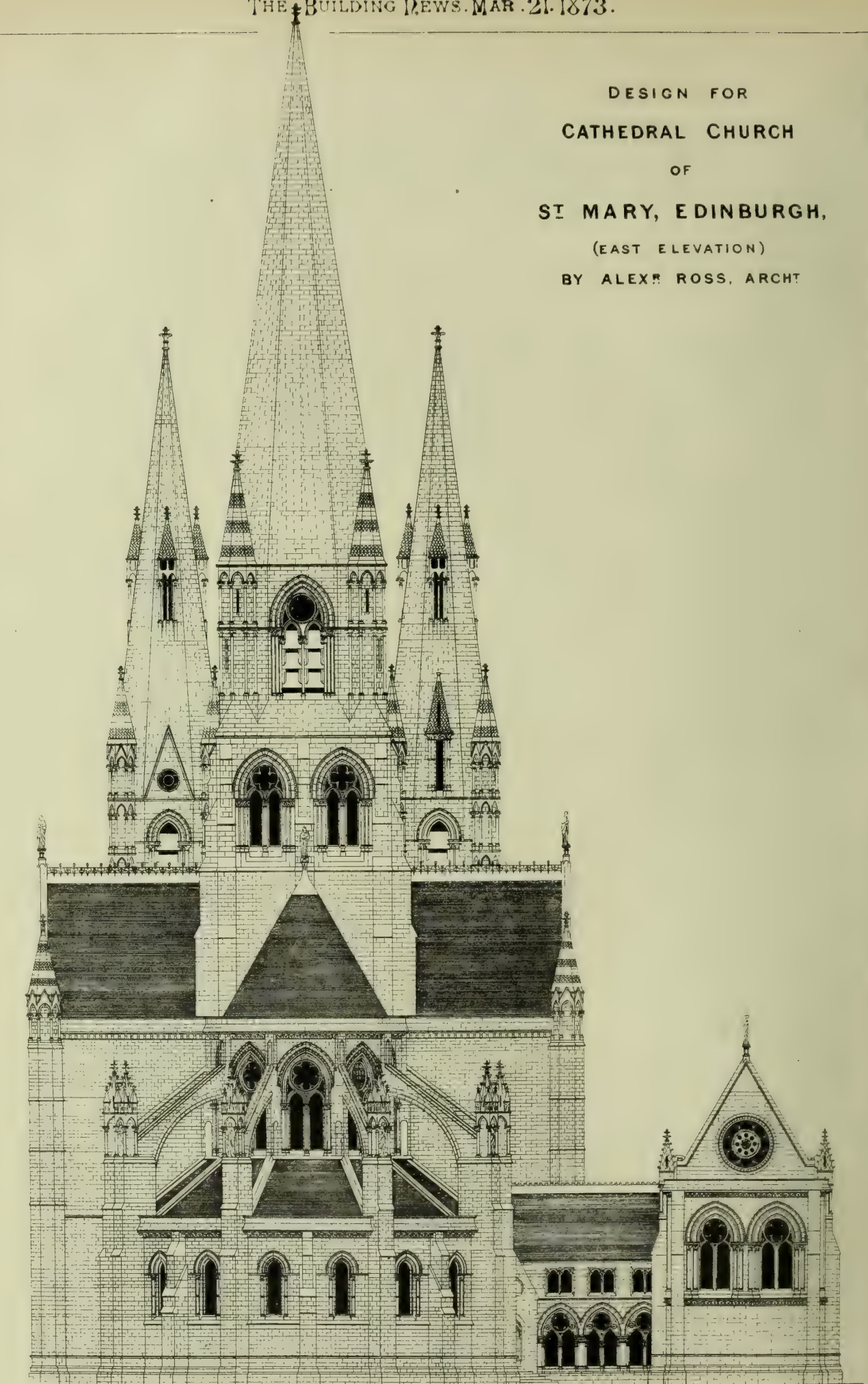


heraldic work for the parish church of S. Onen, island of Jersey,
brass to the memory of the family of de Carteret,
seignenrs of the knight's fief of Vincheles de bas.

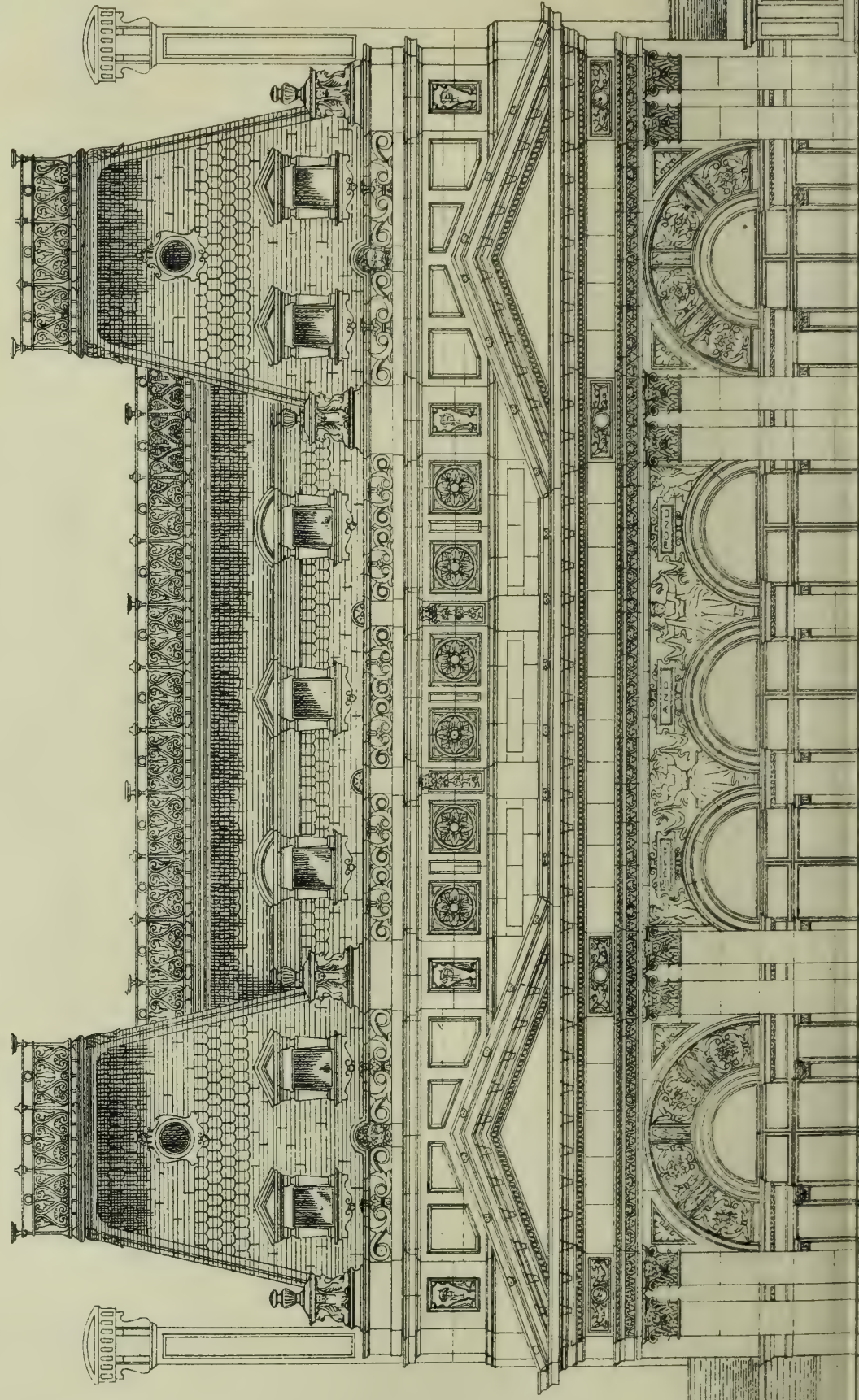
J. Bertrand Pathe

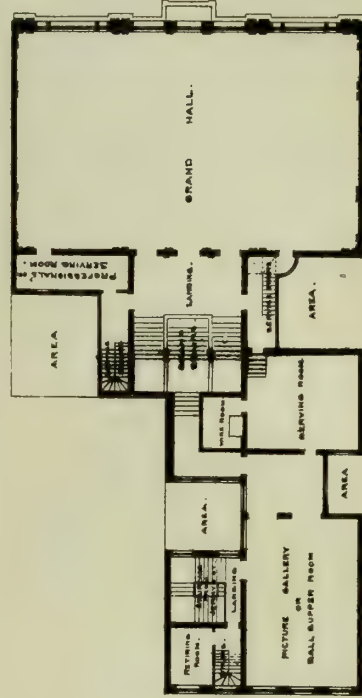
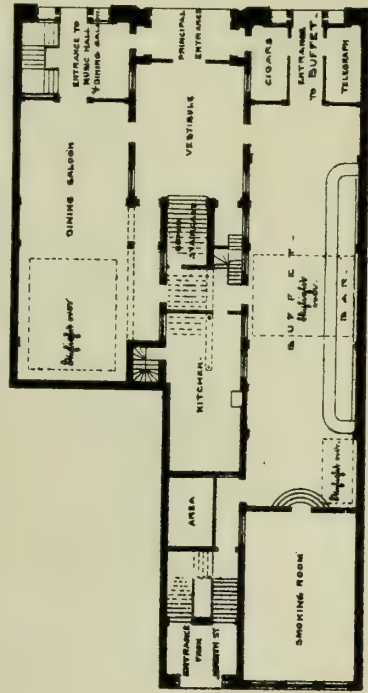
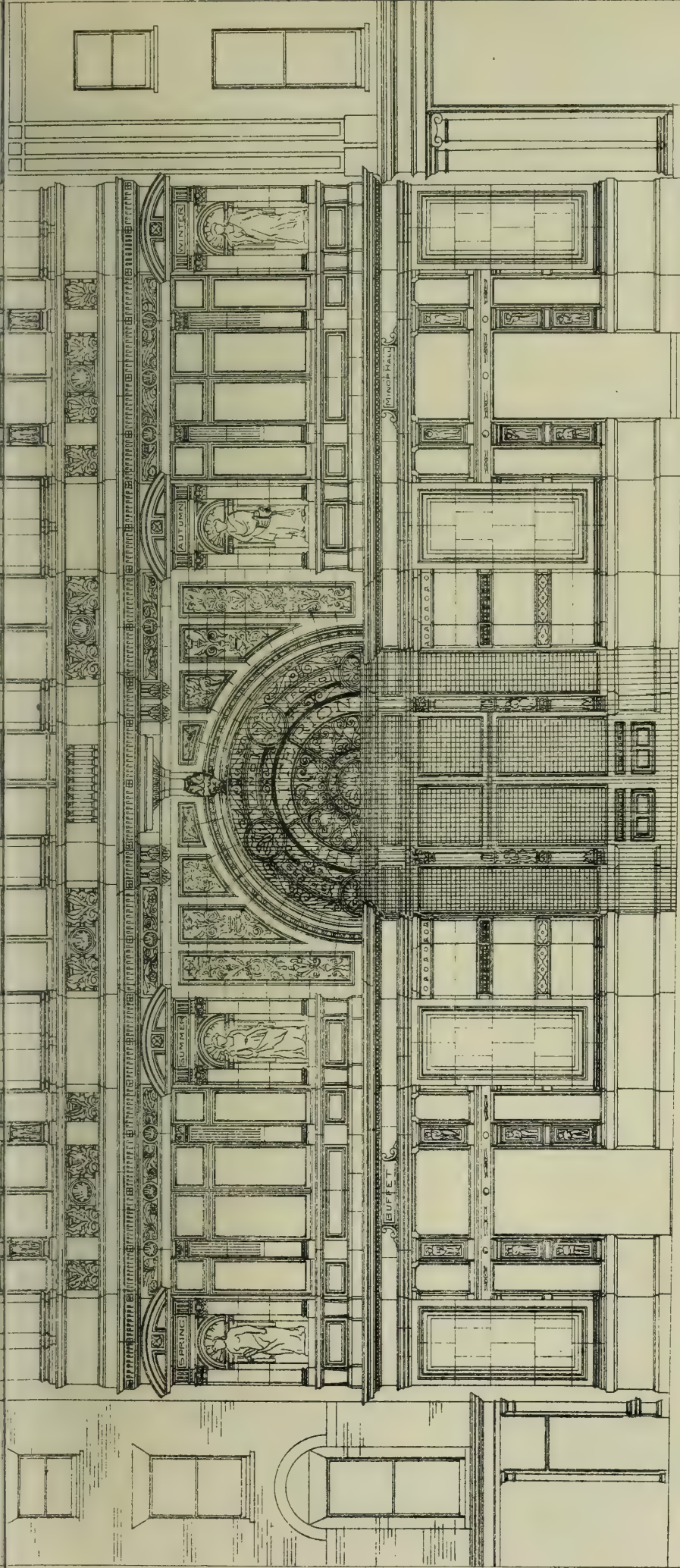
IN ET F&C.

DESIGN FOR
CATHEDRAL CHURCH
OF
ST MARY, EDINBURGH,
(EAST ELEVATION)
BY ALEX^r ROSS, ARCHT



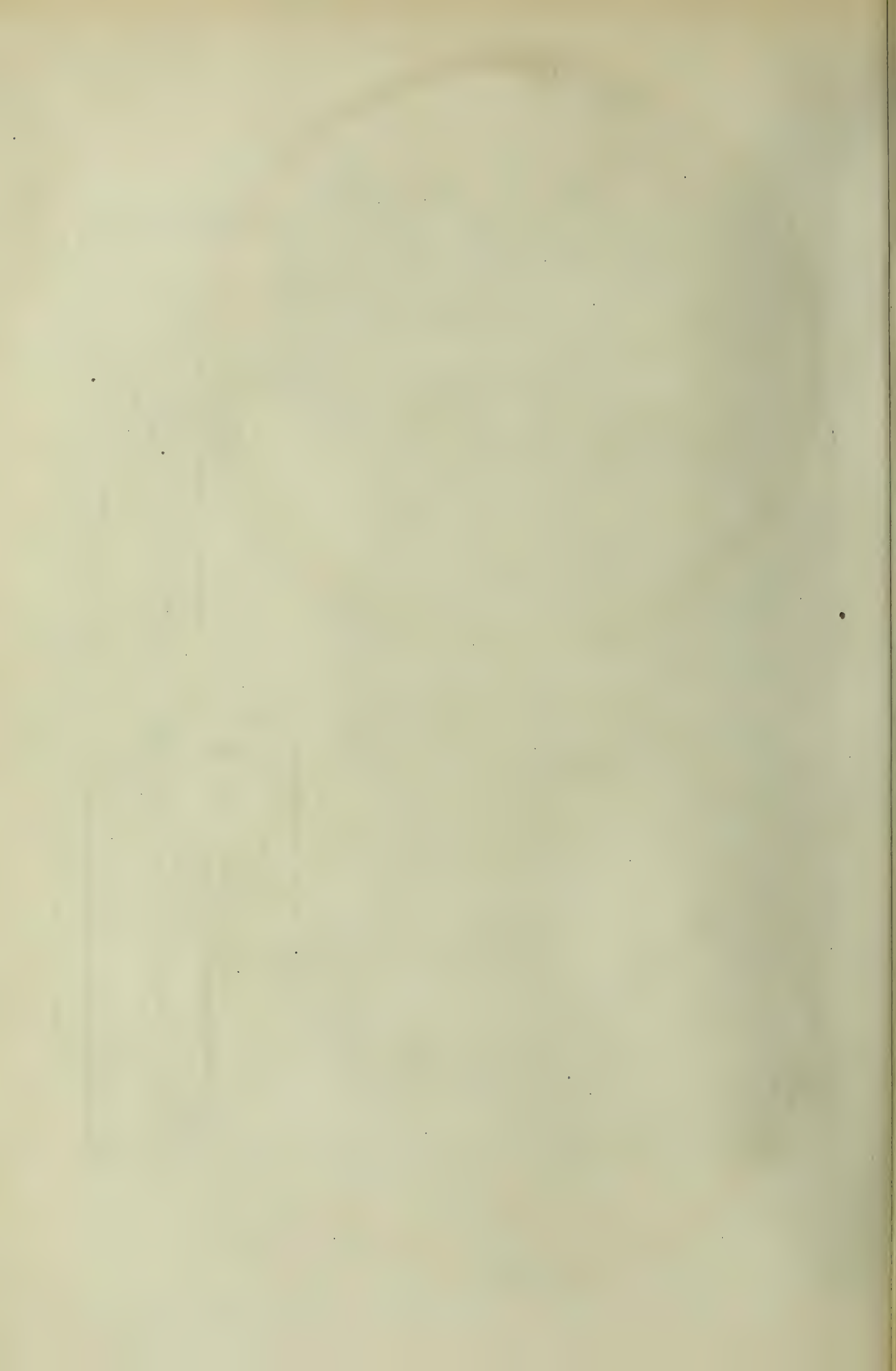
"*Ὁμολογία*": AS ERECTED BY PROPHET
FOR MESSRS. SPIERS & SON





Grosvenor, Architects.

Photo Lithographed & Printed by James Harman, 51 Gray's Inn Road W.C.





⊕ Day ⊕

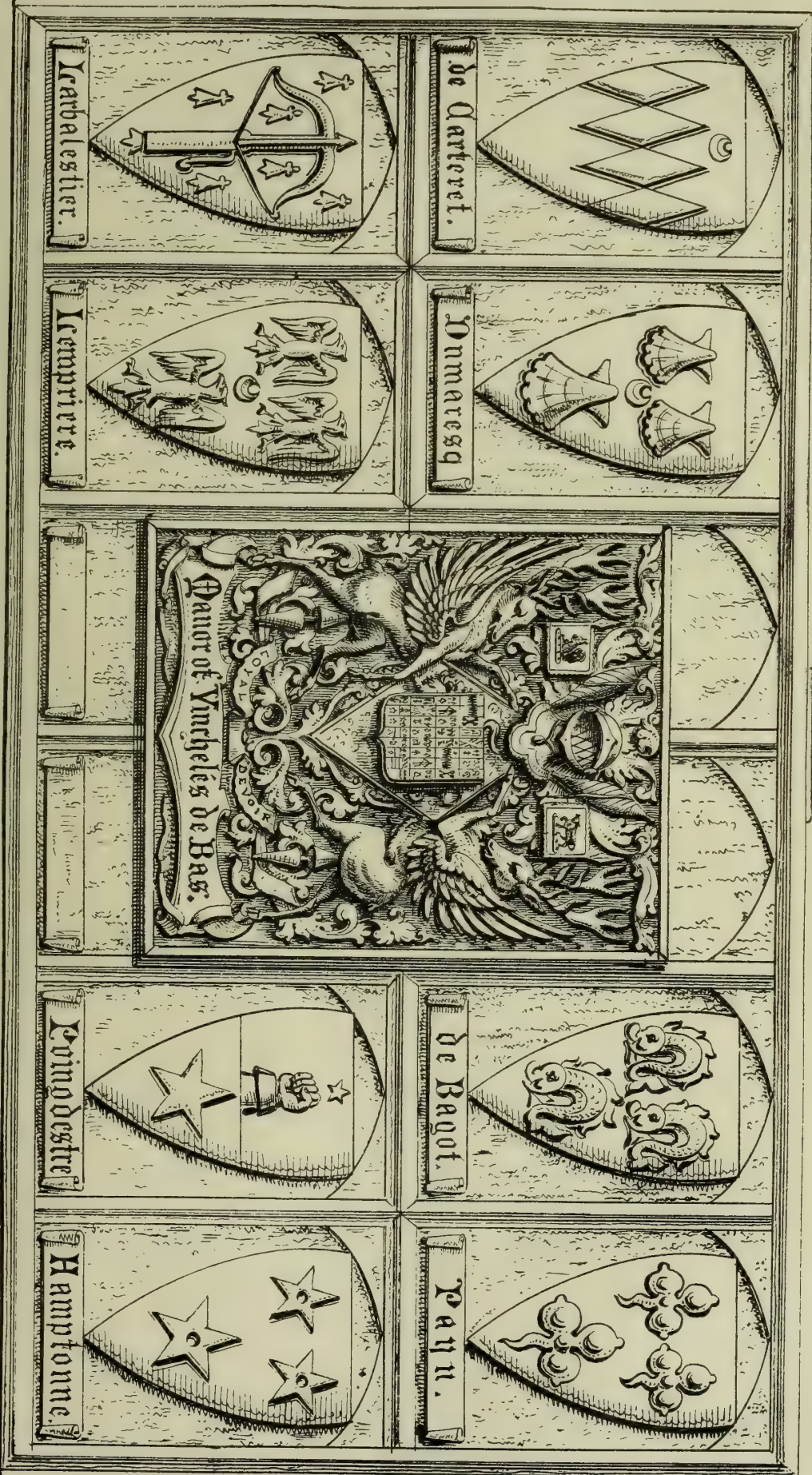


⊕ Night ⊕

PAINTED GLASS
from the
DRAWING ROOM DROMORE CASTLE
DESIGNED BY E. W. GODWIN F.S.A.

DRAWN BY J. HARGRE.

Photo Lithographed & Printed by James Harrison, 51 Gray's Inn Road, W.C.



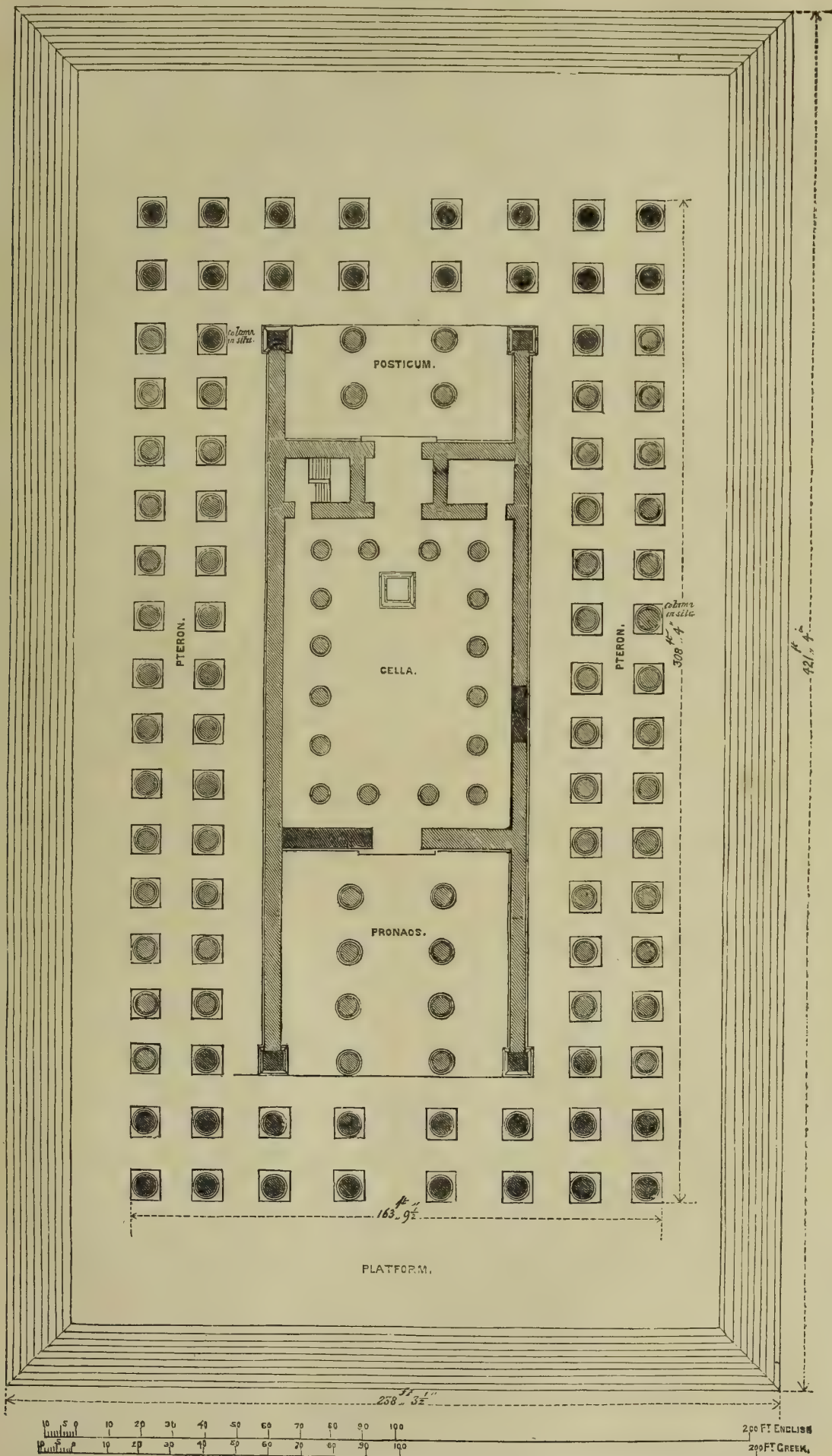
heraldic work for the parish church of S. Owen: island of Jersey.

Scott and Payne

memorial poem of Vincheles de Bas, facing the Altar.

JWET PCC.

TEMPLE OF DIANA.
EPHESUS.



FROM THE "ATHENÆUM," MARCH 8, 1873.—(SEE NEXT PAGE.)

THE TEMPLE OF DIANA AT EPHEBUS.

WE have in preceding numbers frequently referred to the important revelations which have been made at Ephesus by Mr. J. T. Wood; and we are now, by the courtesy of its editor, enabled to reproduce from the *Athenæum* Mr. Wood's last communication, accompanied by a plan of the famous Temple of Diana. The following is Mr. Wood's letter:

"Ephesus, Jan. 18, 1873.

"I have recently read an article in the Belgian *Nord*, purporting to be a translation of one which appeared in the *Athenæum* about two months ago.* There are one or two particulars I wish to refer to, in further explanation of the results of the excavations here, which I have now directed for nearly ten years, under the auspices of the British Museum.

"The vague allusions to the Temple of Artemis (Diana) and its site, in the works of ancient writers, were not calculated to lead to its discovery, and offered no encouragement to commence the search for it, and after some tentative excavations I thought it would be better to open up one or two of the public buildings in the city of Ephesus, in the hope of finding some inscription which would give more definite information. The Great Theatre was the most likely building to have such an inscription, and the Trustees of the British Museum, having been justified by satisfactory results from the expenditure of a small sum at the Odeon, made me a further advance for the exploration of the Great Theatre. As it was reasonably anticipated, this yielded still more satisfactory results; many valuable inscriptions were found: six large stones from the cella of the Temple of Artemis, covered with various decrees, one of which was correctly quoted in your article, and many other inscriptions, Greek and Latin, which are now safely deposited, and set up in order, in one of the rooms of the British Museum. The inscription, however, which gave me the important information as to the procession of gold and silver images from the Temple to the Theatre, through the Magnesian Gate, returning through the Coressian Gate, was found on one of the walls of the entrance lobby of the theatre. The finding of this inscription encouraged an idea I had before entertained of feeling my way to the Temple from one of the City gates, and, having found the Magnesian Gate, I opened up a large area on the outer side of it, and eventually found two roads, one of them leading around the mountain hitherto called "Prion" or "Pion" on the maps and charts, and the other in a winding direction towards Magnesia and Mæandrum. Of these two roads I determined to select that which appeared to be the most frequented. In that which led round Mount "Pion," I found four distinct chariot ruts worn deeply into the pavement, which was composed of large blocks of marble from the adjacent quarries. The other road was but little worn, and the ruts were scarcely discernible. Along the sides of this road, however, I found the tombs and monuments of many notable personages, and this induced me to explore it for some distance from the gate; at the same time, the road towards Ayasalouk was being opened up; and the more I saw of it the more convinced I was that it was in that direction that I must seek for the Temple. As soon, therefore, as I came to a part of the road leading to Magnesia, which yielded nothing of great interest, I abandoned it entirely, and devoted all my strength and energy in exploring the road leading round Mount "Pion," and which eventually led to the Temple. Clearing out entirely the outer side of this road, that no road leading outwards might escape my notice, I came at last to the road I sought, striking out in an easterly direction, and pointing to a spot where I had several years before set some men at work, whom I detached from the main body of my workmen, who were then employed at the theatre. This small gang of men did not succeed in digging a hole sufficiently deep to find the wall, which I was now determined to try for again. I therefore set on a sufficient number of men, and they soon found the peribolus wall, which is alluded to in your notice as having four inscriptions inserted near the angle, informing us that it was the wall built by Cæsar Augustus for the purpose of contracting the limits of the sacred precinct, which had at that time approached too near the city.

"This fortunate discovery was made in May, 1869. The last day of the same year I found the lower

pavement of the Temple more than half a mile from the angle of the peribolus wall first found; and, enlarging the hole, which was 20 feet deep, I soon found a group of drums of fluted columns of white marble resting where they had fallen between fifteen and sixteen centuries ago. From that time to the present I have been engaged in clearing out the whole of the site. There are many difficulties in doing this which absolutely prevent the completion of the work in less than four seasons from its commencement. The season is scarcely of eight months' duration, beginning in September and ending in May. At the commencement of the season very few workmen can be obtained to work at the excavations; and when the full complement of workmen has been got together, the days are of the shortest; and at the same time comes the fast of Ramazan, when the Turks do not eat from sunrise to sunset, and they cannot therefore work with any spirit after mid-day. Ramazan over, the feast of Bairam ensues, when all the Turks make "kef" (holiday) for three days, and return unfit for work for three more days. Then come some heavy rains, which sweep down the "barrow runs" into the excavations, preventing their continuance till the water subsides. The heavy rains may now come at any time, and hasty explorations are made in those parts which may soon be swamped for the rest of the season. This is sure to take place in February, if not before. This season, however, has been most favourable in respect to the weather, the latter half of December and the first two weeks of the present month having been remarkable for bright sunny weather. I have thus been enabled to make considerable progress towards clearing the whole of the Temple site; and although this splendid building was not only destroyed, but nearly all the stones suitable for building purposes carried away, I have still found sufficient data to make a plan of it, the correctness of which is only dubious in one or two comparatively unimportant instances, which I will point out hereafter.

"The position of the outer row of columns is given by the base of one of them which remains *in situ*; that of the inner row is also given in the same manner. Small portions of the southern and western walls of the cella still remain *in situ*, and the position of the northern and eastern walls, which have been completely removed, is to be found by their impression on the mortar of the foundation walls of a church or some other building which was erected within the walls of the cella before they were removed. The position of several of the columns is defined by their foundation-piers, which remain more or less perfect. The position of the antæ, as shown on my plan, is proved by a portion of the foundations of the one at the south-west angle, and the traces of the eastern wall on the wall of the church. The intercolumniations on both flanks between columns No. 3 and 16 are a little more than 17 feet; the two intercolumniations at each extremity are a little more than 19 feet; the first return intercolumniations of the front and rear correspond with those of the flanks nearest the extremities, and the intercolumniations increase in size towards the centre in due relative proportion. The exact position of the two centre columns is doubtful, the slight data hitherto obtained being insufficient to decide the question. The position of the ten steps on the flanks, as shown on my plan, has been proved beyond a doubt by numerous trenches where the pavement next the lowest step has been found, and by the continuous line of masonry on which the steps were placed, which remains on both sides, but which remains comparatively undisturbed on the north side for nearly its entire length.

"The Temple of Diana, about which there has been no much contention among the learned for so many generations, is now proved to be octastyle, that is, having eight columns in front. It has eighteen columns on the sides, and the intercolumniations of the latter are chiefly three diameters, making the Temple distastyle. The statement of Pliny, as to its having had one hundred columns (externally), is correct, and as many as twenty-seven of these might have been the contributions of kings. Of the position of the thirty-six *columnæ celatæ* (sculptured columns), I may obtain further proof before the excavations are completed. I have at present disposed them, as shown in my plan, eighteen in front and eighteen in rear. I must, however, here state that, although I have found ten or twelve large fragments of these at the western extremity of the building, I have found no trace of them at the eastern extremity. Still I have presumed

they must have existed there also, as the disposition of the two columns at both extremities is the same, the intercolumniations as above described being more than 19 feet; allowing therefore for the projection of the sculpture on these columns, which, in the fragments lately found, is as much as thirteen inches, the diameter of the columns was about 5 feet 10 inches. The dimensions of the Temple given by Pliny, viz., 220 feet by 425 feet, were evidently intended to apply to the raised platform upon which the Temple was built. The actual width of the platform, measured at the lowermost step, was 238 feet 3½ inches English. The evidence as to its length is not at present so conclusive, and the dimension given on my plan may have to be corrected when the western and eastern extremities have been more thoroughly explored. The dimensions of the Temple itself from plinth to plinth, "out to out," are 163 feet 9½ inches by 308 feet 4 inches. The height of the platform was 9 feet 5½ inches. The interior appears to have been adorned with two tiers of elliptical columns, Ionic and Corinthian, fragments of these having been found near the walls of the cella.

"The excavations are now going on with a large number of workmen, and before the termination of the season I hope I shall have some interesting intelligence for your readers J. T. Wood."

NEW BUILDINGS FOR THE LEARNED SOCIETIES, BURLINGTON HOUSE.

ON Saturday afternoon last, a large number of members of the Architectural Association visited the new buildings now approaching completion on the Piccadilly side of the site of Burlington House. The buildings have been erected for the accommodation of six of the principal learned societies, viz.—the Royal, the Antiquarian, the Astronomical, the Linnean, the Chemical, and the Geological. The accommodation for each of these societies varies in extent, and each society has a distinct suite of rooms, offices, library, &c., totally cut off from the rooms of the other societies, with separate entrances, separate means of access to the roof, and separate arrangements for warming, lighting, and ventilation. The buildings form three sides of a quadrangle, with the main or southern block towards Piccadilly, and the eastern and western blocks to the right and left respectively on passing through the large archway entrance which forms so conspicuous a feature of the Piccadilly *façade*. The north side of the quadrangle, directly facing the visitor as he passes through this archway, is, as most of our readers know, occupied by the new Royal Academy buildings, completed two or three years ago from the designs of Mr. Sidney Smirke, R.A., F.R.I.B.A. Behind the Royal Academy buildings, and with the principal frontage in Burlington-gardens, are the new buildings for the University of London, also completed a few years ago, from the designs of the late Sir James Pennethorne. The architects of the buildings for the learned societies are Messrs. Banks and Barry. The length of the frontage towards Piccadilly is 250ft., and the quadrangle measures 160ft. by 122ft. The details of the elevations of the main *façade* and the wings facing the quadrangle are Renaissance in character, and the central archway before referred to is 32ft. high and 20ft. wide, rusticated at the base on either side, the under surface of the arch being richly coffered. This archway is divided into three by two ranges of columns at each side, leaving a carriage-way in the centre and a footway for pedestrians on either side. The windows are surmounted by cornices, supported by richly-carved consoles, and with consoles under the string-course, the continuous cornice on the one-pair level being enriched in the frieze by an interlaced ribbon pattern. The *façade* of the one-pair or principal floor has a range of three-quarter columns, with deep capitals of Ionic character, decorated with carved festoons of fruit and flowers, the intervening windows having angular pediments, with the tympana enriched by carving. Excepting to the central and wing towers, which are square, the entablature of this order has a modillion cornice breaking round the columns, with enriched foliage in the frieze. The *façade* of the upper floor has square pilasters with enriched capitals, the intermediate windows having moulded architraves. Above these windows carved panels are introduced. Above these is the main cornice, surmounted by an open balustrade, although over the central portion of the building rises an additional story, in the form of a low

* The article in the *Athenæum* (No. 2345, p. 437) was an abstract of the report drawn up under the auspices of the Dilettanti Society.

square tower with circular-headed windows, carving being freely introduced in the panels and spandrels. At the eastern end of the main *façade* the entrance to the rooms of the Geological Society forms a distinct feature, consisting of a circular-headed doorway with triplet window over. The elevations to the quadrangle correspond in general character with the principal *façade* towards Piccadilly, although they are less elaborate in detail. The whole of the *façades* are in Portland stone of the best quality, the carving being by Mr. Sansom. The members of the Architectural Association visited the works for the second time on Saturday last, a visit having been paid to the buildings about a year ago, and it is probable that yet another visit will be made to the buildings on their completion. On Saturday last the visitors were conducted over the works by Mr. Daniel Ruddle, who very ably fills the responsible position of clerk of the works. The visitors first of all inspected the rooms and apartments of the Royal Society, which overlook the quadrangle on the eastern side. The accommodation provided for this Society on the ground-floor comprises entrance-hall, meeting-room, and committee-room. On the upper floor is a very handsome reception-room, and a library. The latter is lighted from the roof by skylights. The visitors next passed into the rooms, &c., provided for the Linnean Society, which include a council-chamber and herbarium, measuring together 53ft. long, 35ft. broad, and 31ft. high. The rooms of the Linnean Society are, like those of the Royal Society, in the eastern wing. The visitors next inspected the various apartments provided for the Society of Antiquaries and the Royal Astronomical Society, each of which find their quarters in the western wing of the building. The Geological Society and the Chemical Society will be located in the block of building towards Piccadilly, the rooms of each society, as is the case throughout, being quite distinct and complete in themselves. The Geological Society will have a museum, 53ft. by 33ft., by 31ft. high. The principal rooms for all the societies are similar in dimensions, except libraries, three of which are much larger than the other three. The Royal, Antiquarian, and Linnean Societies possess the largest libraries, each of which is top-lighted. The Astronomical, Chemical, and Geological Societies' libraries are smaller, and are lighted by side windows. The accommodation provided for each society includes reception rooms, offices, secretary's rooms, hat and cloak rooms, and the usual conveniences. Over the central archway is a spare *suite* of rooms for use by any or all of the societies on occasions of emergency. The arrangements are very complete, and six, at any rate, of the learned societies which have so largely contributed to the national welfare will soon be worthily housed in Piccadilly, for we believe that the new buildings will be ready for occupation next autumn. In the meantime, a project has been started, under the auspices of the more important of the learned societies not included among those we have enumerated, with the object of providing worthy offices and meeting-rooms for the societies not provided for at Burlington House, and there is every prospect that the scheme will be brought to a successful fruition. The most noticeable constructional features of the buildings at Burlington House were duly pointed out by Mr. Ruddle on Saturday last. The construction is what is known as "fireproof" throughout, the floors being constructed in the following manner: Rivetted wrought-iron main girders carry rolled iron joists about 2ft. apart, which in their turn carry concrete from centre to centre upon light \perp -irons placed 3in. apart. A notable and important point in connection with the principal front is that every cornice forms a guttering in itself on the "weathering," and the water is thrown off by means of gurgoyles, which form a feature in the architectural ornamentation. By this means the rain is prevented from running down and staining the front, and the stonework is to some extent preserved from the action of the weather. The general contractors for the building are Messrs. Perry and Co., of Stratford. The foundations were carried out by Messrs. Trollope, all the brickwork being executed in blue lias, with extra-strong hoop-iron bond, 1½in. wide. The warming and ventilation arrangements have been undertaken by Messrs. Haden.

The church at Killingworth, near Newcastle-on-Tyne, was partly destroyed by fire early on Sunday morning.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary fortnightly meeting on Monday evening last, the President, Mr. T. H. Wyatt, in the chair, the minutes of the special general meeting, held on the 3rd instant, having been read and confirmed, and several donations to the library having been announced,

Sir DIGBY WYATT introduced to the Chairman Mr. Henry Cole, C.B., who attended for the first time since his election as Honorary Fellow. Sir Digby Wyatt remarked that Mr. Cole was a man of European reputation, but it was generally supposed that he had some curious prejudices and ideas as to architects, which prejudices and ideas would, he hoped, be removed, or at least modified, by a more extended intercourse with architects.

The PRESIDENT, in welcoming Mr. Cole as an Honorary Fellow of the Institute, re-echoed what had fallen from Sir Digby Wyatt.

Mr. COLE, in acknowledgment, said that he thought he should not be far from the truth in saying that he had received as many stripes as most men who had devoted themselves to a public career—sometimes, perhaps, very well-deserved. He should like to say, however, that he did not entertain any prejudices against architects, and he was quite content to regard the few observations of the President and Sir Digby Wyatt as belonging to those little aberrations which occasionally happened to the best of men. In his opinion, the architect was the most eminent of artists. He supposed it was no great offence to say that architects in the present day did not aspire to be great painters or great sculptors. No doubt they could build soundly when paid for it, and no doubt they were men of science also; but in the division of labour which existed nowadays, architects were not the same human beings they were three hundred years ago. So far as he had any confession of faith on the subject, it was that architects should strive to be as much as possible what they were in former times. He thought it quite impossible to combine the man of commerce with the man of art. He thought that if he had any power in the matter, what he should like to do would be to say to the artist or architect: "Here is a great work; don't go and build it like a barrack, in three or five years, and as cheap as possible, but go on with it deliberately, and concentrate the whole force of your mind upon it whilst you have it in hand." Such a course and "five per cent." were incompatible. Doubtless "five per cent." was agreeable and important, especially as architects were not given to celibacy; and a number of other considerations rendered it necessary that "five per cent." should be attended to. But if the architect was to be a great artist, and really intended to devote himself to his art rather than to "five per cent.," his opinion was that the course pursued by the architects of olden times must be more closely followed. He would say to the architect on behalf of the country (had he the power): "You are certainly not called upon for any sacrifice; you are to be paid as liberally as possible; but whilst you have this work in hand we want to have the best of your brain-power, and don't want you running about the country attending to many works and entrusting the details of your buildings to clerks of works," and so on. He felt it a great honour to be elected an Hon. Fellow of the Institute, particularly at the end of his official career, and was rejoiced to throw in his fortunes with the architects.

Mr. EASTLAKE, the Secretary, announced the decease of Mr. H. C. S. Head, Fellow; and Mr. L. A. Spurr, Associate.

The PRESIDENT announced that Mr. Beresford Hope, M.P., had taken great interest in the fate of some of the London churches by Sir Christopher Wren, and in connection with a committee now sitting on the Union of Benefices Bill, he had expressed a hope that some action should be taken by the Institute, and that some member of the Institute should give evidence before that Committee as to the great value of Wren's churches. Professor Donaldson had accordingly given evidence before the committee, and it was hoped that his evidence would enable some at least of the churches to be saved from demolition. An arrangement had been come to that in future proceedings under the Act, the President of the Institute for the time being should be examined before the Committee, and that no churches should be demolished until his evidence as to their value had been given.

Mr. ALLAN S. COLE then read a paper on THE ART OF SGRAFFITO DECORATION.

Mr. COLE remarked that whilst London contained some of the finest buildings in the world, its miles of shabby brick houses gave it a dull air, which coal-smoke and fog made duller. In these times of individuality, cheapness had an uninterrupted sway of its own, although probably the worst period of cheapness was over. London would continue to have acres of little brick streets in the working parts of the Metropolis, but there were signs that such streets as Baker-street and Sloane-street, in their dull monotony, were going out of fashion. Houses of a rental of £300 a year and upwards had usually a stucco face, and affected some architectural mouldings in cement, at best very mean and tasteless. But while cheapness must and would prevail as an influential consideration in the erection of houses, Mr. Cole thought that the experience of the past showed that there were processes by which even the cheapest brick architecture might be elevated by a little decoration at a low price. *Sgraffito* decoration was eminently suited to this purpose, and from inquiries Mr. Cole had made, it appeared that surfaces might be prepared at a cheap rate for *sgraffito* or stucco decorations, the cost of the ornament of course depending upon its elaboration. This method of decoration left the style considered to be preferable entirely at the option of the builder, the decorator, or the purchaser, though one dogma should be laid down in respect to this, viz., that the surface under treatment should be panelled, and the arabesques or ornaments placed within the panels. The panels would necessarily follow the prominent constructional lines of the *façade*, and so would not weaken the appearance of them, as was the case with the unsystematic manner in which so-called ornament was applied to, or rather dabbled upon, many of our modern houses. It would no doubt be said that this plaster decoration would become as dirty as the common plaster work which covered modern houses, and that it would require to be protected by paint. That might be so, but it should be remembered that at first starting the ground of the *sgraffito* was of a dark tone, while the upper layer of plaster was white, or light in colour; therefore, although the two might become dirty together, the two colours would remain for a long time in contrast. When they were entirely obliterated, the incised ornamentation would always be apparent, and be of service as a decoration in spite of the toning of soot and fogs. The author said it had occurred to him that some modification of the artificial stone manufacture might be usefully adopted in strengthening the plaster, and in perhaps giving it an invisible vitreous coating after the work had been executed, so that from time to time the dirt which would accumulate might be removed from this coating. At South Kensington various methods of using cement for decorative purposes had been tried by Mr. Moody (whom the author ventured to term Andrea di Cosimo *redivivus*) and the students in training. The practice ground had been the extensive wall surface of the inner side of the new science schools, whose *façade* is in Exhibition-road, opposite to the site of the proposed Natural History Museum. (Some of the original cartoons of these decorations were exhibited, and Mr. Cole invited architects and others who took an interest in the work to go to the Museum and inspect it.) The surface had been treated principally from the experimental point of view, and the work was not to be judged of as a complete design, of which the details had an artistic rationale one to the other. *Sgraffito* proper occupied the largest area, but there were examples of other uses of stucco and cement, such as modelling in low relief, painting upon the stucco itself, &c. *Sgraffito* was the scratching of an ornament upon an intonaco layer applied to a black ground, leaving the white of the intonaco to represent the white forms of the design, and the black to represent the black. To fix this preparation of plasters to a wall it was necessary that the wall should be well wetted; in fact, as Cennini had said, "You cannot wet the wall too much." An ordinary "floating" coat of plaster ¾in. thick was first laid; when this was sufficiently dry (say in three or four days) a layer of black plaster, not more than ¼in. thick, was applied; when this had settled and was still damp, the finishing coat of light coloured plaster was laid on ¼in., or less in thickness, according to the delicacy of the work to be executed, or the distance from which the *sgraffito*

was intended to be seen. This last coating was the "intonaco" or "upper layer" spoken of by Bossi, who in his "Dictionary of Art Terms and Work," describes "*sgraffito*" under "*Sgraffito*." The surface was next prepared for being worked upon, and before the plaster hardened the *sgraffito* or hatching should be executed. In this respect the work resembled fresco-painting, since no more of the surface should be prepared than the artist was able to finish in one day. Mr. Moody, in his report on this art, made the following remarks as to the transfer of a design and its subsequent execution on the plaster:—"Having made a full-sized drawing of the proposed ornament, it can be transferred to the wall by tracing the lines through the paper on to the wet and yielding plaster; or if the drawing is executed in charcoal, it may be printed on the wall by turning its face towards the plaster and rubbing it firmly at the back; then with an ordinary desk penknife, which was found to be the best tool, the artist firmly incises the outline, cutting through the upper layer, into, but not through, the black layer below; he then scrapes away the upper layer and exposes the black wherever black is wanted, leaving the upper layer wherever white is wanted, and in this way any design in two tints can be executed with rapidity and effect. Where large spaces of black occur it is as well to use a broad tool with a square end, which not only removes the upper layer easily and quickly, but gives a tolerably even surface to the layer below. Although designs are very generally executed in black and white, any colours which are permanent when mixed with plaster can of course be used. Shading by lines can easily be done, provided they are not too near together, otherwise the projecting white might be apt to chip off." As regarded the experiment at South Kensington, Mr. Moody said:—"For the top part of the building (and this also refers to the work down to the first-floor), the first, or 'floating' coat, was composed of one part ground selenitic lime to four parts rough sand and a little plaster of Paris; this coat was $\frac{3}{4}$ in. thick. The next, or black layer, was composed of 1 part lime, $1\frac{1}{2}$ black oxide of manganese, 2 of Barra shale or clay; and in the upper parts of the building this was $\frac{3}{4}$ in. thick—a thickness which it was found necessary, at a subsequent stage, to reduce to less than $\frac{1}{2}$ in. The third or finishing coat was composed of silver sand, lime, and whitening in equal proportions. This coat was hardly more than 1-16th of an inch thick. The upper frieze was composed of purple brown and a little manganese, the colouring matter being somewhat less in proportion than in the black. In the second floor, the space above the windows has been divided into panels by a series of stiles. These were in ordinary Portland cement; as the effect was not considered satisfactory, they were afterwards painted maroon with common oil colours. As the work proceeded, it was discovered that the adherence to the wall in the previous work was in some parts defective, for on cutting into the plaster in these places, it was seen that the failure was in the first layer. It was at first supposed that this arose from the wall not having been sufficiently wetted, or the mortar scraped sufficiently out of the joints, to give a good key to the plaster; and it is not improbable that in the long interval that elapsed between the erection of the carcass and the completion of the building, the walls may have become so dry, that they required much more wetting than would have been the case with walls just built. However, be that as it may,* an experiment with the second, or black layer, proved its expansive powers when setting to be so great, that it may possibly have bowed out with sufficient force to have dragged up the first coat with it. Accordingly, in future work it was determined to reduce its thickness to a minimum. Soap lime was also substituted for selenitic lime in the composition of the black layer. A change was also made in the first or floating layer, which in future consisted of 1 part selenitic, 2 parts Barra clay, 5 parts coarse sand, but without complete success, as testing the work with a hammer will betray parts that are evidently hollow. The adherence between the three coats was invariably found to be complete; it was impossible to separate them; indeed, the strength and solidity of the whole slabs or panels were so obvious, that it was thought quite unnecessary to cut them away, although their adherence to the wall was in some places imperfect." The small panels in the upper part of the decoration above the windows of the

first floor are painted in fresco. Some of the more delicate shadows of the ornament were also painted with a little manganese and water on the coat of plaster, and in some parts, more especially in one of the spaces between the arches on the ground floor, a whole bay was entirely painted instead of cut. In the centre plaques of the decoration, between the windows, are figures in relief. There are five of these, beginning on the left. The first is modelled entirely in selenitic mortar, sand, and whitening in equal proportions. The ground was mixed with yellow ochre; but as this was found to be too soft, the grounds of the other figures were painted with raw sienna in fresco; the second and third figures were modelled in the same material as the first; the fourth was roughed out with Beasley's cement, and coated with $\frac{1}{4}$ -in. selenitic; the fifth, the same as No. 4. The above figures were roughly modelled by Mr. Gibbons; their execution did not occupy more than two hours each. The pilasters, with volute capitals were made of Beasley's cement. The great mass of the ornament on the ground floor was throughout executed in the way already described. There was, however, a slight modification in the figure subjects which fill the principal panels. Of these panels (counting the half panels at each end) there were seven. The two half panels and the centre panel were modelled; that to the left was entirely in Portland cement; that to the left, and also the centre one, were entirely in selenitic mortar and sand. The panels next to the centre were executed in *sgraffito*, with shadows in lines, similar to the rest of the work; but in the two panels next to the end ones, three instead of two layers had been laid, namely, first the ordinary black layer, then a gray layer, and last the ordinary coat. To obtain the shadow the upper coat only was cut through, but when it was desired to get to the background both that and the shadow coat were cut through. In this way was produced the appearance of a drawing with tinted shadows, and in this way no doubt still greater variety and refinement could without much difficulty be produced in *sgraffito*; for this work, however, it was necessary to devote considerable care to the preparation of the design; the exact form of the shadow must be clearly defined, and for this reason the preparation of such designs was a most useful and instructive study, although necessarily adding to the expense of the work. This latter piece of work closely resembled the chiaro-scuro which was frequently adopted in the sixteenth century in Italy for decoration of façades, &c. In concluding this description of the South Kensington experiment, Mr. Cole mentioned a successful modification of *sgraffito* which Mr. Moody had tried. "Having prepared a maroon ground, instead of a finishing coat, scarcely more than 1-16th of an inch thick, a layer was laid of light cement, one-half of an inch thick, and having traced the drawing, the outline of the figure was cut straight down to the ground; and, clearing away the waste, a projecting slab of the exact figure wished remained. The face was then carved after the manner of cameo cutting; and in this way was obtained a relief, in some respects better perhaps than if it had been modelled: for the degree of relief is more uniform and sculptural, while the figures come more satisfactorily off the ground than they would if it were painted." It was apparent, therefore, that Mr. Moody had more or less availed himself of precedents which exist for the various uses of stucco supplied by Italian artists of the sixteenth and seventeenth centuries, and by the Tuscan architects and decorators especially. Of the origin of *sgraffito* it was difficult to speak with anything like accuracy. The Italian artists employed stucco considerably in the decoration of the Vatican, both for modelling and for painting upon. Hence from this latter use of plaster were revived the various methods, more or less similar, which went by the names of "painting in fresco," "intonaco," "terrata," &c., which, as the earliest examples of wall decoration indicated—the wall paintings of Pompeii, for instance—were known to artists practising thousands of years ago. It was not unlikely that *sgraffito* was an offspring of cameo cutting. They both were arts having limits analogous one to the other. The artist who designed and executed a cameo limited himself in materials and colours. He depended solely upon the variations of layer which a stone possessed. In the same way the *sgraffito* worker, relieved certainly of the trouble of finding a suitable combination of layers, since each combination was under his control, limited himself to the

variations he could obtain from the two layers of oppositely cut plasters. But Vasari and Bossi, who both described the working of *sgraffito*, threw no light upon its antecedents. In the South Kensington Museum there were specimens of stucco ornamental panels which dated from 200 B.C. The panels come from Pozzuoli, near Naples, a village known in centuries past for its abundant examples of stucco work. Some of these panels were unmistakable bits of *sgraffito*, the marks of the hatcher being quite apparent. *Sgraffito*, as an art applied to other materials, was well known in India. Metal *sgraffito* was of ancient origin. At South Kensington Museum there was a case entirely occupied by specimens of *sgraffito* pottery, Italian in origin and of the fifteenth century. From this was the Italian artist of the fifteenth and sixteenth centuries possibly obtained the suggestion for the revival of *sgraffito* as a means of decorating façades of houses. In Italy, in the fifteenth and sixteenth centuries, great quantities of decoration were executed in plaster. Perino del Vaga, Domenico Beccafumi, and Giovanni da Udine, produced works of this kind. But none of these appeared to have executed *sgraffito* decorations. The artist who chiefly turned his attention, and who seemed to have really instigated a revival of *sgraffito*, was Morto da Feltri. The especial bent of his art was the invention of arabesques and grotesques. He spent a good deal of his time in the subterranean passages at Rome, studying the arabesques which were painted on the walls. From Rome he went to Naples, and at Pozzuoli, ten miles from that city, he found numerous examples of his favourite decorations executed in stucco, some modelled, others done in *sgraffito*. Of these identical works the South Kensington Museum possessed specimens. After his visit to Naples, there was reason to think that in his solitude he occasionally worked in *sgraffito*. His disciple and pupil, Andrea Feltrini, called di Cosimo, undoubtedly worked in *sgraffito*, and it was in consequence of these works of *sgraffito* by Andrea, executed before the death of Morto da Feltri, that Vasari hints at that art having been practised by Morto. The first important work of Andrea di Cosimo was the decoration in *sgraffito* of the facade of the Gondi Palace in the Borgo Ognissanti. Vasari, in describing the mode employed by Andrea di Cosimo for this facade, says that the first layer of plaster was mixed with burnt straw or ground charcoal, and while fresh, a second layer of white plaster was applied. Upon the white was transferred from the cartoon, the ornament, and this was "hatched" with an iron graving tool so that the white ornament remained upon the black ground. The white was then toned down with a wash of colour. It would be observed, that the present mode of *sgraffito* was identical with this—excepting the tinting of the upper layer, which being naturally grey, and likely by the usage of time to become darker, required no tinting. Baldassarre, the great Siennese artist, worked in *sgraffito* as well. He occasionally painted imitations of it and of stucco ornament. In closely following the footsteps of the Italian masters, Mr. Moody had allowed himself to be tempted into painting the arabesques upon the plaster, instead of hatching them. The result of this was in effect as good at first sight as the real work. But in a short time the accumulation of blacks, soaking into the flat surface by rain, revealed the disadvantages arising from such a method of decoration, which could not compete with the real work. *Sgraffito* should be *sgraffito*, and any imitation of it should not be encouraged. The painted work at South Kensington would shortly give place to the real art. Polidoro da Carravaggio was another *sgraffito* and stucco artist, besides being an imitator. For internal decorations, *sgraffito* might be suitably adopted, especially in some of our very bare brick churches. There was every reason to hope that, with the progress which marked at the present time the scientific production of varieties of cement, plaster, &c., fresh discoveries would be made in rendering them more impervious to dirt and atmospheric effects, and thus, by a combination of science and art, a decorative process might be evolved which was suitable for general use in this country, both for decorations internal and external, and which came within the desirable limits of moderate cost, without being cheap and nasty.

A long discussion ensued, which we have not space to report this week, the speakers being Mr. F. P. Cockerell, Sir Digby Wyatt, Mr. Gambier Parry, Mr. Henry Cole, C.B., Professor

* The selenitic mortar was made by hand, which is stated to be an inferior mode to preparing it in a mill.

Kerr, Mr. Charles Barry, Mr. Thomas Morris, and Mr. Robinson, and a unanimous vote of thanks was tendered to Mr. Cole for his paper.

The President having announced that Sir George Gilbert Scott, R.A., had consented to become the next President of the Institute, the proceedings terminated.

ON THE DOME.*

IT has been my lot to deliver my lectures from this chair in groups so very detached from one another as to render it impossible for my hearers to follow them as a continuous series. In spite, however, of this disadvantage, I purpose to make my present lecture form a natural sequence to the last which I had the pleasure of delivering, though this was read three years ago.

My last course was on Arched Construction, and my last lectures were on Vaulting. My present one will carry on the same subject into its culminating development—THE DOME.

Strongly as my tendencies towards our own Mediæval Architecture draw me towards the modes of vaulting which prevail in our own ancient buildings, and which formed the subject of my later lectures, I am bound to admit that the noblest of all forms by which a space can be covered is the dome, and, much more than this, that of all architectural forms it is the most sublime and the most poetic, and is susceptible of, and demands, the highest artistic treatment. I deplore, therefore, its non-existence in our Old English Architecture.

This regret, however, is diminished by the abundant evidence we possess that the dome, though absent from English buildings, was by no means held to be alien from the contemporary architecture of neighbouring countries, inasmuch as we possess it in highly-developed forms over a large part of France, in Germany, and in Italy, erected at the same periods with many of our great Mediæval edifices.

If, then, I am departing from the line I had been taking in tracing out the history of old English architecture, I am not only supplying a hiatus in that history, but I trust that I may be able to offer suggestions for a more practical object—the supplying of that hiatus in our revived and re-developed Neo-mediæval style.

In a former lecture, after defining a vault as the covering of a rectilinear space produced by the motion of an arch parallel to itself, I defined a dome as the covering of a circular space produced by the revolution of an arch round its central vertical axis. It follows that, if the arch so revolving is semicircular, the resulting dome is a hemisphere.

The revolving arch may, however, be of any form which an arch can assume. It may be elliptical, parabolic, hyperbolic, cycloidal; or it may be a pointed, a horseshoe, or an ogee arch. Any one of these, or other forms, of arch revolving on its centre, will generate a dome of its own sectional form. The *plan*, too, in spite of my definition, need not be a circle; it may be an ellipse, or of other forms.

I will not at this stage admit of square-planned, polygonal, or other straight-sided domes, because it may be doubted whether they are genuine domes at all, or whether they are not figures resulting from the intersection of a certain number of ordinary vaults. Anyhow, these are not generated by the revolution of an arch, so that if they are domes, my definition is at fault.

Simple, however, as is the hemispherical dome, it does not appear to have been historically the primæval type; for, strange to say, the earliest known domes assume in section the form of a lofty pointed arch. I refer specially to that of the supposed tomb of Agamemnon, at Mycenæ, and also to some portrayed on the Assyrian sculptures.

These would hardly come within the range of this lecture were it not so curious a fact that the earliest form of the dome foreshadows the very use to which I would now especially desire to accommodate it.

It is easy to perceive why the pointed arch was adopted in these primæval domes. They were not built with radiating joints, but in overhanging courses; and it will readily be seen on comparing their sections, that for this mode of construction, the pointed arch is much more favourable than the circular; while, as soon as

ever the radiating system was adopted, the semi-circle at once became the simplest and most obvious section.

It is, however, strange to observe how little has come down to us of the history of domes. From the tomb of Agamemnon—some eleven centuries before the Christian era—we have scarcely any certain evidences of their history till we arrive at the Pantheon, erected in the reign of Augustus, or, as Mr. Fergusson thinks, considerably later. Yet, as that dome is still the widest, built of solid materials, which exists, and as both in its construction and its architecture it is in a high degree artificial, and evinces a period of advanced development, it follows that it must be the representative of a long series of antecedent domes progressing from the crude idea onwards to this, the very highest developed form of the simple dome; for we shall presently see that there are other forms scarcely foreshadowed by even this magnificent structure.

I may here remark that the dome, like the arch and the vault, having great outward pressure, requires either a vast amount of sustaining wall carried up considerably above the springing level, or, in the absence of this, a tie of metal at, or somewhat above, its springing, or perhaps several of such ties at different heights. Unlike, however, the arch and the vault, it is independent of a *keystone*, each circular course of its structure forming a horizontal arch and keying itself. It may, consequently, be erected without the aid of centering, and may be discontinued at any level, leaving a central opening or eye.

The Pantheon is the great type of Roman domes. It is a simple rotunda of 142ft. internal diameter, the wall being some 20ft. thick. The wall is about 72ft. high to the springing of the Dome and continues above that level about 28ft. more.

The dome is a semi-circle, but has an open eye at its apex of nearly 30ft. in diameter.

The domes, as viewed externally, is buried by the wall which rises above its springing to fully a third of its height, and above this rises a sort of attic crowned by six gradenæ, burying nearly an equal height, so that the dome as an external feature is far from conspicuous, appearing as a mere flattened disc.

Internally, however, it forms a covering of the noblest character. Its internal surface is deeply coffered by panels of four orders, in depth dividing the circumference into twenty-eight parts, and its height, up to about two-thirds of the distance from the springing to the crown, into five parts, the upper portion being plain. These vast panels or coffers, the larger range of which exceed twelve feet in diameter, are curiously arranged as to their sectional recessing, so as to appear perfectly symmetrical to the eye of a spectator standing beneath the centre of the dome.

The wall up to the springing of the dome is beautifully decorated with rich architecture in marbles of varied colour, and it cannot be doubted that the cupola—the very soul of the design—was embellished in a manner fully proportioned to the beauty of its sustaining wall; indeed it is thought to have been coated with gilded bronze. When thus perfect it must have formed an interior of surpassing beauty, lighted as it was solely through the central eye, and the light tempered by the linen veil stretched across its rich bronze cornice, which still remains round the opening, and retains vestiges of gilding. The Pantheon can scarcely be called a *daring* effort of construction, because its vast solidity seems to defy all doubts as to its duration. It would be, however, absurd to suppose it to have been an *early* effort; for it is, as I have already said, so artificial in its construction as clearly to prove it to be the result of long continued practice.

The walls, which I have described as being 20ft. thick, are so only in theory, for practically they are hollowed into innumerable cells, some of them forming beautiful architectural recesses, and others merely constructional hollows.

The dome itself is constructed in a manner evincing long continued practice; for it differs *toto celo* from the normal mode of construction. It is shown differently by different authors; in fact it has probably never been sufficiently exposed to obtain complete information as to its curiously complicated construction. As far, however, as I can ascertain, it seems to be in two thicknesses. The inner thickness consists of the framework of the coffers, which is of brick, and the filling-in of the coffers, which is of rubble or concrete. This would form the centering on which the outer shell was built, which is a

curious tissue of arches, each rising from the crowns of those below it, and so disposed as to concentrate the pressure upon points in the wall which intervene between the cells. The spaces between these arches are filled in (so far as I can gather) with rubble or concrete. The whole was probably covered externally with plates of bronze or of marble.

The next antique Roman dome which I shall notice is that of the so-called Temple of Minerva Medica, so named from the discovery of a statue of that deity among its ruins, but now supposed by some to have been the great hall of some public baths.

This building greatly resembles the Pantheon in its general idea, but differs in this essential particular: that its surrounding wall is not circular, but decagonal.

At a later date, as we shall presently see, this peculiarity would have been seized upon as the suggestion of another type of dome of which I shall have subsequently to treat. As a matter of fact, the transition from the polygonal prism below to the nearly hemispherical dome above, is got over by "rule of thumb," rather than on any true system. The vertical sides of the wall do intersect the dome in arched forms; but neither are these forms the true sections of a plane with a sphere, nor have they been used as architectural features, as in later times; but have been afterwards, so far as I can judge, obliterated by the incrustation of the dome with plaster, so as to slur over a union of forms which the architect had fallen into accidentally without appreciating its true results.

The dome is surrounded by gradenæ much as in the Pantheon. It is not lighted by an eye, but by ten windows, surrounding what we should call the clerestory. Beneath these are ten arches piercing the surrounding wall; indeed, reducing it to small angle-piers. One of these is devoted to the entrance, the other nine to semicircular recesses, of which five seem to have contained basins for water, and four to have opened by means of colonnades into exedrae or surrounding buildings. It may be mentioned that this form was in after times extensively imitated. The span of this dome is about 80ft. Its date is not known.

There are other domes not differing materially from those already described, but which it would extend my lecture unduly to dwell upon. One called the Torre dei Schiavi, in the Via Prænestina, is, like the Pantheon, on a very small scale, though lighted by round clerestory windows instead of a central eye. The Temples of Vesta, both at Rome and at Tivoli, consist of circular walls surrounded externally by a peristyle. The cell of each is supposed to have been covered by a dome, though roofed over. A parallel case, though in a more complex form, exists in what is called the Temple of Jupiter in Diocletian's Palace at Spalatro. In this case, the exterior of the cell, with its peristyle, is octagonal, but the interior with the dome, *round*. The latter has a complicated construction of fan-shaped arches throughout, scarcely any part being constructed of horizontal curves. Next, perhaps, in date, yet at once displaying similarity of idea with a significant change in the carrying out, is the tomb of S. Constantia, the daughter of Constantine.

A Christian church, in its early form, has been familiarly described as the pagan temple turned inside out. To convert the ideal temple into the ideal church, the wall and the colonnade must change places. So completely is this the case that some of the earlier commentators on Vitruvius were completely puzzled between the wall of the temple and the peristyle. They assumed that the latter *must* be *within* the wall, as in their own churches, and based their remarks on this supposition.

The comparison between these almost contemporary works, the Temple of Diocletian at Spalatro, and the tomb of S. Constantia at Rome, exactly illustrates this change. In the one the solid wall forms the circle and carries the dome, and the colonnade is external; in the other the colonnade forms the inner circle and carries the dome, while the wall becomes external, an *aisle* taking the place of the peristyle. The colonnade is *doubled* to support the massive clerestory whence the dome springs, and the whole assumes the type of one form of Christian church, which henceforth became of frequent occurrence. The dome in this instance ceases to be an external feature, being covered over by a conical roof. I may add that the peristyle is repeated in the old manner as an additional feature beyond the wall of the

* Lecture delivered at the Royal Academy, by Sir G. G. Scott, R.A.

aisle. The baptistery at Nocera is similar in distribution to the tomb of S. Constantia, and may be of similar date. It is ruder, however, and loses much beauty by the omission of the clerestory, and the admission of light through the haunches of the dome. Among the innumerable remains of domes of the older type, I will only mention one more before proceeding to the second branch of my subject, to which it in fact properly belongs. That to which I allude is the baptistery at Ravenna, erected, as it is supposed, about the year 450.

This is a very charming building, octagonal in form, yet covered over by a hemispherical dome. Though having no surrounding aisle, the design of its sides seems derived from the aisle and clerestory: indeed it has a clerestory, though the arcade below is rather rudimentary than real. The dome, like that last alluded to, is covered externally by a sloping roof.

The special feature, however, in this dome is that it rests upon an octagonal wall, or rather upon eight arches.

We shall presently see how this was effected in subsequent times, and I will not anticipate that subject, but will content myself with mentioning that this seems to anticipate the Byzantine domes of the succeeding century, as had been the case in two other instances to which I shall have to refer, and as had been nearly the case in the Temple of Minerva Medica.

The domes which we have hitherto considered are exclusively and of necessity carried by circular or other continuous walls. They are consequently supported uniformly throughout their entire circumference, and their use is necessarily limited to the coverings of circular or quasi-circular or polygonal buildings. Had no further development been attained, it would ever have been felt to be a sad deficiency in the scope of architectural facilities that the noblest form of covering should be limited to the least usual and, for most purposes, the least convenient form of apartment. We are happily as far as possible from being left in this dilemma. A very simple application of geometrical thought opened a way by which almost any reasonable form of building may be covered by a dome or by a series or group of domes.

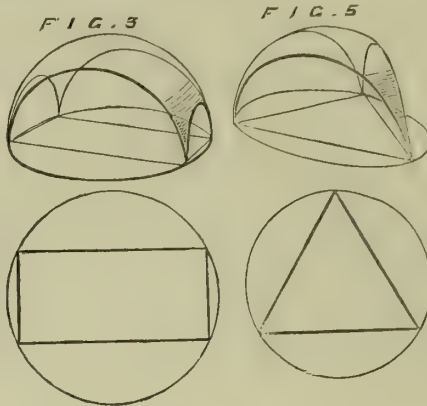
I will endeavour, as simply as I am able, to explain this important development.

It is a property of the sphere that every possible plane section of it is a circle. It follows that every vertical section of a hemispherical or segmental dome assumes the form of a semicircular or segmental arch. If, therefore, a square be inscribed in the base of a dome, and walls be built on that square, and continued up till they meet the dome, they will intersect with it in four semicircles, as in Fig. 1. If, instead of walls, you build arches on

In the first case we have a dome, or a portion of one, covering a square apartment; in the second we have the same covering standing on arches open towards the exterior; in the third we have a dome covering the intersection of two barrel-vaults, just as is more usually done by groining.

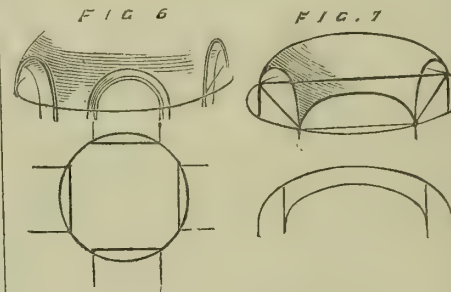
The process, however, is not limited to a square; it is equally applicable to the octagon or any other polygon—indeed, to any figure which can be inscribed in a circle.

The following diagrams (Figs. 2, 3, 4, and 5) will tend better to explain this.



Nor is it necessary that the inscribed figure should be complete, for remnants of the circle may equally well be left between the arches or walls.

Thus, a circular space may be intersected by four vaults of less width than the sides of a



square, as in Fig. 6, leaving portions of the circular walls remaining between them.

The dome, again, may as well be segmental in section as semicircular, in which case the arches supporting it will also be segmental, as in Fig. 7.

Again, the figure inscribed need not be equilateral, so that oblong compartments, such as those customary in the nave of a church, may be domically vaulted.

(To be continued.)

AMERICAN MARBLES.

THE San Francisco *Bulletin* affirms that the coloured marble of California is superior in point of beauty to any European production of a like nature, and is preferred by Italians to the marbles of their own country. This marble is found in detached boulders, below the surface of the earth, near Suisun, Solano county, and may be quarried at a small expense. In 1858 large quantities of the marble were taken out and sent to Europe; subsequently, on account of inefficient management, or for some unknown reason, the business failed to pay, and was suspended.

Vast beds of marble have been discovered on Lake Champlain, in the western part of Vermont. The marble occurs in strata, the thickness of which is from 1 ft. to 6 ft., and can easily be split across the grain, so that blocks of any size can be readily obtained. The stone is of extraordinary hardness, and the owners of the quarry claim that it is not only more perfect, but more durable, than any other marble. The different veins may be classified as follows:—First, a drab marble with a reddish or greenish hue, traversed by innumerable and delicate black lines; second, a green marble variegated with red; third, a chocolate marble; fourth, a red marble resembling Scotch granite; and lastly, a series of marbles of lighter colour, some of which are nearly white.

FELLING TIMBER ON THE GULF OF BOTHNIA.

AT the head of the Gulf of Bothnia, far removed from the enjoyments and advantage of European civilisation, there dwells a community of peasants on whose dreary abodes, for a considerable part of the year, the sun never shines. In frost, and snow, and darkness, throughout the long winter, these unfortunate people are engaged in felling and sawing timber, and making tar.

When the spring at length returns, and the seas, so long frozen-up, are once more navigable, a few mercantile agents pay them an annual visit, and purchase the timber and the tar which have been prepared. The purchase is effected, not by giving money in exchange, but by a system of barter, in which the peasants, innocent of the value of their own labour, are hardly dealt with. They receive a supply of meal barely sufficient to maintain them during the coming winter, and a limited quantity of cast-off clothing, purchased perhaps from the cast-off dealers of London. Many of these poor people have never tasted meat, and as they are always in debt to the merchants for supplies of meal which they have accepted in advance, they are not in a position to negotiate, as independent parties to the transaction, for more liberal terms of payment.

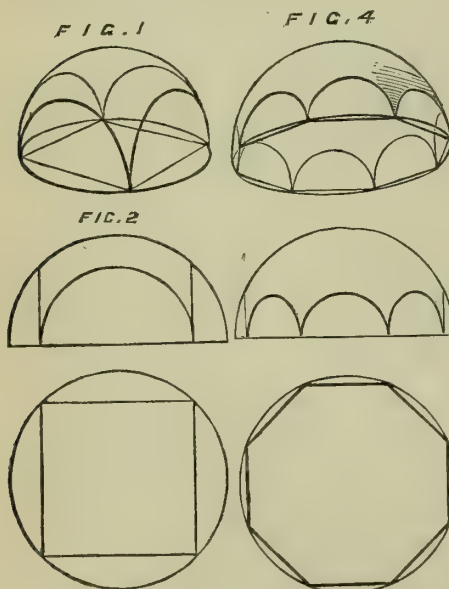
ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

OXFORD ARCHITECTURAL SOCIETY.—The second walk of the members of this Society took place on Saturday week, when Lincoln College was first visited, and afterwards All Saints' Church. The second evening meeting was held on Tuesday week, when Mr. Parker made a few remarks upon the early history of Abingdon Abbey, a peculiarity in connection with which was that they had a more complete history of it than of any other which England possessed. They had chronicles of the abbey which informed them very perfectly of the history of the building for about 500 years. It started from somewhere about the year 652, and continued down to the accession of Richard I.—namely, 1189. Mr. Parker went into detail respecting the history of the abbey; but as he had not exhausted the subject, he promised to continue his remarks, if agreeable to the Society, on a future occasion. The Rev. Prebendary Wilkinson gave a short account of the Church of Bradford-on-Avon. Mr. Wilkinson doubted whether this was the church alluded to by William of Malmesbury, but believed that it might have been rebuilt during the early part of the twelfth century, after William of Malmesbury had seen it.

LONDON AND MIDDLESEX ARCHÆOLOGICAL SOCIETY.—At a meeting held on the 10th inst., at University College, Gower-street, J. Orde Hall, Esq., presiding, the following antiquarian treasures were exhibited: Roman lamps, medals made of lava from Vesuvius, also various Roman antiquities from Pompeii, Venice, and other parts of Italy (Mr. George Browning). Photographs of carved marble reliefs discovered at Hitchin, Herts, and supposed to have been brought from ancient Verulam (Mr. J. E. Cussans). Antique plate and silver cups of early work (Mr. George Lambert, F.S.A.). An illuminated drawing from the rood screen at Westhall, subject, "The Transfiguration" (Mr. C. Golding). A valuable paper entitled "Remarks on three Inventories of the Household Goods and Effects of Sir John Shaw, Knight, Alderman and Lord Mayor of London, temp. Henry VII.," was read by Mr. Henry W. King, Hon. Secretary, Essex Archæological Society. An able discussion followed, in which Mr. Lambert, Mr. J. G. Waller, and others took part, after which a cordial vote of thanks to Mr. King concluded an interesting evening.

LEICESTER.—At a meeting of the Leicester Society of Architects, held on the 8th inst., the following resolutions were passed, and have since been referred to the Municipal Buildings Committee:—

1. That this meeting regrets that the method of selecting the premiated designs which has been adopted by the Town Council, and is expressed in the "Supplementary Instructions to Architects," is not in accordance with the suggestions made to the Municipal Buildings Committee by the Leicester Society of Architects. 2. That the Town Council having selected ten designs, as proposed in the "Supplementary Instructions," this Society is of opinion that the authors of the said designs should themselves appoint the referees, who shall adjudicate thereon, and select the three premiated designs, placing them in the order of merit. 3. That the authors of the three designs so selected should have the option of obtaining, simul-



the sides of that square, these arches will coincide with the curve of the dome where they meet it and, if strong enough, will carry the portion of the dome remaining between them. If, again, instead of arches, you suppose the dome intersected on the lines of the inscribed square by vaults at right angles to those sides, the result will be the same.

taneously, tenders for the realisation of their designs; that if the recipient of the first premium shall produce a *bona fide* tender, not exceeding the sum stipulated to be expended, he shall be the appointed architect; and failing to do this, that the same test shall be successively applied to the architects who have received the second and third premiums. 4. That the cost of all ornamentation indicated on the drawings and perspective views, whether it be sculpture, stained glass, or other decoration, shall be understood as comprised in the amount stipulated to be expended, and shall be included in the tenders produced by the authors of the premiated designs.

COMPETITIONS.

EXETER SCHOOL-BOARD COMPETITION.—Of the plans submitted in competition for these schools, those by Mr. John Johnson, of 35, Moorgate-street, have been selected for the Exe Island site. The second premium for the S. Mary Arches-street site has also been awarded to the same gentleman.

LOWESTOFT.—In our note on the result of this competition last week, we omitted to state that the second premium for designs for laying out the "Bellevue Park" was awarded to Messrs. George Wm. Usill and J. Wallace Peggs, of 3, Great Queen-street, Westminster, and an extra premium of £5 was awarded to Mr. G. B. Simpson, Old Park, Clapham. There were 27 sets of designs submitted.

MANCHESTER CONSERVATIVE CLUB.—Forty-nine sets of drawings were, on the 1st inst., sent in in this competition, for which the conditions were issued in December last. From this number six designs were selected, for the final consideration of the directors, by their professional referee, Mr. Murgatroyd, of Manchester, and premiums of 100 guineas each have been awarded to the authors of the three designs bearing the mottoes "Experientia" (design 3), "Stanley," and "Conservative," the respective authors of which are Mr. Walker (London), Mr. Salomans (Manchester), and Messrs. Pennington and Bridgen (Manchester.) Several of the designs are reviewed at some length on another page of this impression.

BOOKS RECEIVED.

The Year Book of Facts in Science and Art. By John Timbs (London: Lockwood), is, as usual, a strangely assorted bundle of clippings. It contains a good portrait of Dr. W. B. Carpenter. —*How to make a House Healthy and Comfortable.* By H. J. Manchester (London: Simpkin, Marshall, and Co. Brighton: John Beal) has reached a second edition. —*Steam in the Engine: Its Heat and its Work.* By P. Käufler (London: Blackie and Son), is a comparison of the author's experience as a mechanical engineer, with the data of Joule's and Regnault's experiments. However his conclusions may be criticised, all will welcome Mr. Käufler's attempt to help the general industrial public, in these days of dear fuel and rising wages, to select the engine which will do the most work with the least expenditure of coal. —*The Second Annual Report of the Board of Commissioners of the Department of Public Parks for New York,* to May, 1872, is not quite such an elaborate and expensively got-up volume as its predecessor, but is still of such dimensions and character as utterly to shame the modest records of similar bodies in this country. A fair idea of its comprehensive character may be gathered from the fact that—in the interest of the printer possibly—it is deemed necessary to devote five-and-twenty pages to a detailed list of the inhabitants of the menagerie established in the Central Park. —*The Illustrated Guide and Directory of Manufactures of Great Britain and Ireland,* edited by R. S. Barker (London: S. Deacon and Co.), which has reached a third edition, is published in three languages, in separate volumes, and is, we should think, a useful book of reference for colonial and foreign buyers, shippers, and other purchasers of British manufactured goods. —*Geometric Turning.* By H. S. Savory (London: Longmans, Green, and Co.), contains a description of the new geometric chuck constructed by Mr. Plant, of Birmingham, with directions for its use, and a series of patterns cut by it, with explanations of the mode of producing them, and an account of a new process of deep cutting and graving on copper. —*The Export Merchant Shippers of London, with their respective Trading Ports and Class of Goods they Ship* (London: Dean and Son), is an apparently successful attempt to supply the information indicated by its title. —*The Theory of Strains in Girders and Similar Structures.* New and enlarged edition, by Biddon B. Stoney, M.A. (London:

Longmans, Green, and Co.), is well known and appreciated. The present edition has been revised throughout, and numerous additions add to its usefulness.

Building Intelligence.

CHURCHES AND CHAPELS.

CHURCH BUILDING.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on Monday, at the society's house, No. 7, Whitehall, S.W., Sir Walter B. Riddell in the chair. This meeting was the last in the society's financial year, and grants amounting to £11,265 have been made in it towards the erection of 33 new churches (28 of which are entirely free and unappropriated), the rebuilding of 27, and the enlarging or otherwise increasing the accommodation in 88 existing churches. The carrying out of the above works has called forth from the promoters of them the sum of £370,845. The committee have also granted £650 towards building 26 school or mission churches.

MANCHESTER.—The new church of S. James, Collyhurst, Manchester, is rapidly progressing towards completion. The plan consists of nave, north and south aisles, transepts, chancel, organ chamber, and vestry. A tower and spire are placed at the south-west angle of the building. The chancel terminates with a seven-sided apse, five sides of which have a two-light window in each. The building is faced with stone throughout, and all the arches and the columns of nave and chancel are of stone also. The style is Early Decorated, freely treated. The church is 120ft. long by 59ft. wide (inside measurements), and the ridge of the open timber roof will be 75ft. from the floor. Accommodation is provided for about 800 persons. At one extremity of the frontage the parsonage is placed. The parsonage is also faced with stone, and the finishings of both exterior and interior will be of the same nature as those of the church. Adjoining the parsonage an infants' school will be built. The design is by Mr. John Lowe, of Manchester, and the contract for the church is being carried out by Messrs. Ellis and Hinchliffe. The contractors for the schools are Messrs. Crellin and Bailey, of Chorlton-cum-Hardy. The cost of the church and parsonage will be £16,000, and the boys' and girls' schools will be £3,400.

MITCHELTRY.—The church of S. Michael, Mitcheltray, near Monmouth, is undergoing restoration, under the care of Mr. Pritchard. A new east window of three lights has been erected in place of the old one: two new single lights—one north and one south—have been put up, of the same character as the others, and a new piscina of Bath stone has been erected. The walls are of ashlar, and the quoins and inner window jambs are of Bath stone, and form a most pleasing contrast to the walls. In the new east window it is proposed to place stained-glass lights, having for a design the Ascension of the Saviour. There will be new altar-rails and steps, a new vestry of stone, the floor will be of Godwin's encaustic tiles, and four handsome oak seats will be added to the chancel accommodation. The roof will be of an open design, covered with green slates. It is contemplated, at no distant period, to restore the remaining part of the building, and to add a new north aisle.

MONMOUTH.—The church of S. Thomas, Monmouth, is undergoing restoration. A short time back the Rev. T. O. Tudor, the vicar, discovered that the roof of the chancel was in a bad state, and that the foundations appeared to be giving away in places. He communicated with the Duke of Beaufort, to whom the church belongs, and the result was that Mr. Pritchard, architect of the diocese of Llandaff, received instructions to restore it at the entire cost of the Duke. It was further discovered that the stonework in the north and south windows had perished. The east window of three lights was found to be an innovation, the lights being merely placed in the wall with cement. The work of restoration is now rapidly progressing. The whole of the foundation has been renewed with native stone from Longstone Wood; the walls have been underpinned, and the old heating apparatus taken up. The outside of the walls will be neatly painted, there will be a new open roof of pitch-pine, with a

boarded ceiling, and the covering will be of sea-green slates from Penmole. There will be new altar-rails and steps, and encaustic tiles will take the place of the present wooden flooring.

SALISBURY CATHEDRAL.—Excepting the pavement, the restoration of the Lady Chapel of this Cathedral has at length been completed. The decorative painting on the roof of the choir has also been finished. The refitting of the choir and the restoration of the eastern transept and the choir aisles are next to be proceeded with—all of which work will be commenced forthwith, a sub-committee having been appointed during the past week to obtain information and report upon the character and arrangement of the ancient fittings.

STOKE NEWINGTON.—S. Faith's Church, designed by Mr. Burges, and now in course of erection, is expected to be ready for consecration about the end of May. The portion now building—about three-fourths of the whole—includes a large apsidal chancel and two-thirds of the nave. About forty feet long of the western end remains to be built, and a temporary west wall has been erected meanwhile. The building is early thirteenth-century Gothic in style, and has been designed with a view to internal decoration, while the exterior has been left plain and substantial, as being best suited to the locality and the close proximity of surrounding houses. The interior is very lofty and spacious. The chancel is of grand proportions, and is surrounded by a double wall, between the sides of which is an ambulatory, going all round the church. This feature has led to the church being very costly, but on the other hand, there is no occasion for side aisles. All around there is a lofty clerestory. The altar will stand out some distance from the wall; and the choir will be capable of holding about 150. The nave will be seated with chairs.

BUILDINGS.

LISKEARD.—A new masonic hall is now nearly completed at Liskeard. It has been designed by Mr. Paul, architect, of Liskeard, and is built entirely of stone. The style is French Classic, freely treated. The plinth of the building is of grey granite, and above the walling is of local stone. The dressings are of Ham-hill. The arch stones of the windows are relieved by alternate bands of Polyphant, and above and below the richly moulded and carved cornice, that runs the full length of the building between the ground-floor and the story above, are bands of Polyphant also. The columns to all the windows, as well as those at the entrance, are of red Mansfield stone, and from them spring carved foliated capitals, by which the window arches are carried. Mr. Lang, of Liskeard, was the builder. The carved stone and wood-work and the sculpture have been carried out, by Mr. Harry Hems, sculptor, of Exeter.

SCHOOLS.

LONDON.—At the meeting of the London School Board, on Wednesday, Mr. C. Reed, M.P., in introducing the report of the Works Committee, stated that a builder whose tender for the erection of schools had been taken refused to carry out his contract because of the "rise in prices." Another tender had been taken, and the repudiating firm was struck off the Board's list, so as to be debarred from tendering on any future occasion. The tender of Parson Brothers was taken for the erection of Hornsey-road School for £2,449, the highest of nine tenders being £2,995.

EXTRA MEETING OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Mr. George Ledwell Taylor, the surviving author of Taylor and Cressy's "Architectural Antiquities of Rome" (who is now in his eighty-sixth year), has expressed a wish to read before the Institute a paper on "Classic Architecture" as principally exemplified in the buildings of Rome. But as papers have been promised for all the ordinary general meeting nights of the present session, the Council have arranged that Mr. Taylor's paper shall be read at the rooms of the Institute on Monday, the 7th of April, when the chair will be taken at 8 p.m. The paper will be illustrated by a large number of original drawings.

Mr. Howarth, the patentee and manufacturer of the Archimedean screw ventilator, has removed from Victoria Works to more extensive and convenient premises at Farnworth Hall, Hall-lane, near Bolton, where all communications should be addressed.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

To OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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RECEIVED—G. and J. D.—W. S. and Son.—K. H.—E. W. G.—C. B. A.—R. K.—Competitor.—J. P. S.—W. and P.—E. W. P.—W. B.—J. H. C.

A. J.—It is customary for the assistants to find the instruments, and the employers to find the colours, &c.
E. WILLIS.—The letter came to hand, but the sketch did not.

W. H. ROBERTSON.—MS. on "Girders" to hand.

E. P. J.—Ask through "Intercommunication."

E. J.—Test it by experiment, and if you do not find ours decidedly the best medium for advertisements, we will not charge you anything.

H. A. ROSLING.—We are not responsible for the errors. We take the prices of timber from the *Public Ledger* weekly.

JAMES DAVIS.—Your reply to 2809 is an advertisement. If you want a foreman, advertise for him.

R. HENRY.—We do not know where the Cymagraph may be bought, but any practical optician could make one from the drawing we gave.

J. H. T.—Sketch to hand, and returned.

Correspondence.

"BUILDING NEWS" TOWN CHURCH COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—Allow me to congratulate you upon the liberality of view with which the rules in this competition have been framed. I am all the more induced to express my satisfaction at the manner in which this competition has been set forth, because of the limits of site and other rules which might not have been imposed in your school-planing competition, but which caused, in a great measure, the failure, or partial failure, of that competition.

The great object to be aimed at in designing a Town Church is to render it suitable for congregational worship, where all can hear and see equally well. It is clear that the usual style of churches—suitable enough perhaps in the country—does not attain this result, so that to realise the chief purpose of this competition it is necessary, first of all, to shuffle off the coils which fetter modern architects to the literal or servile imitation of ancient examples. It is a melancholy fact that our very best architects almost wholly ignore the claims of those who, as worshippers, are becoming more and more enlightened and intelligent. It is even suicidal to religion itself to place such a congregation beyond the reach of the preacher, or out of sight of the pulpit. Nor can it be less prejudicial to art itself to adopt such a procedure. Yet in a greater and lesser degree it is almost universally adopted. The Edinburgh competition is a most notable case in point. Mr. Street appears to be the only competitor who paid the least consideration to the requirement, comfort, and convenience of the public. The nave is the proper place for the people, and although expense seems to have been almost unlimited, not one could place more than sixty or seventy per cent. of the congregation in that portion. It is manifest, therefore, that we do not in your competition require ambitious rivals of Scott, Street, Ross, or Burges.

Amongst the architects who have made practical attempts to render Town Churches suitable for congregational purposes is Mr. J. P. Seddon; and the excellent remarks of that gentleman on the subject in the BUILDING NEWS, in introducing this competition, are sufficient to insure a proper regard being paid to any original conception, having a fitness for congregational purposes as its chief object, so that competitors will be encouraged from the fact of Mr. Seddon being associated with the award.

I think that the treatment of details, or even style, should be left entirely to the judgment of competitors, and I would submit that the recommendation of this, that, or the other feature of some Continental church is most prejudicial in every point of view. Moreover, it gives those who have illustrations of the works an advantage over those who have not. Besides, if we are to have churches made up by pasteboarding a dozen photographs, I will at once predict that your competition will be a failure.

There is one point of detail to which I will refer—viz., the size of the perspective views. You state that 16in. is to be the maximum length. This will do very well for the interior view, but it will not answer for the exterior. The difference of scale would be very disparaging to the latter. The detail, moreover, of such a large building confined to so small a scale will necessarily be vague and indistinct. I would therefore suggest that, confined within moderate limits, say a double elephant sheet, the size of the views should be left to the judgment of competitors.—I am, Sir, &c., H.

[We have received a great number of letters containing inquiries about the competition, and in reply to them, have to make the following statements:—

1. As to the size of paper. In answer to many applications, we withdraw the former conditions on this point, and substitute these:—The general drawing should be on two sheets of imperial. The two perspectives should both be on one other sheet of imperial. If a sheet of details is also sent, this should be on a fourth sheet of imperial. The paper is best if hot-pressed.

2. As to the building line on site. We thought the conditions made this clear enough; but in answer to inquiries, we may say that the adjoining houses may, of course, be built up to if desired, and that the buttresses must not project beyond the two lines of frontage.

3. As to scale. One competitor wishes for 1-16th scale, but this would be too small to photograph from, and the conditions must remain as they are.

4. The 1,200 sittings include the choir.

5. One correspondent desires to make his perspective the size of a double elephant sheet, while another wishes to have the sending of perspectives at all made optional. We cannot accede to the former request without throwing needless labour on the competitors generally, nor to the latter without increasing tenfold the difficulties of the referees in coming to a decision. To do without perspectives doubtless saves trouble to competitors; very often it saves all the trouble of thinking out a design as a whole; which is precisely the trouble we are anxious not to save them. The Edinburgh competition, to look no further, shows plainly enough that four pretty elevations do not always make one good building.—Ed. B. N.]

PLYMOUTH TOWN-HALL AND CONSULTING ARCHITECTS.

SIR,—Permit me to explain that the authorship of the designs for the Plymouth Town-Hall was raised incidentally to the much larger question of "Consulting Architects" and "Architects to the Trade." So far as the last-named are concerned, you are to be congratulated for the courageous attempt to root out the rottenness which is generally supposed to exist in connection therewith. The consulting architect, however, stands upon a totally different footing, and it is to be regretted that he has not assigned to him that legitimate position which is freely given to the leading men of other professions. It must be acknowledged that there is not only room for a more general adoption of consulting architects, but also for a higher standard of *esprit de corps* and general fraternisation. With most architects at present, individuality—which means the perpetuation of peculiar crotchets—is far too much the beau ideal, but which, as a rule, the

public esteem in the same degree as they do the baseless fabric of a vision.

Except perhaps in ecclesiastical architecture, there is no sufficient motive or definite object or purpose which the designer has in view. This is the cause of the immense diversity of opinion existing in the profession as to style, taste, and practice: and that absence of unity may be obviated with advantage by a liberal adoption of the system of consulting architects, than which I know of no scheme more legitimate and honourable.

The good people of Plymouth have supposed—a supposition certainly strengthened by the local papers—that Messrs. Norman and Hine are the authors of their really fine Town-Hall. The reply of those gentlemen which my letter has called forth, is all that could be desired:—"We have acknowledged in the most public way Mr. E. W. Goodwin as our consulting architect for this building, and that we frankly recognise his services in that capacity." It would be a manifest acquisition to consulting architects if other parties who employ them—and there are some—were equally open and liberal in their views, for I believe that the more the system is known the more will it be appreciated and adopted.

I have only to remark, in conclusion, that as Messrs. Norman and Hine "acknowledge in the most public manner" the source from whence their inspirations have been drawn, they will only be too glad to correct the wrong impressions on that score—and the injustice to Mr. Goodwin—which have hitherto prevailed in the "Three Towns" and they will doubtless equally rejoice in the BUILDING NEWS being made the medium, especially as it is largely read in the locality.—I am, Sir, &c.,

Redruth, 15th March.

JAMES HICKS.

ACANTHUS FOLIAGE.

SIR,—Your correspondent "J. P. S." (BUILDING NEWS, Feb. 28, 1873), who I presume to be my friend Mr. Seddon, has pointed out the difference between my sketches of the Roman Acanthus foliage and Taylor and Cresy's illustrations of the same in their work on the "Antiquities of Rome." The casts from which my sketches were made were in the South Kensington Museum, and were remarkably good ones, sharp and well defined, especially that from the capital of Mars Ultor, which is a very large and bold leaf. Since I made my sketches from them, the casts have been removed, and I cannot, at present, again find them in the Museum, but, no doubt, should be able to do so upon making inquiry, which I will do as soon as I have time, and will again examine them. My sketches, however, were carefully made; and I believe that if there were any indications of points to the lobes, I should so have sketched them, had they been ever so obtuse; but, on the contrary, I was struck very forcibly at the time with the decided and palpable difference between the casts and Taylor and Cresy's illustrations.

That I was in error in comparing the Greek foliage with the *Acanthus mollis*, instead of the *Acanthus spinosus*, I admit at once; but still this does not at all affect the main point—that the Greek is as much like several kinds of foliage as it is like even the *Acanthus spinosus*, without being a copy of any one in particular, and that the sharp foliage of the Greeks is never found in the Roman.

When I described the Roman foliage as round-lobed, I did not mean to say that soft, obtuse points were not sometimes found, because I knew that they very often were, but that they were never sharp and spiky like the Greek. In the very rich and elaborate friezes from the Trajan forum, and other similar examples, a different development of foliage is seen which is entirely distinct from the foliage of the Corinthian capitals, but which still is usually denominated the Acanthus foliage. I mentioned, in my work on "Art Foliage," that the lobes of the leaves in these examples were not exactly round, but that the points were obtuse and soft, much like the natural Chrysanthemum leaf.

I think, therefore, that there can be no doubt that I am correct in the view I took of the subject—"That we have two principal antique types of the Acanthus—the sharp and spiky-lobed foliage of the Greeks, and the round and soft-lobed of the Romans." I purpose going into the subject again in the work I am now publishing on "English Mediæval Foliage," as I consider it a very important one, and that it marked a very essential difference between Byzantine foliage

and Romanesque foliage; and I will endeavour to examine very minutely the South Kensington casts before doing so.—I am, Sir, &c.,
March 17, 1873. JAMES K. COLLING.

Intercommunication.

QUESTIONS.

[2811].—**Party Gutters.**—Will some of your kind correspondents give me some information on the laws relating to party gutters? I hold some premises on lease, and there are some party gutters between my premises and the adjoining premises, and outlets are on that side. The present occupier is now re-building his premises much higher than they are at present, and the gutters must be removed from their present position. Whose duty is it to replace them, and make proper outlets for the water? At present some of the gutters are removed, and the rain comes down inside my walls, causing a nuisance and much damage. A word of advice from some of your kind correspondents will much oblige yours.—A REGULAR SUBSCRIBER.

[2812].—**What is usual?**—Supposing an architect is asked to furnish a plan of a villa, and when sent in neither the elevation nor internal arrangement is approved of, and the building is not carried out in consequence—How stands the law in such a case? Can the architect claim commission?—O. P.

[2813].—**Timber Roof, 100ft. Span.**—(See No. 945).—Will your correspondent oblige by answering the following? If lattices be 2½ in. apart, how can they be secured flush in centre of bow in a space of 14 in.? If lattices be 2½ feet (supposing inches a misprint), how can "each lattice apex pass through bow, and be notched to receive and clip purlins?" If purlins be 2½ in. apart, how are ends of bow secured? In working out description of your correspondent, extrados of bow intersects bottom line of string 6 in. within the bearings. Is this right? Should there not be a distance of at least 2 ft. between bottom of stringer and extrados of bow at line of bearing, filled in with a solid web? How are trusses secured to wall-plate? Can you suggest any fireproof covering to a roof of this kind, which would be sufficient to resist fire from sparks out of a cupola?—INQUIRER.

[2814].—**Drainage Question.**—I am a lessee of a small house in the suburbs of London. The house was built about 1840, and the lease was granted to me in 1852. This was before the Metropolis Building Act or the Local Management Act came into operation. The lease terminates June, 1873. There is a covenant to cleanse, repair, paint, &c., but nothing said about drainage or sewers except that I am to pay the sewers' rate, and this has been paid for 21 years. The parish lately sent a notice that there was no direct communication with the main sewer. I referred them to the real owner of the house, who is also the freeholder, and because I delayed doing it, they summoned me before a magistrate, and he decided that I must do it at a cost of £19. Now, having paid the sewers' rate for 21 years, which is a landlord's rate, it seems unjust. I have heard that the 79th section of the Local Management Act, or some other section, states that the real owner must refund. If this is the case, it seems unjust, when the Sanitary Inspector of the parish knew the real owner, and still summoned me 40 miles to appear before a magistrate. Will you please in "Answers to Correspondents," or in some way, ventilate this subject, or give advice to leaseholders how to avoid an expense of £19 just as a lease terminates, when they have been bound to pay a sewers' rate for 21 years?—RICARDO.

REPLIES.

[2797].—**Durability of Stone.**—Mr. Goad, in last week's BUILDING NEWS, does not reply to the inquiry of "Stonemason." His assertion about "Plymouth" limestone and granite may be quite true, but it would be misleading to conclude that granite is not durable. A short time ago I saw a monument of this material at Wormhill, Derbyshire. It was erected 20 years ago, and the vicar said that not the slightest change had taken place, and that 100 years hence it would be in the same condition as now. As in all other materials, judgment and experience are required. There is as much variety in the quality of granite as other materials.—H. T.

[2810].—**Economy in Use of Fuel.**—I do not see that the use of ovens for heating would in any way interfere with the "Manchester School-grate," only they must be ovens *bona fide*. In the "oven" you have a rude primitive contrivance for effecting the purpose desired; in the "Manchester School-grate" you have a scientific invention for increasing the heating surface at a much cheaper rate. I should recommend "Inquirer" to communicate with Messrs. Shillito and Shorland, the patentees of the "School-grate." I think he would find them willing to afford information. He will find their address in your advertisement pages.—KAPPA.

LEGAL INTELLIGENCE.

WHAT IS "SCANTLING"?—RAYNER V. GRIFFIN—GRIFFIN V. RAYNER.—These were cross-actions tried in the Crown Court, Derby, on Monday week, before Mr. Justice Denman, arising out of a contract, and had a rather singular termination. The contract was for the sale of oak "scantling" for making railway waggon. The main point in dispute was what was included in the word "scantling." Shortly after the commencement of the case one of the jurymen said that he was thoroughly acquainted with the building trade, and "scantling" meant the smaller pieces of timber filling up the framework of the carriage. Thereupon another jurymen said that it included the framework as well, and that he was well acquainted with the trade.—His Lordship thought that this showed how the parties might easily have been mistaken as to their respective intentions at the time of making the contract, and the learned counsel agreed to withdraw a juror in both actions.

Our Office Table.

INSTITUTION OF SURVEYORS.—At the ordinary general meeting, held on Monday, March 10th, the following names were read and passed to be ballotted for on April 21st, 1873:—As Members—William Stephens Cross, 14, Strand, W.C.; Henry Parr Jones, Portway House, Warminster; John Noble, Woodhall, Hertfordshire: As Associate—William King, Gas Office, Duke-street, Liverpool. The adjourned discussion on the paper by Mr. R. B. Grantham, entitled "Private Agricultural Railways," was resumed, and after a long debate concluded.

BLACKMORE'S PATENT EARTHENWARE CISTERN.—Amongst the many improvements in connection with pure water, the patent cisterns manufactured by Mr. Blackmore, of Manchester, claim attention. A few words will suffice to explain the cistern itself, as it is simply a glazed earthenware vessel, somewhat in the shape of a teacup made large enough to answer the purpose required. In price they are cheaper than either lead, slate, or iron, and possess the additional advantage of being all in one piece, while for cleanliness they bid fair to be unrivalled.

"GARRAWAY'S."—On Wednesday last, this noted coffee-house, situated in Change-alley, Cornhill, was doomed to destruction. The structure is the property of Messrs. Glyn, Mills, and Co., bankers, Lombard-street, who are about to remove it and to erect an additional wing to their banking-house on its site. The original coffee-house was destroyed in the Fire of London. Having been rebuilt, it was a second time destroyed by fire in 1748, and again reconstructed. Below it is an ancient crypt of great archaeological interest, and with many ramifications, which have been long used as wine vaults. "Garraway's" was a place of much popularity and resort in the time of the famous South Sea Bubble, and has often since been the scene of great mercantile transactions. Thomas Garway—not Garraway—described in old chronicles as a "tobacconist and coffee man," is said to have been the original proprietor, and hence its distinctive name, corrupted afterwards into "Garraway's." According to the *Journey Through England*, in 1722, Garraway's, Robins's, and Joe's were described as the three celebrated coffee-houses. The first-named was frequented by people of quality who had business in the city, and the more considerable and wealthy citizens; the second by foreign "banquiers" and even foreign Ministers; and the third by the buyers and sellers of stock. In 1673 wines were sold at Garraway's "by the candle"—that is, by auction, while an inch of candle burnt. For many years, in modern times, Garraway's has had a celebrity as a luncheon and wine room. There, too, a great auction business has long been carried on for the sale of landed and house property, and periodically of drugs, mahogany, and timber, the sale-room being an old-fashioned apartment on the first-floor, with a little rostrum for the auctioneer, and a few long "settles" for the buyers.

THE BUILDING TRADE IN BIRMINGHAM IN 1872.—The Borough Surveyor's report, showing the number and class of buildings of which plans were deposited in 1872, has just been issued. The total number of buildings erected or in progress shows a great falling off as compared with previous years, and thus exhibits in a striking manner the effect of the great rise in the value of building materials and in the cost of labour. The following are the comparative returns for the years undermentioned:—

	1872.	1870.	1869.
Houses.....	1,103	1,603	1,536
Churches.....	1	1	0
Chapels	0	1	0
Schools	6	3	7
Manufactories ..	16	9	7
Warehouses, &c....	57	52	46
Stables.....	23	15	18
Miscellaneous.....	12	11	59
Alterations.	47	39	36

1,265 1,734 1,709
The term "miscellaneous" for 1872 includes 1 hospital (Queen's out-patient department), 1 rolling mill, 2 foundries, 2 glass works, 1 saw mill, 1 set of offices, 1 hotel, and 3 bakehouses. The total number of buildings for 1872 shows a falling off of 469 as compared with 1870, and of 444 as compared with 1869. Of the value of the buildings no estimate is given in the report.

CHIPS.

The Congregationalists of Hale Leys Chapel, Aylesbury, are about to undertake the erection of a new chapel in the Early English style, and consisting of a nave and tower. Accommodation will be provided for 740 persons, nearly double the number which the present building can seat. The cost is estimated at £2,500.

At the Auction Mart, on Wednesday week, Messrs. Edwin Fox and Bousfield sold the Globe Tavern, at the corner of Fore-street and Finsbury-pavement, for £17,000, the two houses adjoining in Fore-street for £8,400, and the Moorgate Tavern, in Finsbury-pavement, for £8,150. The area of the several lots amounted to 3,448 feet, so that the price realised was at the rate of £10 per superficial foot.

The new chapel built by the Primitive Methodist Connection at Howden was opened on Sunday week. The architect is Mr. Thompson, of Hull, and the contractors Messrs. R. and W. Sugden, and Messrs. Shaw Brothers. The dimensions of the chapel are 50 ft. by 40 ft., and it will seat 320 people.

A timely and unexpected good fortune has just come to the burgh of Paisley, in the neighbourhood of Glasgow. Its public-spirited inhabitants had subscribed £13,870. 10s. 6d. towards the £15,000 or £20,000 required for the building of a Town Hall, when a gentleman dies in New York, and apparently unwitting of the subscription-sheet in the burgh, bequeaths £20,000 "to the Provost, Magistrates, and Town Council of Paisley, for the purpose of erecting a Town Hall in that part of Paisley called the New Town, with a large reading-room for working men, to be open from five in the morning till twelve at night."

The Salford Town Council instructed the Building Committee of their body, on Saturday, to spend upwards of £61,000 in sewerage works.

A new (Roman) Catholic Church, to be dedicated to our Lady, is about to be erected at Wednesbury, at a cost of from £5,000 to £6,000.

The Baptist Church and Schools, Prince's End, Tipton, have just been completed and opened. The buildings are of red brick with Hollington stone dressings and traceried windows, and have been satisfactorily carried out by Mr. Haffner, builder, of Tipton, from the designs and under the superintendence of Messrs. Weller and Proud, architects, of Wolverhampton. The church will seat 700, and the schools will accommodate 500 children.

The Committee appointed to report on the Column of the Place Vendôme, in Paris, has decided to re-erect the monument as it stood when it was destroyed, and to record by two inscriptions the date of its demolition and that of its reconstruction.

Trade News.

WAGES MOVEMENT.

AYR.—The dispute between the operative joiners of Ayr, who struck work more than a fortnight ago, and their employers, seems to be no nearer a close. The operatives demand an advance of ½ d. per hour, and a reduction of the hours from 54 to 51 per week. At a meeting of the masters, held on Friday evening, it was agreed to withdraw their offer of ½ d. advance, and only offer ¼ d., without any reduction of hours.

BRADFORD.—The master builders have concluded an agreement with the stonemasons for a rise in the summer, but the carpenters and joiners have distinctly refused to accept the employers' offer. Masons' labourers, whose wages in Bradford were originally from 14s. to 15s. a week, are now asking 24s. a week in summer and 22s. in winter, for shorter hours than used formerly to be worked.

EXETER.—The carpenters and joiners of Exeter have given their employers notice that unless the nine hours movement is conceded to them, and their wages increased, they will strike next month. The masters have declined to submit to the men's demand. Negotiations have been in progress twelve months.

HUDDERSFIELD.—The master painters have refused to give an advance of wages to the men, but have offered to reduce the length of the day's work by allowing the men to commence work in the morning half-an-hour later than hitherto. This the men have decided not to accept.

LONDON.—The reply of the committee of the Master Builders' Association, refusing to accede to the request of the masons to raise their wages from 8½ d. to 9d. per hour, has occasioned considerable disappointment. The clause that suggests that if the men require more money they should be allowed to work during longer hours in the summer months, has been met with especial dissatisfaction, and an aggregate meeting of the trade will be held shortly to consider the course to be pursued under the circumstances. The memorial of the carpenters and joiners, asking for the same advance in wages and a clearly defined code of working rules, was acknowledged by the secretary of the masters' committee on Saturday morning, but no hopes were held out that the results of their application would be more favourable than that of the masons. The memorial of the labourers for an advance has been placed by the men's committee in charge of the Labour and Capital Committee of the Social Science Association, who are using their good offices

with the masters' committee on behalf of the labourers. The bricklayers, plasterers, and painters are about sending in memorials to the masters, also requesting an advance of 3d. per hour.

SOUTH SHIELDS.—The joiners of South Shields are agitating for an advance of wages. They addressed a circular to the masters, in which they stated that, owing to the high price of provisions, they must have an advance of 4s. per week. The masters have refused the advance, and the men are threatening to strike.

THE NAIL TRADE.—A meeting of the nailmasters of Worcestershire, Staffordshire, and Derbyshire was held last week at Birmingham, in consequence of a fortnight's notice having been received from the workmen, those in the wrought-nail branch demanding a rise of 10 per cent. in their rate of payment. After a protracted discussion, it was resolved that the printed list of July 24th, 1872, be continued. This is tantamount to no concession being made. In the case of the horse-nail makers, it was unanimously resolved that the present rate of wages—namely, the 4s. list—should be continued. The men had demanded an advance of 3d. per thousand, but it was not conceded. It is presumed that the men will cease working on the expiration of their notice.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.				
24 by 12	22 by 12	20 by 10	18 by 10	18 by 9
420s.	370s.	285s.	245s.	222s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8
222s. 6d.	170s.	212s. 6d.	130s.	77s. 6d.

Per m. of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BLACKFRIARS.—For superstructure of the new Royal Hotel, Blackfriars, for Mr. P. De Keyser. Mr. E. A. Gruning, architect. Quantities supplied by Mr. James Barnett.

Myers and Son	£55,872	0	0
Jackson and Shaw	55,327	0	0
Asby and Sons	55,295	0	0
Holland and Hannen	54,763	0	0
Corder	54,215	0	0
Rider and Son	53,920	0	0
Browne and Robinson	53,780	0	0
Trollope and Sons	53,483	0	0
Perry and Co.	52,300	0	0
Henshaw and Co.	50,827	0	0
Lucas Bros. (accepted)	49,790	0	0

GREAT GRIMSBY.—For twenty houses for Perseverance Building Company, in Heanegate-street, Weelsby, on the estate of Mr. Ed. Heanage. Mr. David Pick architect. Coulson and Haywood (accepted) ... £8,830 0 0

LONGFORD.—For S. Thomas's Church, Longford.—Summary of tenders, March 14th, 1873.

Contract Extra for Contract		No. 1. buff bks.		No. 2. Totals.					
Clark	£2,100	0	£80	£2,100	£3,180 0 0				
Marriott	2,280	0	120	635	3,035 0 0				
Estcourt	2,250	0	185	545	2,980 0 0				
Hallam and Co. ...	2,300	0	75	600	2,975 0 0				
J. & G. Callaway ..	2,137	0	165	488	2,790 0 0				
Osborne Brothers ..	2,060	0	93	559	2,712 0 0				
Herbert Brothers ..	2,048	0	84	549	2,681 0 0				
Parnell and Son	2,060	0	120	500	2,680 0 0				
Davies Brothers...	1,990	0	100	560	2,650 0 0				
Fox	1,888	0	96	507	2,491 0 0				
Makepeace	1,959	0	—	470	2,429 0 0				
Whitome	1,892	17	9	69	18	440	2,402	15	9
Nelson (accepted) ..	1,761	0	0	included	370	2,131	0	0	

PONTYPOOL.—For new schools to be built at Croesycei-log, near Pontypool, Mon., for the Llantarnam School Board. Mr. O. Watkins, Newport, Mon., architect.

Jones	£1,300	0	0
Needs	1,200	0	0
Williams	1,050	0	0
Parfitt (accepted)	990	0	0

SOUTH WALES.—For new shop at Aberysthan.	
White	£1,000 0 0
Evans	995 0 0
Parfitt	990 0 0
Stephens	700 0 0

SUFFOLK.—For a new house and offices at Carlton Colville, Suffolk, for Mr. William Andrews. Mr. Charles Pertwee, architect.

Brett	£1,997	0	0
King and Co.	1,837	0	0
Bedwell	1,740	0	0
Riches (accepted)	1,655	0	0

STAFFORD.—For the erection of a shoe manufactory, situate in Rowley-street, Stafford, for Messrs. Hollin and Anderson. Mr. J. Ratcliffe, architect.

Ratcliffe	£1,897	0	0
Adams and Pemberton (accepted) ..	1,890	0	0
Whitome	1,856	0	0

ENGINEER'S AND HEATING APPARATUS.

Rudge and Griffiths (accepted)	260	0	0
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STAFFORD.—For the erection of a leather warehouse and house, Marston-road, Stafford, for Lewis Bros. and Askell. Mr. J. Ratcliffe, architect.

Bridgett	£1,332	11	0
Adams and Pemberton	1,210	0	0
Ratcliffe	1,189	0	0
Reynolds	1,100	0	0
Whitome (accepted)	1,146	0	0

STAFFORD.—For the erection of Christ Church Schools, Rowley-street, Stafford. Mr. J. Ratcliffe, architect.

Adams and Pemberton	£1,039	10	0
Whitome	1,016	10	0
Ratcliffe (accepted)	1,009	0	0

UXBRIDGE.—For alterations and additions to "Sandstone," near Uxbridge, for Mr. F. B. Garrard. Mr. Chas. J. Shoppee, architect, London. Quantities by Mr. Sidney Young.

Macey	£2,369	0	0
Gibson Brothers	2,081	0	0
Collins and Sons	1,994	0	0
Adamson and Sons	1,745	0	0
Fasshidge and Son	1,692	0	0
Kearley (accepted)	1,650	0	0

YARMOUTH (ISLE OF WIGHT).—For alterations in the parish church. Mr. W. T. Stratton, of Newport, architect.

Salter (accepted)	£153	10	0
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TO ARCHITECTS.

GREEN ROOFING-SLATES.

As supplied to H.R.H. The Prince of Wales at Sandringham.

The Penmoyle Sen-green Slates are specially adapted for Churches, Public Buildings, &c., &c.

(Less costly than ordinary Gable Tiling.)

These durable and non-absorbent slates can be obtained in sizes suitable for Gothic Architecture, at prices as under.

In Railway Trucks, Docks, Gloucester:—		Per		Equivalent to	
		1,200 Slates.		per square	
Best Green Slates 14 by 7	.. ..	2	17	6	.. .. 16s. 6d.
Do. do. 13 by 8	.. ..	2	17	6	.. .. 16s. 6d.
Do. do. 13 by 7	.. ..	2	5	0	.. .. 14s.
Do. do. 12 by 7	.. ..	1	18	6	.. .. 13s.
Do. do. 12 by 6	.. ..	1	7	6	.. .. 11s.

Prices of large Sizes, Cost of Transit, Reference estimations, and Sample Specimens may be obtained on application to

MESSRS. RANDELL & CO., Corsham, Wilts. Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tufston-street, Westminster

BATH AND OTHER BUILDING STONES, OF BEST QUALITY.

RANDELL, SAUNDERS & CO., Limited
Quarriesmen and Stone Merchants.

List of prices at the Quarries and Depots, also cost of transit to any part of the United Kingdom, furnished on application to

[ADVT.] BATH STONE OFFICE: CORSHAM, WILTS.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—SOCIETY OF ENGINEERS.—Resumed Discussion on Mr. W. H. Fox's paper "On Continuous Railway Brakes." 7.30 p.m.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—"On the Mont Cenis Tunnel." By Mr. Thomas Sopwith, jun. 8 p.m.

WEDNESDAY.—SOCIETY OF ARTS.—"On the Edible Starches of Commerce, their Production and Consumption." By Mr. P. L. Simmonds. 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—Meeting of Class of Construction and Practice; subject: "Mason, Slater, and Tiler." Visitor for the Evening, Mr. T. E. Mundy. 6.30 p.m.—Meeting of Class of Design; subject: Altar Frontal (testal), 11a. scale, with detail. 8 p.m.

COMPETITIONS OPEN.

LEICESTER, May 14.—For designs for municipal buildings, to comprise all public offices, assize court, and police buildings. Premiums of £200 for the best, £100 for the second best, £50 for the third best designs. T. Standbridge, Town Clerk, Leicester.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY (Whitehall), April 1.—For the English oak timber, 2,600 loads; boat crooks, 1,100 No. F. W. Rowell, Superintendent of Contracts.

BOARD OF WORKS, WHITECHAPEL DISTRICT, March 24.—For paving portions of Brushfield-street (late Union-street), Spitalfields, and New-road, Whitechapel. Mr. Iron, Surveyor to the Board, 15, Great Alie-street, Whitechapel.

BORTH (Aberystwith), March 25.—For the erection of proposed new church at Borth. Rev. O. P. Evans, Borth.

BRIGHTON, May 6.—Tenders for the supply of 130 fathoms of the best Baltic yellow deal ends for firewood. A. Morris, Clerk to the Guardians, Parochial Offices, Brighton.

CAMBRIDGE, April 5.—For the erection of the new S. Giles' Church. Messrs. T. H. and T. Healey, architects, Tyrtel-street, Bradford, Yorkshire.

CARDIFF, March 24.—For the erection of a Governor's house, at the county gaol. Tho. Dalton, Clerk of the Peace, 6, Working-street, Cardiff.

CARDIFF, March 27.—For the construction of a sewer on the western side of the River Taff. Geo. Salmon, Clerk, Town Hall, Cardiff.

CITY OF LONDON UNION, March 31.—For repairing the workhouse at Homerton. J. Bowring, Clerk, 61, Bartholomew-close, E.C.

CLAPHAM, NEAR BEDFORD.—For the erection of a farmhouse and homestead. M. Usher, Architect, 44, High-street, Bedford.

DOWNHAM SCHOOL BOARD (Norfolk), April 5.—For the erection of schools, &c. Mumford and Townshend, architects, Wisbech.

DRONFIELD, April 3.—For the erection of a school and master's house in Cross-lane, Dronfield. Frederick Thos. Hawkin, Clerk to the School Board, 8, George-street, Sheffield.

EGHAM, April 3.—For making about 804yds. of road on the Limes Estates. Mr. R. Oades, Land Agent, Egham.

EXMOUTH, March 24.—For the supply of wrought-iron girders, cast-iron columns, cast-iron brackets, and various other ornamental ironwork, required in the erection of a music-hall and shop. Mr. A. H. Wills, Popsham-road, Exeter.

ISLE OF WIGHT, April 16.—For repairing the roads and highways. A. H. Estcourt, Clerk to the Commissioners, Guildhall, Newport.

KENSINGTON, March 31.—For the erection of a porter's lodge, relief offices, and clerk's office, and alterations to the receiving wards at the workhouse in Marles-road. E. Herbert Draper, Clerk to the Guardians, 1, Devonshire-terrace, Marles-road, Kensington.

KINGSTON HIGHWAY BOARD, March 29.—For the supply of 250 cubic yards of Broken blue Guernsey, Mount Sorrell, or Enderby granite. J. Bell, Clerk to the Board, Kingston-on-Thames.

LEEDS, March 27.—For the erection of the Royal Exchange. Henry H. Sales, Secretary.

LONDON, March 26.—For the erection of relief offices, in Mary Ann's Buildings, Deptford, and boundary wall of workhouse, in Conduit-lane, East Greenwich. Samuel Saw, Clerk, Greenwich, S.E.

MIDDLESBROUGH, March 31.—For the erection of winch houses and waiting rooms, the formation of roads and embankments, and the construction of iron draw-bridges, tramways, &c., required in carrying out the new cart ferry works on the north and south sides of the River Tees at Middlesbrough and Port Clarence. Mr. E. D. Latham, Borough Surveyor, Middlesbrough.

NORTH WALSHAM, March 26.—For the erection of a group of three schools, to accommodate about 500 children, with master's house and boundary walls. B. Scott, Clerk, Antingham-road, North Walsham.

OSWALDTWISTLE, March 26.—For the erection of office and boardroom. Mr. William Henry Bell, architect and surveyor, Accrington.

OXFORD, April 7.—For the construction of about 3,450 yards of brick sewers, and about 8,100 yards of stone-ware pipe sewers, with bell-mouths, manholes, ventilators, &c. Frederick J. Morrell, Clerk to the Board, 1a, S. Giles's, Oxford.

SALFORD, March 25.—For alterations and additions to the Town Hall. E. Andrew, Town Clerk.

SOMERSET COUNTY LUNATIC ASYLUM, March 25.—For the erection of new buildings at Wells. A. Whitehead, County Asylum, Clevedon, Somerset.

SPALDING, March 24.—For the erection of external staircases and other additions to the infirmaries, and for the formation of vagrant wards, at the Union Workhouse. A. Maples, Clerk to the Guardians, Spalding.

STRAFORD (Essex), March 24.—For the erection of school buildings in High-street. J. Self, Clerk to the Board.

TRINIDAD GOVERNMENT RAILWAY, April 2.—For the construction of about 16 miles of railway in the Island of Trinidad. P. G. Julian and W. C. Sargeant, Crown Agents for the Colonies, Spring-gardens.

WAR DEPARTMENT, March 29.—For the erection of concentrated offices at Colchester. War Office, Spring-gardens.

WOOLWICH ARSENAL, March 25.—For the purchase of steel turnings. Tenders at the War Office, Spring-gardens.

BANKRUPTS.

DECLARATION OF DIVIDEND.

J. W. Hackworth, Darlington, engineer, div. 4s. 6d.

SITTING FOR PUBLIC EXAMINATION.

W. Wright, Swaffham, builder, May 8.

DIVIDEND MEETINGS.

W. and T. Y. Freeman, Otley, Yorkshire, stonemasons and builders, March 26.—J. Matthews, Jennings's building, and Dour-o-place, Kensington, builder, April 18.

SCOTCH SEQUESTRATION.

John Findlay, Glasgow, painter, March 24, at 12.

PARTNERSHIPS DISSOLVED.

Ripley and Denton, Dewsbury, masons and contractors.—B. Musgrave and Son, Hull, bricklayers.—Summersgill and Todd, Leeds, plumbers.—Ogden, Calderbank, and Co., Oldham, machinists.—Charles Bishop and Son, Diss, builders.—Williamson and Price, Wilmslow, plumbers.—G. Porter and Co., Bristol and Bath, sculptors.—Simpson and Smith, Eccles, joiners.—E. A. S. W. B., and T. A. Bell, Grantham, builders.—Beckett and Thorntree, Lichfield, builders.—Joseph Midgley and Co., Idle, delvers and stone merchants.

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THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 28, 1873.

THE GOTHIC MOULDINGS OF ENGLAND AND SCOTLAND.*

IN the BUILDING NEWS of August 25th, 1871, we gave a general notice of the plan for Mr. Sharpe's comprehensive work on mouldings. The second part, containing sixty plates, deals, like the former one, with arches, but includes those of doorways as well as of nave arcades. The examples are taken, as before, from works of the highest class, and many of them from buildings which are comparatively little known. We observe, for instance, specimens from Lilleshall, Calder, and Margam Abbeys: from Aberbrothock, Lanercost, and Abbey Dore, as well as from the magnificent series of North Country churches to which we were long since introduced in the pages of "Architectural Parallels." The first feeling that such a collection produces is that of wonder at the uniformity with which the Pointed style everywhere developed itself. From Elgin to Winchelsea, from Lincoln to Llandaff, one identical system of evolution went on, age after age; and each minute modification seems to have penetrated unfailingly even to the remotest and obscurest spots where architecture was practised. The laws of Gothic art, in short, seem to have worked as thoroughly and certainly as the laws of Nature; and it is no more possible to find a Perpendicular building with Early English mouldings than to find a ruminating quadruped with carnivorous teeth. The Gothic system throughout gives the impression of having grown, rather than of having been made; and this impression, strong as it is everywhere, becomes doubly strong from a study of the details now in question. How was it, we may well inquire, that throughout all Northern Europe the same original forms went through the same series of progressive modifications—the same in essence and character, and yet, which adds to the marvel, *not* the same in their absolute form and shape; so that, while every one can infallibly tell any early moulding from a late one, every one can also distinguish, with little less certainty, an English moulding from a French, and this again from a German one? We may make many guesses to account for this surprising unity amidst equally surprising variety; but we shall hardly guess, as did a recent "Quarterly Review," that it arose under a state of things where every workman did as he listed. Mediæval art was, it is true, the freest thing in the world: it gave such play to individual fancy as no art before or since ever dared to do; but every line of it that remains proves that the freedom was bounded by rigid limits, and that the fancy was drilled and disciplined to perfection before it was allowed in the slightest degree to assert itself.

The traces, however, of individual fancy in the design of mouldings form an interesting subject for investigation. Most of our more important buildings, of whatever date, seem in this particular to show something of personal likes and dislikes. It may have been the master-mason or architect who in each case preferred or rejected some special type; or, on the other hand, it may have been the particular body or group of workmen employed who, acting together year after year, had formed, to some extent, a school of their own; but, however the fact may be explained, it certainly is a fact that many of our cathedrals, and not a few of our village churches, exhibit, as regards their mouldings, an individuality of their own. The present volume

of Mr. Sharpe's work affords several illustrations of the circumstance; and these local peculiarities come out with unusual clearness from the accuracy with which the sections are evidently taken. The designer, for instance, of the west doorway at Whaplode S. Mary's (Transitional, *circa* 1175) had a great fancy for the pointed roll at the outer angle of each order, as had also the architect of the pier arches at Byland (*c.* 1170). Nothing, however, can be more marked than the difference between these two examples. At Byland the section of each roll forms three-fourths of a *vesica*, nearly twice as long as it is wide. Its sides are arcs of circles—its point is scarcely sunk below the angle of the original archstone—and its adjacent members are two great hollow quirks, meeting it at an angle, and reminding us more of Early French than of English architecture. At Whaplode there are no circular arcs at all; instead of quirks, there are flattened hollows, which join the pointed roll by an undulating curve instead of an angle. The roll itself is wide, short, and obtusely-pointed; but the striking peculiarity is, that wherever it occurs its point is drawn inwards, away from the angle of the order. It looks as if the inventor of this particular group disliked the sharp, trenchant contrasts of light and shade which were sought for at Byland. Though he adopted a pointed roll, he tried to give it the soft gradation of a round one, and had no doubt found by experiment that he could do this by turning its point away from the wall-plane. Little peculiarities like this are apt to be missed, or, at any rate, to be recorded with uncertainty by ordinary sketchers; and it is one advantage of a careful work like the present one, that it will lead its students to expect and look for them.

We have noticed the little peculiarity of outline in the Whaplode door as being so delicate as easily to pass unnoticed. Other buildings, however, show their designers' tastes in a far more conspicuous, if not more real, way. The pier-arches from Beverley, for instance (*c.* 1200 A.D.), contain what may be described as a truncated bird's-beak moulding, freely used with singular, though not altogether pleasing, effect. Those from Rievaulx show an unusual preference for the scroll moulding, which here, as elsewhere in this abbey, occupied the place generally filled by a round or pointed roll, or a roll and fillet. At New Malton (*c.* 1185) the scroll-moulding found more favour than even at Rievaulx. The west doorway there has an inverted scroll-moulding for the dripstone—three scroll-mouldings in the first order of the arch, three in the second, four in the fourth, and three in the fifth—making altogether fourteen in this one group. So skilfully, however, are they arranged, and so well are they contrasted in size, curvation, and position, that the section of this doorway is surpassed by very few in the present collection. The North Transept-door from Calder Abbey has a peculiarity, which, to judge of it from the profile merely, without an elevation of the jamb, looks less like the expression of an individual taste than a mere isolated caprice. The angle-roll of the second order projects below the general soffit of the stone it is worked from, which must consequently have been sunk away, for no reason that can now be discerned. Possibly a sketch of the general design might explain the mystery; but it is one of the inevitable drawbacks of a book which, like the present one of Mr. Sharpe's, deals only with sections of mouldings, that it leaves us to guess at the way in which the general design of each example may have influenced them. There seems to be no help for this, except such as may lie in research and comparison of books and photographs. Every illustrator must leave something to be desired, unless he means to give us complete monographs of all the buildings he touches; for there is a vital connection between the several parts of an architectural composition, and the smallest details ultimately depend on the largest structural

forms. To account for the peculiarities of a door-arch, we want an elevation of the door; and then, to account for the peculiarities of the door, we want the plan and elevation and section of the church, since it is these which finally determine its height and width and thickness. It might not, however, be impracticable to give, either in the letterpress or elsewhere, some slight description of the surface ornament which we occasionally meet with in Mr. Sharpe's plates—such, for instance, as that in the Norman and Transitional doorways at New Malton; in the west doorway at Southwell, or the south doorway from Llandaff, and in other examples. The section of a zigzag or medallion, or other Geometrical form, overlaid on an arch, is quite unintelligible and valueless, unless we know exactly what the ornament is; while very much might be learned from it if this were indicated, even by the slightest sketch.

Besides the peculiarities, greater or less, which may probably have sprung from individual caprice, there are others here and there to be seen, which look at first-sight like the results of foreign influence. The south doorway at Elgin Cathedral, for instance, shows in its outer order a section which is very uncommon in England and Scotland, and very characteristic of the best Early French work. It consists of a bold circular angle-roll, flanked not by quirks or hollows, but by a Romanesque ogee on the wall plane, and a bird's beak moulding on the soffit. The same identical combination occurs, amongst other places, in the rose window at S. Etienne, Beauvais, where it is repeated to form a second order. The Ogee differs from most English Gothic ones in having its convex part much smaller, and much quicker in curvature than its hollow one: it is, in fact, the sort of ogee which occurs in our own Norman, but oftener, and in more perfection, in the round-arched style of Southern France. It meets the roll, too, at an angle, instead of joining it, as the flanking members generally do in this country, by an undulating curve, and the whole effect strongly suggests that the idea was borrowed from abroad, rather than struck out by accident. Considering, however, the constant intercourse which, in the Middle Ages, went on between France and Scotland, there is nothing wonderful in supposing ideas to have been some time transplanted from one to the other; even so early as the twelfth century. The real wonder is that national styles generally have remained so distinct, and yet that the succession of their phases everywhere was so uniform. It may be worth noticing, with regard to the Elgin arch mould, that a similar use of the ogee is made in a doorway at S. Margaret's, Leicester, and that Mr. Sharpe gives an example, from S. Margaret's, Lynn, where the bird's-beak moulding occurs by way of quirk to the angle-roll.

In the promised appendix of letterpress, which is to conclude the present work, we may perhaps hope for some remarks on the general differences of character between English and Continental mouldings. We do not know of any book which deals in a thorough and comprehensive way with those details as they were developed in France and Germany: but the history of their growth and progress in those countries would throw much light on the origin of English forms, and even on the evolution of the Gothic styles everywhere. Speaking roughly, Early French sections seem to have had more boldness and breadth of treatment than our own. They avoided the petti-ness and wiriness which, after the Transitional epoch, were our besetting sins; and they seem to have given even freer play than ours did to the fancies of individual designers. Personal tastes in England seldom ventured to do more than to modify received types; in France they sometimes went so far as to strike out new ones for the occasion. These aberrant forms, however, usually ended as they began: as they had no ancestry, so they left no posterity; and, whether they turned out well or badly in

* "The Mouldings of the Six Periods of British Architecture, from the Conquest to the Reformation." By EDMUND SHARPE, M.A., F.R.I.B.A. No. II. Sixty Plates. London: E. & F. N. Spon.

the work they were designed for, they had little effect in modifying the course of the style. In Germany, at least after the Romanesque period, one is inclined to think there was too little individuality. A cast-iron uniformity seems to have been the aim of the later architects, and their mouldings, like their tracery and other details, look like the products of machinery rather than of men. After the end of the Thirteenth century, English mouldings partake a good deal of this same cut-and-dried character. They were never finer than in the latter part of the Transitional period, and in work of this age Mr. Sharpe's collection is unusually and unexpectedly rich.

QUANTITIES.—XI.

PLASTERER.

I THIS week give this trade complete, with the Table. In the admeasurement of plasterers' work, it is advisable to adopt the course already prescribed, namely, to take floor by floor, completing one floor before the other is commenced. This, however, is applicable only to inside work; that to outside should be taken on the entire surface. Read carefully the specification, and keep the different descriptions of cement separate. Commence then with the *External Work*.

Measure the entire portion covered, taking the length by the height, including all projections for set-offs, plinths, strings, &c., and also the returns, so as to arrive at the entire area. Make all the deductions as they occur for openings, &c. Describe the nature of the workmanship, and quality of the material. State whether laid on brick or on laths, and whether jointed to imitate stone. It is recommended that all additions be taken before any deductions appear in the Dimension-book or paper, and by adding and subtracting these items the total area can be brought into abstract in one item, thus effecting a saving of time, and producing less complication. It is afterwards reduced to the yard superficial, and billed accordingly, as shown hereafter in the Table. Having disposed of the superficial area, take a running dimension of the arrises or angles, additional labour being necessary to obtain a clean, sharp angle, and abstract and bill it accordingly. Labour to beads and quirks is also measured by the foot run. Take all reveals and soffits, and other work, where executed in narrow widths, by the foot superficial.

CORNICES are measured by the foot superficial, taking the length by the girth; number all mitres, stopped ends, and returns. All cornices under 6in. girth are measured by the foot run. Take all enrichments by the foot run, stating the girth, and giving sketch in explanation, also numbering the mitres and stops to the same. All mouldings, architraves &c., above 6in. girth are measured by the foot superficial, taking the extreme length by the girth—as shown in Fig. 21, p. 206, *ante*; where under that girth, by the foot run; number all mitres, stops, and returns, stating in each case the girth. Take all beads and quirks by the foot run, and number mitres and stops as before.

COLUMNS, PILASTERS, &c.—Plain work, &c., to columns, is measured by the yard superficial, and described as circular work to columns, the mouldings to necking and base being also described as circular. Number the caps, and give a sketch showing what is intended, and also figure on it the height of the cap, and the upper and lower diameters. Pilasters are measured by the foot superficial. Take a running dimension of the arris, and also of the neck and base mouldings when under 6in. girth; number the mitres. Number the cap, and give sketch and figure dimensions. Take any fluting to pilasters and columns by the foot run, stating whether diminished, and number the semicircular stoppings to ditto.

Floriated moulded strings and parapets, &c., &c., are measured by the foot run, giving sketches and dimensions for the different descriptions of work.

BALUSTERS are numbered, giving sketch and dimensions.

Chimney-pots are numbered, stating dimensions, and, when out of the ordinary, giving sketch.

Rendering to inside of parapets, &c., is measured by the yard superficial, as shown in the Table.

INSIDE WORK.—In measuring inside work, adopt the same course throughout each room: commence at the bottom of the house, and take floor by floor, as already stated. Proceed to measure the ceilings firstly, then take the cornices, and then the walls; and, lastly, whatever else remains, as skirtings, &c. Measure the ceilings the full dimensions between the walls; but where cornices occur, it is customary to make a deduction of the width of the cornice upon each dimension for width and length of ceiling. This is done on "Waste." Presuming the room to be 20ft. long and 16ft. wide between the walls, and a cornice run round the room, projecting from the face of the wall 12in, this would appear in the Dimension-book as follows:—

"Waste."	
Length . .	20 · 0
Less cornice	1 · 0
Net length .	19 · 0
Width . .	16 · 0
Less cornice	1 · 0
Net width .	15 · 0

19 · 0	285 · 0	Lath, plaster, float, and set ceiling.
15 · 0		

Make the deductions for chimney-breasts, &c., and also any additions that may occur. Refer to specification for description of the work, and state the same fully in the quantities—whether lath and plaster one coat; ditto one coat and set; lath plaster float and set; or as the case may be. Some surveyors take the sizing and whitening to ceiling, and include it in the one dimension, thus:—

19 · 0	285 · 0	Lath, plaster, float, set, and twice whiten ceiling.
15 · 0		

This, of course, is quite optional; but undoubtedly it effects a little saving of time, though the dimension for whitening ceilings would simply be a repetition of that for plastering.

Where elaborate ceilings occur, it is customary to measure such elaborations as "extra" to the ordinary work, and to take same by the foot superficial, as, for example, to raised panels.

PANELS.—Take mouldings to panels by the foot run, stating the girth; number the labour to mitres, stoppings, &c. Also number pateras and centre-flowers; and in the latter cases it is recommended that architects should always affix a p.c. value in the specification, as it is almost impossible to give sketch; and in very few cases are details sufficiently far advanced to include the centre-flowers; and as also in many cases they are selected, this will be the more apparent.

SOFFITS to stairs are measured in the same manner as already described to ceilings, although they should be kept separate from the ceilings, as hereafter shown.

CORNICES are measured the length by the girth, and where the latter exceeds 6in., they are taken superficially; where under that girth, they are measured and billed at per foot run. To obtain the average length of cornice, take the full dimension between walls for the lengths of two sides, and the nett length between the nose of the cornices for the other. These should be collected on "Waste," thus, taking the case already given (cornice 1ft. projection).

Length of room between walls	20 · 0
Do. "	20 · 0
Net between cornice . . .	15 · 0
Do. "	15 · 0
	70 · 0

70 · 0	105 · 0	Plaster moulded cornice.
1 6		

Or the length may be arrived at by taking the round of the walls and deducting twice the projection of the cornice, thus:—

Round of walls . . .	20 · 0
	20 · 0
	16 · 0
	16 · 0
	72 · 0
Twice projection of cornice	2 · 0
	70 · 0

Make the additions and deductions as they occur. Number all the mitres, and state the girth, and keep the external and internal angles separate. Also number the stopped or returned ends, stating girth as before. Enrichments to cornices are measured by the foot run, stating girth, and also whether undercut. The mitred angles and stopped ends to be taken and numbered as described to cornice.

FRIEZES are measured the length by the width, and valued by the foot superficial, any enrichments being taken, as already described in cornices.

Rendering to walls is measured the length by the height, the latter being taken from the top of the skirting-grounds to the ceiling, and where there is a cornice it is customary to deduct from this dimension half the height of the cornice. The lengths of the several walls of each apartment can be collected on "Waste," and brought forward in one dimension if preferred. Make the additions and deductions where they occur. In the case of deductions for doors and windows, take the full dimensions for length and height to outside of the grounds, and not the net dimension of the door, the height where skirting occurs being taken from the top of skirting-grounds, and not from floor, as above stated. State the nature of the wall, and the number of coats, whether floated and set, &c., &c. Where the angles are described to be executed in Keene's or other patent cement, measure the same by the foot run, taking the length as already stated to walls, and describing as "*Extra* to Keene's cement angle," or as the case may be.

Beads and quirks are measured in a similar manner.

If any of the foregoing work is executed on a circular surface, it must be so stated, and be kept separate from the straight work.

Lathing and plastering to partitions follows rendering to walls, and is measured in a similar manner, with the exception that where cornices occur it is customary to deduct only one-third the depth of cornice from the height, instead of one-half, as described to walls. Make the additions, and also the deductions, as stated to walls, and keep any circular work separate from the straight. Describe the nature of the work, whether lath and plaster one coat; lath and plaster two coats; lath, plaster, float, and set, &c., &c. Where the work is executed in narrow widths, as to jambs, soffits, &c., it should be measured by the foot superficial. This applies also to rendering to walls.

Measure all mouldings and architraves, as already described to external work.

Cement Skirtings.—Take the lengths and collect the same on waste. State the height, and they are afterwards reduced and valued by the foot superficial. Where the skirtings are moulded, instead of the net height take the girth from floor to face of plastering of wall. Number all the angles, and state the nature of the work.

Cement floors are measured by the yard superficial, and the nature of the work described, also the quality of the material.

Cement hearths are measured by the foot superficial.

Limewhiting, Colouring, Whitening, Distemping, &c., are measured by the yard superficial. Take the dimensions of the several walls, collecting the lengths on "waste" of all walls of equal height, so as to bring forward in one dimension. Make the additions where they occur, and also all deductions for door and window-openings, fire-places, &c. Take the cornices by the foot run, and state the girth, and where enriched, state the number of members and tints. It may be observed that most of the dimensions for this work can be taken from the dimensions for plastering.

TABLE VII.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement:—

EXTERNALLY.

Portland Cement.	
Plain face on brick	Per yard superficial.
Do. jointed	"
Do. circular	"
Do. to fascias, pilasters, reveals, &c.	Per foot superficial.
Do. in weathering	"
Plain mouldings	"
Do. circular	"
Arris	Per foot run.
Bead and quirk	"
Flutes to columns	"
Do. diminished	"
Mouldings under 6in. girth	"
Stops to mouldings	At per number.
Returns to 6in. do.	"
Mitres to 9in. do.	"
Intersecting mitres to Do. do.	"
Enriched and floriated strings, cornices, &c., &c. (stating height and giving sketch, showing nature of work)	At per foot run.
Stopped ends to do. Angles	At per number.
Ornamental parapets, including all dubbing out, &c. (giving dimensions and sketches as before)	At per foot run.
Moulded trusses (Do. do. do.)	At per number.
Caps to pilasters, including mitres and returns, do. do. do.	"
Do. to columns (giving sketch and height and upper and lower diameters)	"
Rough rendering to back of parapets, &c.	At per yard super.
Internal Work.	
Render, one coat	At per yard super.
Do. two coats and set	"
Do. float and set	"
Do. to jambs, and in narrow widths	At per foot run
Do. do. circular	"
Lathing	At per pard super.
Lath and plaster, one coat	"
Do. do. one coat and set	"
Do. do. two coats and set	"
Do. do. float and set	"
Do. do. to groins	"
Lath, plaster, float, set, and twice whiten ceilings	"
Do. do. soffits of stairs	"
Plain mouldings	At per foot super.
Mitres to 6in. moulding	At per number
Stoppings	"
Enrichments (stating girth and giving sketch)	At per foot run
Mitres to 6in. enrichment	At per number
Stops to do.	"

Keene's cement angle	At per foot run
Bead and quirk	"
Do. and double quirk	"
Do. do. circular	"
Mitres	At per number.
Stops	"
Stops to splay	"
Do. moulding	"
Pateras 6in. diameter, p.c. 2s.	"
Centre flowers, 30in. diameter, p.c. 30s.	"
Portland cement flooring (stating thickness)	At per yard super.
Do. hearths (do.)	At per foot run
Twice limewhiting	At per yard super.
Do. colouring	"
Washing, stopping, and whitening	"
Do. distemping to approved tint	"
Do. do. cornices	At per foot super.
Do. do. enrichments, picked out 4in. girth in tints	At per foot run

B. F.

ON THE PROPER CONSERVATION AND TREATMENT OF OUR ANCIENT CHURCHES.

HAVING, in various papers read before the Architectural Society of Liverpool (reported in the BUILDING NEWS and elsewhere), as well as in letters in the *Athenæum*, denounced the principle and practice of church restorations, I feel it is due from me to give a distinct answer to the question—an important one—that naturally arises, and which I am frequently asked, namely, What are we to do with these buildings when they become dilapidated and unfit for use? My answer is, Let them alone, and spend the money available for such purposes in the erection of buildings to supersede them in their practical uses as churches—buildings exactly adapted to present ideas of propriety and personal comfort, and to give full effect to music and oratory, which the old ones, designed chiefly for scenic processions, are very far from being; and so leave the latter henceforth to exist as historic monuments, and objects of venerable beauty only.

The new erection might in each case be either an independent cathedral on a separate site, or, what I should think preferable, it might form a noble additional wing, transept, or chapel, sufficiently large for the cathedral service, harmonious in style with the original pile, and increasing its variety and beauty; a scheme which the usually irregular character of the general composition would favour. Or, if an original symmetry of arrangement remained to the pile, the additional mass might be so introduced as not to disturb that symmetry, either as an advanced limb westward, or an appendage eastward, like Henry the Seventh's Chapel at Westminster, or Becket's Crown at Canterbury.

This would be adding another episode or additional canto to the architectural epic, another part to the oratorio, another act to the sacred drama, another chapter to the architectural history of the edifice; combining with the art specimens of perhaps the twelfth and thirteenth centuries, and sending down along with them to posterity a specimen of the nineteenth; and, with the greater simplicity of arrangement favoured, if not imposed by the Protestant faith, and made as faithful to the religious feelings of the present age as the old one to the Middle Age, it would be a Protestant and Anglican supplement to the Roman Catholic work, an art-manifestation and embodiment of Christianity as understood in the nineteenth century.

This mode of treating our ancient churches would not be opposed to the pecuniary interest of the architect, but rather favourable to it, as the public would be more ready to subscribe for an object they could fully understand, and which their judgment and taste would approve,

than for the chimera of restoration, which must ever go counter to their common sense and natural feeling. I believe, too, that increased employment would flow in upon the architect from the improved taste and educated sense of beauty leading to a juster estimate and appreciation of architecture and its professors, which the continued existence of these old buildings in all their native and acquired beauty and historic associations is so well calculated to promote among all classes. In this matter, as in every thing else, I believe, honesty is the best policy.

But I am sure there are a large proportion of the architectural profession capable of doing right from a higher motive than this, and who, on due reflection, would be led by their own self-respect and veneration for their art to enlist themselves against any practice inimical to its welfare, however it might favour their pecuniary interest—men who feel their proper office is to give a special and peculiar form to the impulses of the age in which they live—to draw the world to them, and not meanly suit themselves to the world. As a great English writer remarks, "a real genius and thorough artist, in whatever kind, can never, without the greatest unwillingness and shame, be induced to act below his character, and for mere interest be prevailed with to prostitute his art or science by performing contrary to known rules." This feeling he calls virtue and love of truth, independent of opinion and above the world. I will only further remind them that the architectural profession being the one best acquainted with the value of our ancient architectural monuments as works of art, and to which they are of most value as links in the chain of architectural history—without which its course from the Egyptian and Greek roots could not be traced—is the one that must naturally be looked to by the public as the guardians and protectors of these monuments, through the force of their influence and example, from every species of harm.

The erection in each case of an additional limb or wing to the old building, instead of inclosing the whole of its carcase, as it were, in a cerecloth or shroud of new stonework, should not be disagreeable to the Cathedral clergy, since it would increase the importance and interest of their Cathedral establishments, and would preserve sculptural forms and objects of art which are exponents of religious faith and embodiments of ecclesiastical history. In its great building-age, it is said that the faintest shadow that darkened, or the lightest breath that disturbed, the internal harmony of the Church, was immediately reflected by the pencil of the painter and the chisel of the sculptor, rendering almost every ancient cathedral, as it were, a hieroglyphic record of the changes which the church has undergone during successive ages.

Far be it from me to recommend an utter abandonment of these buildings to the mercy of the destructive agents of nature. I would have them preserved by every means short of defacing them. I would, where needful, lay bare, point, and cement the whole of the parts below ground, and, after hardening by the best artificial means the stonework above ground, so closely point it as to confine the action of the elements to the mere face of the stones. This, I believe, with due care of roofs and windows, the maintenance of good fires, and their own enormously thick walls and innate strength, would preserve them sufficiently long. But should they ever by any chance reach the condition of those roofless and early-ruined piles of ecclesiastical and monastic architecture which still delight the traveller, which, by the way, without violence they never can, they will still be infinitely more interesting and valuable as antiquities than any restored cathedral, for they will exhibit more of the original building; showing that shot, shell, fire, flood, earthquake—all conceivable agents of mischief, natural or artificial, are less destructive to ancient

buildings than the restoring process. Let the worst of these agents, or all of them together, exhaust their force on some devoted building, a very Job of structures, till, realising the scriptural expression of desolation, scarce one stone remained upon another, and they would in all probability leave some trace of beauty, some touch of the past—something, if not for the architect, at least for the poet, the painter, or historian, some bit that says to you, like the messengers to the Man of Uz, "I only am escaped!" These agents leave something, but the restorer leaves nothing, for, there is no ruined building anywhere so completely destroyed as regards human interest as a restored cathedral, which is not so valuable for the purposes of art or history as a picture or photograph of the old one. The vulture, in the Greek fable, fed upon the liver of Prometheus, but the Restorer, more cruel to his victim, tears the flesh from the bones.

The course I have proposed is the one most in harmony with the course of nature, with the practice of ancient architects, and with the common sense of mankind as shown in everything else. That they (the old buildings) should so continue to exist as solemn mementos of the past, as landmarks of ecclesiastical history, as frozen and sacred music of the middle ages, as petrified religion, as trophies and triumphal arches of Christianity—seems to have been taken for granted by all the world, and their right to continue acknowledged through all art and literature. The very titles and plan of some historical, archaeological and architectural works, as "Stones of Venice," "Bricks of Bruges," "History in Ruins," "History of Art by its Monuments," and such like, are based on the supposition that ancient buildings are to remain intact, and not, by being inclosed in new ones, for ever hid from the eyes of gods and men; that ruins, with their immaculate charm, are to remain ruins as long as time will yet spare them. Societies of antiquaries and archaeological societies are based on the presumption, and must, should the evil become general, like the silkworm without the mulberry-leaf, lose their occupation, for ancient buildings are the chief object of their study and investigations. Such institutions, and, indeed, the recently-erected science of Archaeology itself, which deduces history from the relics of the past, imply the assumption that these monuments will not be defaced, cut to pieces by their anxious friends, and the friends of art; that architects could not be found who, snatching the scythe from Time's more merciful and indulgent hand, would destroy in a few weeks what, left to him, would have remained for ages, increasing in interest every year by greater picturesqueness and beauty and richness of association, becoming more touching to the heart, and suggestive to the imagination of a higher beauty than they perhaps ever possessed; and approaching nearer to those "airy shapes which, wrought in fancy's loom, float in light visions round the poet's head."

I am accused of having used language and illustrations over strong on this subject. If I have, I am unconscious of it. I have always felt that I could not use language strong enough, and that no ridicule or sarcasm could be too severe to pour upon a practice to which there is no parallel in the history of architecture or any other art. I believe that no practice of human beings at any time, in any place, has more outraged common sense than this subjection of a building by its friends to an operation the destructive effects of which might satisfy the bitterest hatred of its enemies—a process by which a great architectural work is from the most interesting condition in which it could appear—in which it attracts the pencil of the greatest painters—a Prout, a Turner, a Canaletto, and affords scope for their pencils—is suddenly thrown into the most uninteresting. The vocation of the restorer is, in short, to exchange away an old building, which is generally a work of art, a

work of nature, a work of time, a page of the history of our country, and one of the most eloquent witnesses of the past that time has bequeathed to us, and which consequently pleased the eye, informed the mind, and touched the heart—to exchange such an old building for a new one, a work of masonry only, ungraced by nature, and as innocent of history, legend, or association of any kind as of true architectural or sculptural beauty—a quality which, however inventive the restorer, is too subtle to be embodied in a merely archaeological compilation.

In taking leave of this subject, I cannot escape a depressing fear that but few of the structures in question remain unscathed. Should, however, my appeals to the architectural profession and the public on their behalf be instrumental in averting the fate of one single pile, the last remaining cathedral in the British Isles, I shall consider my efforts as amply rewarded.

SAMUEL HUGGINS.

THE MANCHESTER CONSERVATIVE CLUB COMPETITION.

[FROM OUR CORRESPONDENT.]

IT is not within my province to know upon what grounds, or with what object, the Directors of the Manchester Conservative Club Company (Limited), issued a general invitation to the architectural profession to submit designs for their proposed new clubhouse; nor do the three premiated designs afford any architectural clue to their intentions. Giving them the highest credit, they probably acted upon the common, but most erroneous, supposition that the offer of moderately-remunerative premiums for the necessary outlay incurred would induce the more eminent architects to compete. The result must have convinced them of the utter folly of such a supposition. That is not all; it should also convince them that not only have they failed to get the best efforts of the best men, but they have failed to get the best work of even those who have been willing to compile designs for their inspection.

The competition, as a whole, is grievously common-place, and, with a few exceptions, displays more poverty of conception than usual. It is also singular that the majority of the works of the local architects (most of whom have appended their names to their designs since the opening of the exhibition) are moulded on the same type—that of a Manchester warehouse. Can the directors have desired nothing better? Surely the architects must have felt that something better was demanded. The subject has an element of public importance. It is to form the head-quarters of a powerful political party, and will occupy a prominent position in the thoroughfare connecting the new Royal Exchange with the new Town Hall. On commemorative occasions, during times of public demonstration, and on days of great party victories, it would be mortifying to the members of the Conservative Club to find themselves located in the subordinate portion of a warehouse, or in ignominious subservience to shops and offices under the same roof. Undoubtedly, their status will be determined by the character of their building.

That ideas of this kind have had no influence with the directors is apparent from their selection. Being satisfied, as they appear to be, with a building of moderate architectural pretensions, why did they invite the whole of the profession to submit designs? In a limited competition they would have secured much more thoughtful and valuable work; and their premiums of three hundred guineas might have been equally apportioned, and offered to more than three selected competitors. Even with still more force it may be asked, why the directors, having at their command the professional services of one of the architects of the new Royal Exchange, gave themselves the

trouble, and forty-nine architects the cost, of a fruitless competition? According to the local Conservative journal (the *Manchester Courier*), which has commented with severity upon the proceedings, the directors have no higher object in view than one "purely commercial." It states further that "it remains to be seen by careful calculation whether the rental obtainable from the shops" in Mr. Salomons's design "will exceed that secured by Messrs. Pennington and Bridgen from their shops and offices together. If it should prove in excess, we suppose all other considerations must be sacrificed, and the plan carried out." Should this really be the "lame and impotent conclusion" of the proceedings, the Manchester Conservative Club Competition will be regarded as a contemptible affair.

Since your previous notice, several architects whose works were referred to, have affixed their names to their designs. The clever design, "Queen and Constitution"—undoubtedly the finest architectural composition in the competition—is the work of Mr. E. M. Gibbs, of Sheffield. "Honour the King," is by Mr. G. T. Redmayne; "Pelham," by Messrs. Blackwell and Booth; "Utility," by Mr. P. Pous; "Manchester" and a Maltese Cross, by Messrs. Clegg and Knowles; "Hinc spes Effulget," by Messrs. Horton and Bridgford; and "BB," by Messrs. Speakman, Son, and Hickson, all of Manchester.

To the designs previously noticed should be added one with the motto "Idoneus," a symmetrical building five stories in height, worked out with academic truthfulness. Another with the motto "Fidelity," showing a skilful regard for symmetry in plan and elevations, but with an exuberance of minor ornamentation which might be toned down with advantage. "Vivo in Spe," by Mr. Lowe, of Manchester, should also be included for its general merit, apart from a strange defect in the elevations which have the appearance of being a series of narrow single houses, an idea that would work out capitally upon a street frontage of separate properties, but out of keeping as applied in this instance. Messrs. Price and Linklater, of Manchester, affixed their names to a design with the motto "Real," containing some rather bold and good treatment; Messrs. Maycock and Bell, of Manchester, announced themselves as the authors of the cleverly-planned set marked "Treu und Fest"; and the names of Messrs. Alley and Wilson, of Manchester, appeared as the designers of the plan with the motto "Anchora Spei." The author of the Gothic design, "Audi Alteram Partem," did not gratify the curiosity of his numerous admirers by divulging his name.

It is rumoured that the calculations of probable rental have been made during the present week, with a view of submitting one of the three premiated designs to the test of cost. This rumour confirms the statement of the local journal before referred to.

ON THE DOME.*

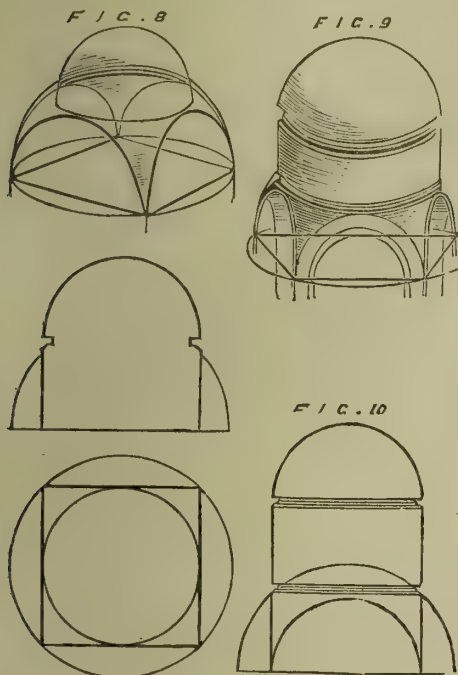
(Concluded from p. 348.)

IN all the cases which I have enumerated, I have supposed the result to be literally a *portion* of the original dome. As it happens, however, we have but few ancient examples of so strict an adherence to principle; though in modern works they are more frequent. The purest specimen I know of (if I judge rightly from drawings) is the dome of the little church of S. Nasario and Celso, at Ravenna, the Mausoleum of Galla Placidia, and of her two husbands, the Emperors Honorius and Valentinian II. This is a dome such as I described as standing between four walls, which intersect it in the form of arches.

The next step beyond this was a very important one as to beauty of effect. I refer to the practice of drawing the circle by means of a moulding on the surface of the dome, touching the crowns of the arches. This is not only ornamental, but it has the effect of emphasising the first completed

* Lecture delivered at the Royal Academy, by Sir G. G. Scott, R.A.

course of stones, and perhaps even of strengthening it, and it has the further effect of defining the spherical triangles between the arches which, when thus gifted with a separate existence, receive the name of "pendentives" (see Fig. 8), whence this



entire class of domes are called "pendentive domes."

The earliest specimen of this is probably the little tomb in the Via Nomentana at Rome, which, though probably of earlier date than the church of SS. Nasario and Celso, carries out the pendentive principle to its full development, just as we see it treated at a later period in the double gate and the golden gate of the Temple Area at Jerusalem, most probably erected under Justinian. All these domes are segmental in section.

The pure form, however, of a pendentive dome—that is to say, the form in which the pendentives and the upper portion are really veritable parts of one and the same original dome, in the plan or base of which the rectilinear figure is inscribed—was not long adhered to. It was soon felt that the disc inclosed by the circular moulding looked flat and ineffective; and the idea early suggested itself of converting the circular moulding into a massive cornice, raising upon it a new dome of such proportions as should approve themselves to the eye, and allowing nought but the pendentives to remain of the original dome.

No bolder idea was ever introduced in constructive architecture; for now the dome, instead of being, as at the Pantheon, supported firmly by a solid wall throughout every portion of its circumference, finds its conditions absolutely reversed; for in no portion of its circumference has it now a solid support, but all floats upon vacuity, suggesting the poetical similitude to Procopius that the Dome of S. Sophia appeared as if suspended by a chain from Heaven.

Pendentive domes, in neither of their typical forms, seem to have been frequently or customarily made use of in the more genuine Classic ages, though in modern times they have both been very wisely adopted into the revived Classic styles. They were, in fact, the special characteristic and the great glory of the Byzantine style.

Mr. Freeman, on this subject, remarks:—"The offspring of the arch is the vault, of the vault the cupola; and this majestic ornament is the very life and soul of Byzantine architecture, to which every other feature is subordinate. Its use had hitherto been mainly confined to circular buildings. To make it the central point of a Christian temple was a grand and bold idea, and one which involved a complete revolution in the existing principles of architecture."

And not only did the grand cupola crown the whole pile, but the smaller portions are often covered with smaller domes and semi-domes. . . . The eye, habituated to the long naves . . . of our own great churches, is totally bewildered with so huge a pile, with

apses and semi-domes 'sprouting out,' to use the expression of Mr. Hope, in every direction, and all circling round the vast central cupola like tributary rulers encircling an imperial throne."

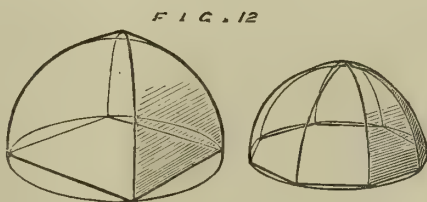
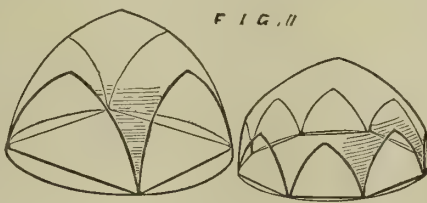
It is thought by some that the Byzantines borrowed the pendentive dome from Persia, but this seems insusceptible of proof; indeed it exists of earlier age in Italy. It is more certain that having once discovered its wonderful utility it was communicated by them to every region to which their influence extended, and that, having been learned from them by the Mahomedans, it became the conspicuous feature of the architecture which extended continuously from the Bay of Bengal to the Atlantic.

The next development I will mention is the raising of the dome proper upon a drum or circular wall, elevated upon the pendentives or corbels, so as to convert it into a species of tower. This seems to have been the first step by which, in later times, the dome came to be made a conspicuous external feature, though rather at the sacrifice of internal beauty.

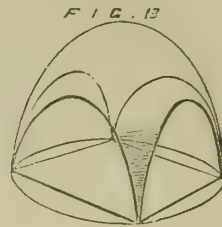
It is, in fact, the weakest point in the dome, æsthetically considered, that the same dome cannot be made artistically perfect both within and without. If its height be limited to what looks thoroughly well from within, it is so low in its external aspect as to have little artistic value; while, if raised so high as to be an important external feature, it is only seen by a painful effort from within. This is manifest even in the Rotunda, where the dome rises from a circular wall as in the Pantheon and the Temple of Minerva Medica, but it becomes much more so in a pendentive dome, where the angles are externally encumbered with large masses of masonry. In the earlier Byzantine buildings, we accordingly find the dome to have been viewed almost solely as an internal feature, and its exterior very much neglected, and in the case of St. Sophia itself no one would be prepared by its low, heavy external aspect for the unrivalled glories of its interior. Many of the old architects, in fact, gave up the external form altogether, covering over the dome, as at Parma, &c., by an ordinary sloping roof.

The change I have last chronicled, the interposition of a circular wall between the pendentives and the dome, though by no means in all cases leading to the result I am referring to, was unquestionably the origin of the treatment of the dome as an important external feature. It was, in fact, the elevation of the rotunda upon the top of the pendentives (as in Figs. 9 and 10). Unhappily, however, it had at once the effect of lifting up the dome above the level favourable to its internal effect, while, if erected on four arches only, the weight became so serious as usually to limit its use to domes of very moderate sizes.

A large number of domes thus raised high above their pendentives or corbellings are really of a class whose claims to the name of dome are somewhat ambiguous. I refer to those whose horizontal section is not circular, but polygonal (see Figs. 11, 12, and 13). Strictly speaking, this is



would follow that the vaults under consideration are no domes at all; yet they look so much like them, and as the number of the sides of the polygon increases, actually approach so closely to the genuine dome, that it would be affectation to deny them the name. They may form the cover-



ing of any rectilinear figure at all approaching to regularity of form; as the triangle, the square, the canted square, polygons, either regular or elongated, oblongs or parallelograms of any kind; but the usual form is the octagon or other polygon, and for our general purpose it may be best to limit them to figures capable of being inscribed in a circle or an ellipse.

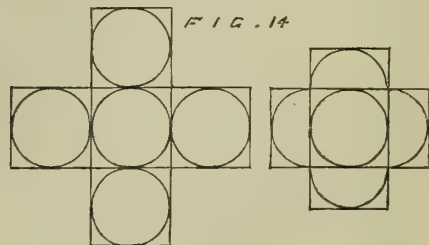
I have introduced this variety of dome as occurring in those which are raised high above their pendentives or corbels. They occur, however, in numerous positions. The greatest I know of is that of the Cathedral at Florence, of which I shall have to speak more in detail in my next lecture.

But to return to the Pendentive Dome. The Pendentive Dome, though occasionally used at an earlier period, established itself as the leading feature of a style about the time of the Emperor Justinian, and its central seat was Constantinople. The earliest, or about the earliest, church now remaining in that city seems to be that of SS. Sergius and Bacchus. Its dome is supported by an octagon. It appears itself to be coincident in its horizontal section, and to be supported on 16 small pendentives. It bears considerable resemblance to the Temple of Minerva Medica, but is really less developed than the Baptistery at Ravenna, which dates full half a century earlier.

Contemporary with this was the Church of the Apostles, also erected by Justinian, but now destroyed. It showed, however, according to the description of it by Procopius, an immense advance upon that last named; for, while in one the dome was carried by an octagonal wall, thus showing no practical advance upon the antique form of dome, in the latter a vast cruciform building was covered by five domes, which is just the advantage which the pendentive system affords; for, when the base of a dome is cut into a square by four arches, those arches may aid in the support of other domes beyond, and thus any space may be covered over by a series or a group of domes. This last church then, was the true type of advanced domical structure.

The great glory however of this age, and of domical structure of this class (for it has never again been equalled), is the Church of S. Sophia, or of Sacred Wisdom, erected by the same Emperor as the Metropolitan or Patriarchal Cathedral of the Eastern Church. The plan of this church differs in ideal, and yet more in fact, from the contemporary church last referred to.

The ideal of each is a cross with a central dome. The difference is that in the Church of the Apostles the limbs of the cross were each covered by a complete dome of equal dimensions with the central one. Those of S. Sophia are covered each by a semi-dome only (see Fig. 14) of equal dia-



a variety of groined vault; it is generated by the intersection of several barrel vaults, springing from the horizontal tops of the surrounding walls. Now, my definition of a dome was a vault generated by the revolution of an arch on its vertical axis. If this were an exhaustive definition, it

meter with the arches carrying the central dome; so that if we consider the latter to spring from the top of its pendentives, which it in effect does, its springing is on a level with the crown of the surrounding semi-domes.

In reality, however, this idea is not carried out to completion, as only two of the semi-domes have been erected, the other two arches of the central dome being filled in with an arcade in many stories. This incompleteness, however, is greatly more than compensated—firstly, by the vastness of the scale—the central dome, if measured on the diagonal, being 150ft. in diameter—and, secondly, by other semi-domical projections branching out from the walls which support the great semi-domes, three from each, excepting that on the western side one is devoted to the entrance, and is not domed. Even these secondary projections are mostly arcaded, so as to allow the eye to pass onward into a yet inner chamber. So that, simple as is the primary ideal, the actual effect is one of great intricacy and of continuous gradation of parts, from the arcades last alluded to, up to the stupendous dome which hangs with little apparent support, like a vast bubble, over the centre, or, as Procopius, who witnessed its erection, described it, “as if suspended by a chain from heaven.”

The dome is lighted by forty small windows, which pierce it immediately above the cornice which crowns its pendentives, and which, by subdividing its lower part into narrow piers, increases the feeling of its being supported by its own buoyancy.

The interior thus generated, covered almost wholly by domes, or portions of them, each rising in succession higher and higher towards this floating hemisphere in the centre, and so arranged that one shall open out the view towards the others, and that nearly the entire system of vaulting may be viewed at a single glance, appears to me to be, in some respects, the noblest which has ever been designed, as it was certainly the most daring which, up to that time at least, if not absolutely, had ever been constructed.

Its beauties are of a contrary kind to those of that noblest interior of antiquity—the Great Hall of Karnac—or to those of later ages—the Gothic cathedrals. Both of these gain beauty of effect and an increase of apparent extent through the endless intricacies of their perspective, and the changes of aspect at every step arising from the multitude of their columns, and from no possible view showing the whole interior at once. This, on the contrary, trusts to the very reverse of all this—the absence of all interruptions, and the studious distribution of parts, so that no one conceals another, but that the entire building shall be grasped at once by the eye.

I have not seen S. Sophia's, though I long to do so, if only to view a form of artistic treatment so different from what I delight in in our own cathedrals. The internal effect does not, however, trust exclusively to this panoptical theory. The contrary theory was too well known from the Christian basilicæ to be lost sight of in this, the greatest of Christian temples. It was, in point of fact, added to the other by means of arcades, both in the sides of the nave and in its apsidal projections, opening out mysterious perspectives into the inner recesses of the temple. This union of the more palpable with the more mysterious, of the vast unbroken expanse with the intricately broken perspective, must, as it appears to me, and as I judge from representations, produce an impression more astounding than that of almost any other building; but, when we consider the whole as clothed with the richest beauties of surface: the piers encrusted with inlaid marbles of every hue, its arcades of marble gorgeously carved, its domes and vaultings resplendent with gold mosaic interspersed with solemn figures, and its wide-spreading floors, rich with marble tessellation, over which the buoyant dome floats, self-supported, and seems to sail over you as you move—I cannot conceive of anything more astonishing, more solemn, and more magnificent. Well might its Imperial founder exclaim, when with pardonable exultation he viewed the result of his costly aspirations—“Glory be to God, who hath thought me worthy to accomplish so great a work; I have vanquished thee O Solomon!”

I have dwelt longer on my description of this wonderful building because it is *facile princeps* among structures on the pendentive domical principle, just as the Pantheon had been among those with the simple dome; and as, in after ages, was S. Peter's among these whose domes soared upwards as lofty towers.

I must here close my lecture, leaving the continuation of my descriptive sketch of the history

of the Cupola, and such remarks as I may have to offer on its uses, its practical application, and its future development, to be followed up in my next.

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting, on Friday evening last, Mr. J. Douglass Mathews, President, in the chair, Messrs. A. B. Deakin, V. M. Barratt, W. Murray, and A. Goodchild were elected members. Several new members attending for the first time having been introduced to the President, a donation to the Library of Vols. I. to LIII. of the *Journal of the Society of Arts* was announced, and a vote of thanks given to the donor, Mr. Sidney Vacher. The thanks of the Association were also voted by acclamation to Mr. Charles Barry, for allowing the members to visit the new buildings for the Learned Societies at Burlington House, a fortnight ago; and to Mr. Daniel Ruddle, the clerk of the works, for accompanying the members over the buildings and explaining the construction, &c. The announcement was made that classes for the study of Chemistry, Geology, and Land-surveying were in the course of formation. Members intending to join either of these classes must send in their names before the 10th proximo. The first meeting of the Surveying-class will be held on the 30th proximo.

Mr. GEORGE AITCHISON, B.A., F.R.L.B.A., then read a paper on

COLOURED DECORATION.

The author commenced by saying that ornament was more natural to man than clothing, and this personal adornment was usually an attempt to copy something that struck the savage as being more beautiful than his own body. In some cases he was struck by beautiful form; in other cases by brilliancy of colour; and Mr. Aitchison said that if his object were to consider how those instincts were to be utilised for the purpose of civilising the savage, it might be roughly hazarded that those savages who stained or painted themselves in irregular spots, lines, or patches, red, white, black, or blue in colour, were more likely to be trained as colourists; while those who ornamented themselves with curiously-designed forms were more capable of being taught composition and outline. The New Zealanders, and many other tribes of savages, tattooed themselves in various patterns, the New Zealander endeavouring to imitate on his own body the lovely stripings of the mackerel. But what he (Mr. Aitchison) had then to consider was the ornamenting of man's habitation. In this respect man only developed an instinct or a passion that he held in common with birds, beasts, and fishes. Of course, many of these were of a practical, rather than of an artistic turn, and so that their habitations were convenient for them, they cared little or nothing about their beauty. The beaver, though an excellent builder and plasterer, did not care for ornamental plastering; the crow contented itself with plain wattle; the swallow with a mud cottage; but many of the birds and some fishes made their nests not only convenient and comfortable, but also beautiful. The nest of some of the finches were beautifully interwoven with hair, feathers, moss, lichen, and twigs, and it was not to be supposed that these birds did not derive pleasure from the decoration of their houses. The bower birds adorned their nests with shells, stones, and other natural objects, and also, when near man, with bits of ribbon, looking-glass, coloured paper, and tinsel. There was nothing to show us that the birds, the fishes, and the cattle did not receive delight from the shape and colour of the flowers and the landscape. No one who had watched the pains the peacock took to exhibit his body and tail in every variety of light to his hen, could imagine that the glorious tints of its neck and body, and the effulgence of its thousand-eyed tail, were for the delight of man alone. From very early periods it was probable that something was used for the express purpose of decorating the abode of man. The skins and leaves earliest used to exclude wind and rain, or to ensure privacy, must have suggested ornament when their place was usurped by woven stuffs, and, in fact, the greater part of all the patterns used for modern decoration pointed to their woven origin. To those who dwelt in caves, holes, or subsequently in mud or mud-lined huts, sculpture most naturally suggested itself, and doubtless some rude kind of painting was almost coeval with it; as wealth and civilisation increased, the various substances that were useful,

pleasant, or ornamental, were made to contribute to the splendour and comfort of man's abode. The perfection to which decoration arrived in many epochs of the world's history was greatly owing to religious enthusiasm. Man when confined to purely selfish objects was but a poor creature, and it was only when generations of men were fired with patriotic, religious, or benevolent enthusiasm, that individual man exhibited the highest capacities of his nature. The most perfect specimens of decoration were to be found in the church, the temple, or the mosque, rather than in the house, the palace, or the council-chamber. The arrangement of a scheme of decoration, in one way, was simple, as in the bulk of cases it was internal, and could but be applied to the floor, to the walls, and to the ceiling. The floor had to be walked on, and the lower part of the wall to be protected from injury, dirt, and stains, and, if possible, made agreeable to the touch. Therefore, properly speaking, the upper part of the walls and the ceiling were the only parts in which the decoration was purely for instruction and delight. And, as “the proper study of mankind is man,” it would be found that the main body of the decoration in every palace, church, or temple was the depiction of man, except in the case of those religions where the portraiture of the human form was forbidden. This was the art of the sculptor or painter, and with neither of these did Mr. Aitchison wish to interfere, confining himself to the humbler part that fell to the lot of architects. He would say, however, that no one should attempt decoration in whom loveliness of colour was not an enrapturing delight; for such an one, if he once departed from monochrome, would make his work more conspicuous than pleasant. If his greatest pleasure was not to bathe in the liquid coloured light of fine stained-glass, to watch the colours fade out as the sun went down, to be entranced with the deep azure blue of the mountain, gentian imperceptibly fading into grays and greens, never to forget the flaming star that the sun made of the first autumn leaf in the gloom of the woods—if he had not been thrilled with the harmony of some bit of chequered light falling on a mountain-stream from between trees, or with the mysterious colours of a distant wood or mountain, even if he did not dream of the beautiful colouring of some Oriental dish, dress, or carpet, he should avoid coloured decoration. They should always remember that they were Englishmen living in the nineteenth century, and in all probability doing work for Englishmen of the nineteenth century and that they owe to themselves and to their country, that they gave something beautiful and new. They should not be copyists, reproducers, paraphrasers or imitators, but should do what was lovely in their sight, and make those they did it for love it. They were artists, inventors, makers, poets even, and they were to impress their own creations on their age. If they had no new ideas, no inspiration, nothing that they thought lovely and wanted to do, they should leave decoration and do something else. Decoration was an art, and therefore little could be written or said about it: it was not a science for which rules could be given. At the most one could only give recipes, and those were not of much value. Colour was the main thing to study, and it was not the Greek or any other example that should be studied by day and by night, but the book of nature. There were always the sky and the clouds, sunset and sunrise; the pond, the lake, the river, the sea and the ocean, the woods and fields, the rocks and mountains, the colours of birds and flowers of butterflies and beetles, of beasts and fishes; and from these one could not but learn, and would learn, much more even than form and colour—would learn what might be called the inexhaustible patience by which effects were obtained. If, at a cursory glance, they were struck by the loveliness of a flower, and they tried to paint, they would generally, on close examination, find that in a brilliant flower the brilliancy was partly obtained by the various gradations of tint and tone, and partly by its having some small spot, speck, or dot of its complementary colour placed where it gave the greatest effect. The light was concentrated on one particular spot by its sculptured form, and it would be found that the surface was ribbed or embossed; the texture was dull, like silk, or shiny like satin, or piled like velvet, or shaggy like plush; and its general effect of colour was set off by the tertiaries of its leaves and stalks. After successive and unavailing attempts, one might throw down the brush in despair on find-

ing that the sketch had just missed the grace of the flower and the peculiar loveliness of the colour. In such work, however, the student would, if he persevered, learn much. He would improve his taste, and his admiration would be raised for the inexhaustible fertility of invention and the exquisite subtlety of the methods that Nature employed to bring to perfection one little perishing flower. He would also learn the relative value of form and colour. Throughout nature he would find that some things were to our eyes only barely agreeable; others were ugly; while some were of an exquisiteness of form and colour that could never have been appreciated without diligent study. These were what the French called *distingué*. Natural objects were by no means equal in beauty. It was as ridiculous to suppose that all things were equally beautiful as to contend that the croak of the crow or the scream of the peacock was as musical as the song of the nightingale. In designing the decoration of a house, one had to consider the various uses for which the parts of the house were intended, and this must necessarily govern the style of decoration. Supposing the house consisted of a hall, staircase, library, dining-room, drawing-room, boudoir, and bedrooms. The hall was a passage only for the inmates and their visitors, and a waiting-room for servants and messengers. It should convey, to a certain extent, a notion of comfort, and of the quality of the house. It must not be too dark, or else it made the reading of addresses, &c., too difficult; and as it was generally a receptacle for hats, coats, rugs, sticks, and umbrellas, it would require a plainer and broader treatment than other parts. As visitors could not conveniently linger there, no very elaborate decoration was required. Such decoration might also spoil the effect of any more elaborate adornment of the staircase or the rooms, by raising the expectation too high; or it might give a smack of ostentation to the house. The staircase must be light, or, if the lighting was insufficient, the tone must be light, to supplement this insufficiency. A staircase might be treated in almost any way, either simply or elaborately, but of course this must greatly depend on its architectural character, and on the decoration of the rooms. If the staircase was very small or narrow, elaborate decoration was thrown away. If the rooms were brilliantly and gorgeously decorated, the staircase must be simple, or their effect was injured. If the rooms were treated with severe simplicity, the splendour of the decoration might be concentrated on the staircase, unless it was to be the field for exhibiting sculpture or painting. For the dining-room, the idea of warmth and comfort had to be conveyed; and as it was frequently the picture-gallery of the house, it must be treated in entire subservience to the pictures, as a setting for the gems. The library was for study, and its decoration must be also broad—not so light as to fatigue the eye, nor so dark as to render reading difficult. There must be nothing in its decoration to distract or even greatly to attract the eye. The drawing-room was, perhaps, the most difficult room to treat, for it had to fulfil so many different and even opposite requirements. It must be light and cheerful by day, as well as brilliant at night. It must be suitable, on the whole, to the complexion and dresses of ladies, and this while its walls have to serve as the background for pictures, china, and objects of *virtu*. The boudoir was easier to treat. It was the temple of the lady of the house, and must be treated the way most advantageous to her complexion. An air of luxurious repose must also be given, with some tinge of its fitness for her especial pursuit, be that art, music, or literature. The bedrooms should be light rather than dark, and might be either plain and simple, or gorgeous and elaborate; but to Mr. Aitchison's thinking, there should be nothing in their decoration which would suggest difficulty in the frequent use of the mop, duster, and scrubbing-brush. Common sense should guide the architect in his main arrangements, art and skill in the disposition, and genius, or at least study, in the application of colour. Floors should be rather dark than light, with the lines, spots, or patterns not too trenchant. Though one did see carpets of living flowers walked over by processions in Italy, Mr. Aitchison thought unshaded patterns were the best for floors, pavements, and carpets. In ordinary houses and in most rooms the height of the dado was fixed by the height of the chairs, unless perhaps in a dining-room, with very large pictures or tapestry. Then the dado might reach on occasion as high as the head, and perhaps have brackets, or a shelf for china. Good low-toned

tapestry was always agreeable in a dining-room, if pictures were not to be hung on it, but one could not put one picture over another. He thought that the carpet or floor was not the lowest toned portion of the whole decoration; the bottom of the wall or the dado should always be darker than the upper part. The cornice should be still lighter, and the ceiling again lighter than that, or should be a white. Bad pictures were as inadmissible as bad wine, being costly luxuries. Everything must be subordinated to good pictures. Warm neutral greys, greens, or dull reds, were most serviceable as backgrounds, for reasons apparent to all who know Chevreuil's law of complementary contrasts. Dados might be wood, either of the natural colour or coloured, stained or painted and varnished, with but very slight polish. The upper part of the background proper might be of velvet, of dull stuff, of flock, distemper, or even fluting. If not for pictures, it might be hung with tapestry or figured paper; or it might be painted in a pattern sufficiently interesting to engage the eye and attention, but not too obtrusive. The main body of the ceiling should be white, or but slightly toned—even a gold ground was rather heavy. In each room the decorator should seek for some principal object as the key, and work up and down to that. If some prominent piece of furniture, as a splendid cabinet, was in a room, he must work his general decoration to be in harmony with it. If he wanted a room to be a success, he must choose carpet, curtains, and furniture. One blot of inharmonious colour might spoil the room. Every colour might be made to harmonise with every other, but only by varying its tints and tone. In Nature there was no flat or uniform colour anywhere—not in the gradual melting of a blue sky, nor in the smallest leaf or speck of dust. Large flat uniform tints were always unpleasant, and were only to be allowed where the surface was broken up by many objects. Those single colours pleased us most that approached other colours, or wavered, as it were, between two. The gorgeous colouring of India, the brilliant colouring of China, or the soft harmonies of Japan might be emulated, but the works in which these were found should not be slavishly copied, but rather imitated in spirit.

Mr. R. PHENE SPIERS proposed a vote of thanks to Mr. Aitchison, and remarked on the great value of the study of nature as recommended by Mr. Aitchison, both as a preparation of the hand and discipline for the eye and mind. He thought water-colour drawings of buildings and landscape should, however, be regarded as almost as important as the delineation of the minute subdivisions of animal and vegetable life.

Mr. J. D. CRACE seconded the motion. He thought Mr. Aitchison's advice to students was capable of being outlined briefly as—first, study nature; secondly, use common sense; and he, too, thought those the only methods for reaching success in this art. That the suggestions now poured in upon us from every quarter of the globe should be utilised was nothing but reasonable; but perhaps the worst use that could be made of them was to blindly copy their crudities or oddities, and in doing so miss to a certainty those essential qualities that give them their charm, and their best freshness also, to the cultivated eye. The enamels, porcelain, and stuffs of India, China, and Japan were a storehouse from which the worthy student might extract many an inspiration, that would first delight himself, and this delight should then be made evident to others; but mere copying would assuredly repel, and not captivate, trained European taste.

Remarks were made by Mr. E. Hall, F.S.A., and Mr. Stannus, Mr. Ravenscroft, and others; and the vote of thanks was carried by acclamation.

Mr. AITCHISON, in his reply, touched on all the points which the previous speakers had brought forward. He also took the opportunity of enlarging on the thanks due to Mr. Owen Jones, that veteran colourist, for his teaching by precept and example through many a year. He had done more than any other man to introduce the love of colour into this country; and his teaching was always distinguished by a quality that gave it a charm all too rarely felt. He was impressed with the value of the work in which he engaged, pure delight in the pursuit was shown in all his words, and gave to his detailed rules none of the aspect of mechanical or perfunctory or laboured instruction, but they seemed the utterances of his own deep conviction and personal delight. Such teaching as this, united to brilliant technical skill, could not be without

great value, and should not be without its meed of gratitude. Mr. Aitchison thought that the English had a good eye for colour, and that there were all the materials in our painters of a brilliant school of colourists, who should not run second to the great schools of old.

The meeting then terminated.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

ON Tuesday evening last the sixth annual general meeting of the Builders' Clerks' Benevolent Institution was held at the office of the Institution, 27, Farringdon-street. The chair was taken by Mr. Henry Robinson (Messrs. Cubitt and Co.), and there was a large attendance of the donors and subscribers. The report read by the secretary showed the Institution to be in a flourishing condition, many new members having joined. A sum of £190. 6s. 1d. was in hand, and was carried forward to the next account.

The Chairman, in moving that the report be adopted, printed, and circulated, congratulated the subscribers on the prosperous condition of the Institution, and said that the managers had not been unmindful of keeping down the expenses. He urged upon the meeting to make the objects of the Institution widely known among those builders' clerks who had not yet joined. He could not but regret that so many of that class were not mindful of the advantages of joining such a society as this, considering the numbers of them in this metropolis. Even as a matter of self-respect and self-preservation, it was desirable to join such an institution, for no one could see into the future.

Mr. Stirling seconded the adoption of the report, which was unanimously carried. Mr. Pugg proposed, and Mr. Matthew Hall seconded, a vote of thanks to the late president (Mr. George Plucknett), and other officers for the ensuing year, which was also carried. On the motion of Mr. Payes, seconded by Mr. Smith, Mr. Henry Robinson was unanimously elected President for the ensuing year, and the meeting afterwards terminated.

TOOKE'S HISTORY OF PRICES.—Tooke, in his "History of Prices," gives some valuable tables compiled from "The New London," now "Prince's and London Price Current," an old file of which now is before the writer. The following is a condensed statement of the prices of Memel timber and yellow pine from 1782 to 1838, by which it will be seen that the old times saw some astonishing fluctuations of prices:—

MEMEL TIMBER.		Duty.			
Year.		£ s.	£ s.	S. D.	S. D.
1782 to 1790...	1 7 to 3 10...	4	1	to	6 8
1791 „ 1800...	2 0 „ 5 15...	6	8	„	10 0
1801 „ 1810...	3 0 „ 17 0...	10	0	„	27 4
1811 „ 1820...	2 10 „ 12 10...	27	4	„	65 0
1821 „ 1830...	1 15 „ 3 5...	55	0		
1831 „ 1838...	2 2 „ 3 0...	55	0		

YELLOW PINE.		Duty.			
Year.		£ s.	£ s.	S. D.	S. D.
1782 to 1790...	1 10 to 2 15...	Free			
1791 „ 1800...	1 17 „ 5 0...	Free			
1801 „ 1810...	3 18 „ 17 0...	Free and 2s.			
1811 „ 1820...	3 0 „ 12 0...	2 0 to 12 6			
1821 „ 1830...	2 10 „ 4 2...	12 6 to 10 0			
1831 „ 1838...	2 15 „ 3 15				

The year 1809 saw the highest price. The uncertainty as to what the Chancellor of the Exchequer might do respecting timber, when his Budget was forthcoming, affected the market then as it has done in more recent times, and, in addition, there was the great excitement consequent on war. The qualities of the timber are not stated, and in the Memel would range from Common to Crown. The yellow pine would be more uniform.

MR. LOWE AND THE SOCIETY OF ANTIQUARIES.—The Chancellor of the Exchequer, in a characteristic letter to Earl Stanhope as President of the Society of Antiquaries, declines to aid by a Government grant the explorations of the plains of Troy. He is "convinced that, if one-half the energy which is devoted to attempts to obtain aid from Government were given to create a spirit of private munificence, this and many similar objects might be attained with the utmost facility and completeness."

OUR LITHOGRAPHIC ILLUSTRATIONS.

PRACTICAL DESCRIPTIONS OF FIGURE-SCULPTURE.

A fortnight since we reported and illustrated Mr. J. F. Redfern's first lecture "On the Figure-Sculpture in the Architectural Museum." This week we are enabled, by Mr. Redfern's courteous co-operation, to report and illustrate his second lecture. (See lithographic illustration and report on page 374.) Next week we shall report and illustrate Mr. Redfern's third and concluding lecture.

SPECIMENS OF INDIAN ARCHITECTURE.

For historical description and criticism of these interesting specimens of Indian architecture, see elaborate article on "Historic Art Studies," by Dr. Zerffi, on page 373. Having now ample room for illustrations, we are enabled to fulfil a promise made some time since. This series of illustrations representing historical art monuments, accompanied by Dr. Zerffi's erudite comments will constitute one of the most valuable features of the BUILDING NEWS for many months to come.

NEW LIBRARY, GRAFTON-STREET EAST, TOTTENHAM COURT-ROAD.

This library, which for very many years was located in Redcross-street, Cripplegate, had its premises taken some years since by the Metropolitan Railway Company, and after much trouble the trustees obtained a site in Grafton-street East with a considerable frontage and good front and back light. The building, now nearly completed, consists of three stories, viz., basement, ground, and first floors, the library itself being practically divided into two heights by the proposed galleries for books. The basement contains strong-rooms for the valuable manuscripts belonging to the Trust, the kitchen and other offices, and the furnace room, with coal-cellars, &c., complete. The ground floor consists of a large entrance-hall, board and committee-rooms, with waiting and retiring rooms, and the whole of the first-floor is taken up by the library. The aim in designing the building has been to approach to fireproof construction as nearly as practicable, and with this view the floor of the library is carried by girders and tile arches, all carefully cross-tied, the spandrels being filled with concrete, and an ordinary floor being formed over same. The style adopted for the elevation is that of simple Gothic, the chief character being obtained by deeply moulded brick jambs to the various openings, Forest of Dean stone and red Mansfield being used in places, but the facing generally being of white Suffolk, with Bath Box-Ground stone dressings. The roof has been constructed of wrought-iron, and is of somewhat singular design, each rafter being itself a truss, and is mainly carried out with L and flat bar iron, the panelled wood ceiling being hung up to the same. The roof has been covered with old tiles, and the necessary laths for same have been steeped in a solution of alum to render them as far as possible unflammable. The library is lit by three sun-lights, and care has been taken to make the same effectually assist in the ventilation of the building, beside other provision for the same.

The building has been heated by hot water, all the pipes in the library being laid above the level of the floor under the book-cases, admitting the warm air by perforated risers in same to the room. The book-cases themselves are so planned that they may be in two tiers in height, with corner circular staircases for access, and they are constructed of deal faced with wainscot, with moulded cornices and shifting shelves. The best chimney-pieces are of oak and Bath stone, with ornamental polished shafts, and carved both with monograms and records of the date of the establishment of the trust and the re-erection of the building.

The cost of the building, with the necessary fittings, will probably be about £8,000.

Heating executed by C. E. Phipson, C.E.; lighting, Richardson, Slade and Co.; carving, F. G. Anstey; ironwork, R. Moreland and Son; shuttering, Snoxell and Co. The architect of the building is Mr. Thomas Chatfield Clarke, of 63, Bishopsgate-street Within, and the builders, are Messrs. Perry and Co., of the Tredegar Works, Bow.

"BUILDING NEWS" SCHOOL-PLANNING COMMISSION.

The design we publish this week obtained the second prize. It was contributed by Edw. Street, of Ellington-square, Barnsbury, under the motto

"Nunquam Exspes." The design was planned and worked out under the following conditions, and agreeable to the views of the author, as stated below:—

"1. That the design is intended as a model for a town school under the Elementary Educational Act, and to be managed by a school board. With this view the school has been generally planned as a parallelogram in three floors, accommodating the infants on the ground-floor; the boys on the one-pair floor, and the girls on the upper floor; and which floors are connected by staircases at either end of the block. Private doors of communication open from the landings on each floor; by this arrangement the managers can visit each school in succession without having to retrace their steps or return to the open air. The accessory rooms and offices are placed as projecting wings in the rear. The committee-room for the Board of Managers would be the drawing class-room, which would be only partially used by the scholars.

"2. That the site, while being sufficient for the purpose, is somewhat restricted, and requires that the buildings be dealt with to suit the configuration of the ground. The block plan virtually settles the space that can be allotted for playground; and as this is of no considerable extent, the whole of it has been given to the infant children. It has a southern aspect, and consequently would be warm and sunny, and protected from cold winds. The infants' w.c.'s are gained from the covered play-shed. Ample ventilation is secured by the wall dividing them from the girls' w.c.'s being only 8ft. high; this will allow 6ft. or 7ft. for the air to pass over. The entrances to the girls' and infants' schools are in Cross-street, in close contiguity to each other; the boys' entrance is removed to the farthest point in the main street, and their entrance is protected by a covered way, at the end of which are their out-buildings. The caretaker's residence is so placed that immediate access can be gained to the school-buildings.

"3. That the chief points in the general design in which convenience and merit will be looked for are as follows:—

"(A). Convenient arrangement for teaching the children according to the Educational Code.—Thus the boys' and girls' schools are respectively divided into senior and junior standards, according to the proper proportions laid down. Each section is again divided into four standards or classes, 25 children constituting a class in the senior, and 30 in the junior section. Two classes from each section would be in the general school-room at one time, the other two classes of that section being at that time taught in the class-rooms, the classes of course changing at certain intervals. Thus every class would have a class-room. When the whole of the children were assembled at one time in the general school-room the extra number (amounting to half of the whole) would be seated in the following manner, and as shown in detail attached. Space is allowed between the desks for two rows of seats instead of one; of course only one seat would be generally occupied, as the other classes would be in their respective class-rooms. This, as stated by an authority, 'causes the three rows of desks to occupy a greater floor space, but it is the best solution of the problem that has hitherto been given.' In the class-rooms for the senior section desks are provided; in the junior section, galleries only. The drawing class-room is easy of access for both boys and girls, and is placed on the boys' floor. In respect to the arrangement of the children in the infant-school: they are accommodated in different-sized galleries in the general school and class-rooms. A group of movable desks for 30 of the elder infants is shown. If it were necessary to bring the whole of the infants into the general school-room, the extra number would be accommodated by forms. The forms and movable desks could be cleared away and stacked at the end of the large class-room, and plenty of floor-space would then be obtained for the children. The class-rooms in the three schools all open out of the general school-rooms, and are well under the command of the master or mistress as the case may be.

"(B). Ample Light and Ventilation.—The general school-rooms, from end to end, are lighted and ventilated by opposite windows; these are placed well up from the floor, to be above the children in the desk-wall, and to allow of maps and diagrams being hung on the opposite wall under the windows. In the class-rooms, the light is obtained from the side and also from behind

the children. The drawing class-room is partially lighted from the top. The author has carefully considered the lighting and ventilation of the schools, and trusts that he has been successful in these particulars. Large windows with mullions only are, perhaps, the best means of distributing the light evenly over the rooms, the lights glazed with rough plate; part of the upper lights would be hung on centres in small iron frames. By this arrangement no large piers would occur to throw a shadow on the centre of each desk, as is the case where ordinary openings and sashes and frames are adopted. As regards the means for drawing off the heated air from the top of the rooms, channels would be formed between the joists, communicating with the open air at either end, and in the centre with a perforated grating in the ceiling of the room below. In the accompanying plans the warming is shown by open fireplaces with warm air-chambers at the back, as the system most generally in favour; but the author considers that a properly devised system of hot air or water-pipes circulating round the entire building from the basement, would be found more economical in the end.

"(C). Provision for, and arrangement of the different accessory rooms and offices for the convenience and efficiency of the schools:—The lavatories and cloak-rooms combined are placed by the school-room doors. The author cannot consider that anything is gained by making them distinct and separate, as is sometimes done; much less trouble is involved in superintending the one room; separate doors for ingress and egress are provided, which could be kept under lock and key. In the infants' school a somewhat different arrangement is adapted; a room, ante to the school-room, of ample size, contains the basins and space for caps and cloaks. It communicates directly with the entrance lobby, and also with the playground and shed; this arrangement has been adopted for the reason that infants require so much more personal tending, and have not been trained to the discipline and method of the elder children. Small apparatus rooms and private w. c. and lavatory for the teachers are provided to each school.

"A full analysis of the cost is appended hereto:—

Estimate.—Cubical Contents.

69	
23	
52	
82,524	In main building centre block.
31	
2) 23	
56	
76,496	Main-building class-rooms in wings.
26	
17	
28	
12,376	Back addition—boys' staircase.
17	
7	
12	
1,428	Do. Do. apparatus room over.
19	
31	
45	
26,505	Back addition—girl's stairs.
22	
30	
30	
19,800	In drawing class-room and w.c.'s.
30	
11	
18	
5,940	Porch before school-entrances.
225,069	cube. Total in school buildings, 5d. 4688 18
	£. s. d.
Allow for caretaker's residence	200 0
Allow for fittings in boys', girls', and infants' schools	150 0
Allow for inclosing fore-courts and yards with fence walls	50 0
Allow for levelling yards and laying with tar pavement.	100 0
Total cost of schools, fitted and finished complete.	£5,188 18

PRACTICAL DESCRIPTIONS OF FIGURE SCULPTURE BY J.F. REDFERN. (ILLUSTRATING LECTURE DELIVERED AT THE ARCHITECTURAL MUSEUM)



(1)



(2)



(5)



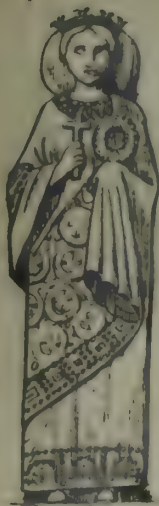
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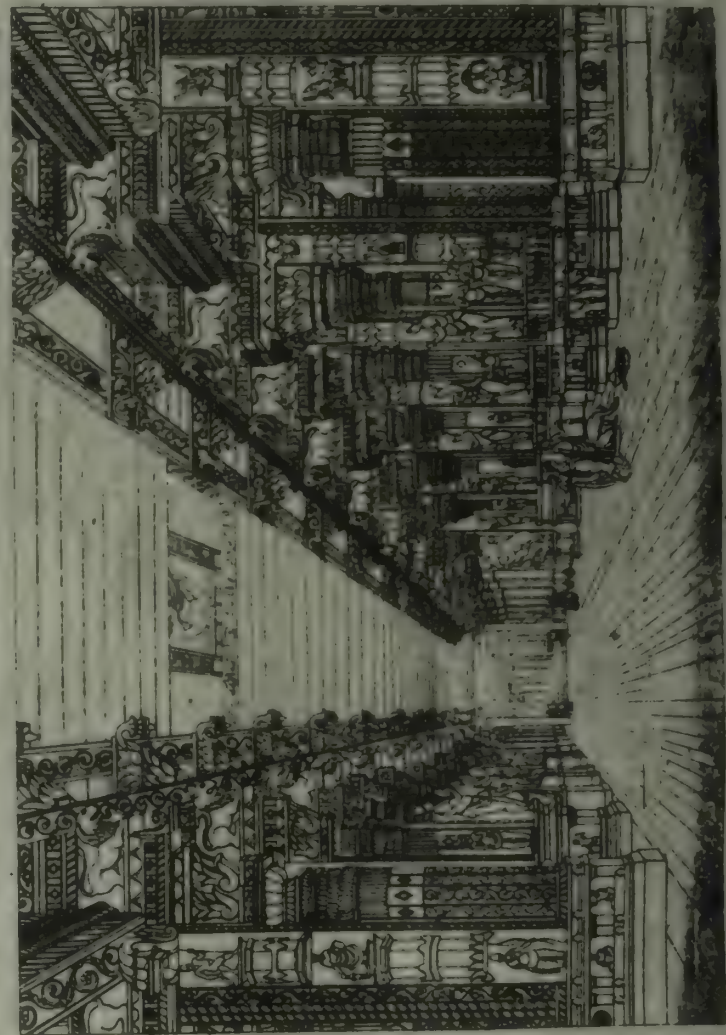
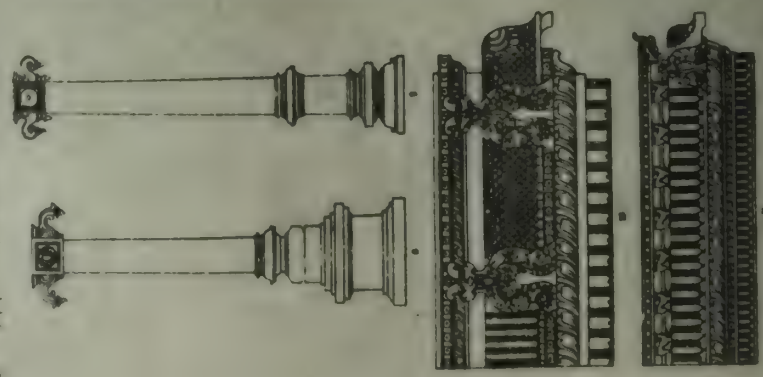
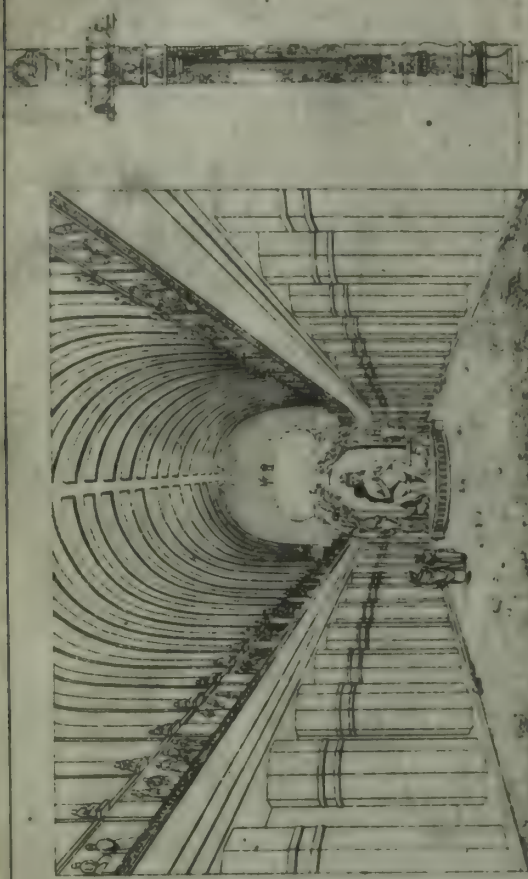
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(9)



SPECIMENS OF INDIAN ARCHITECTURE.

NEW LIBRARY.
DR. WILLIAMS' GROSS.
GRIFFON STREET.
LONDON.

T. CHAPFIELD CLARKE
ARCHT.

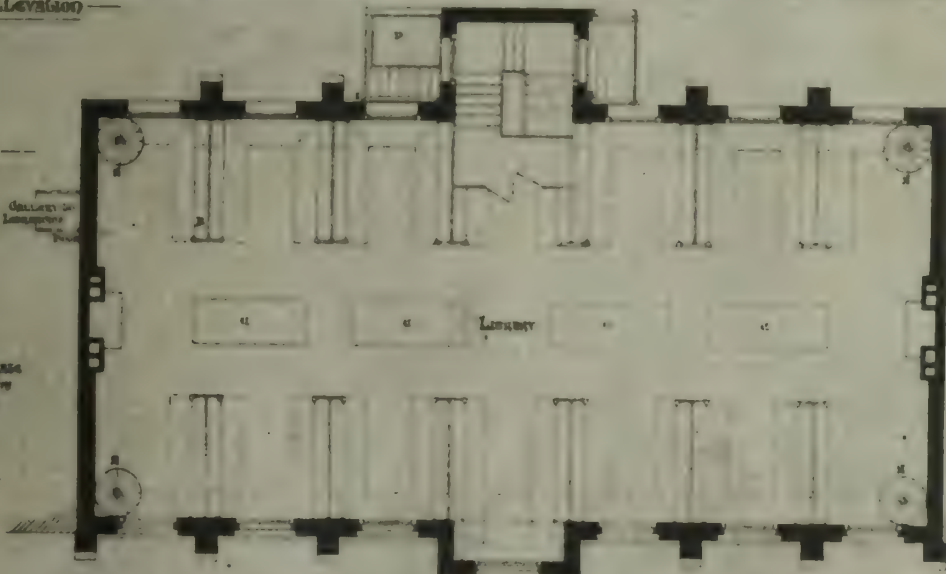


FRONT ELEVATION

UPPER PLAN

- A - Stairs to Gallery.
- B - Book Room.
- C - Tables.
- D - (Hallway)
- E - Reading Room.

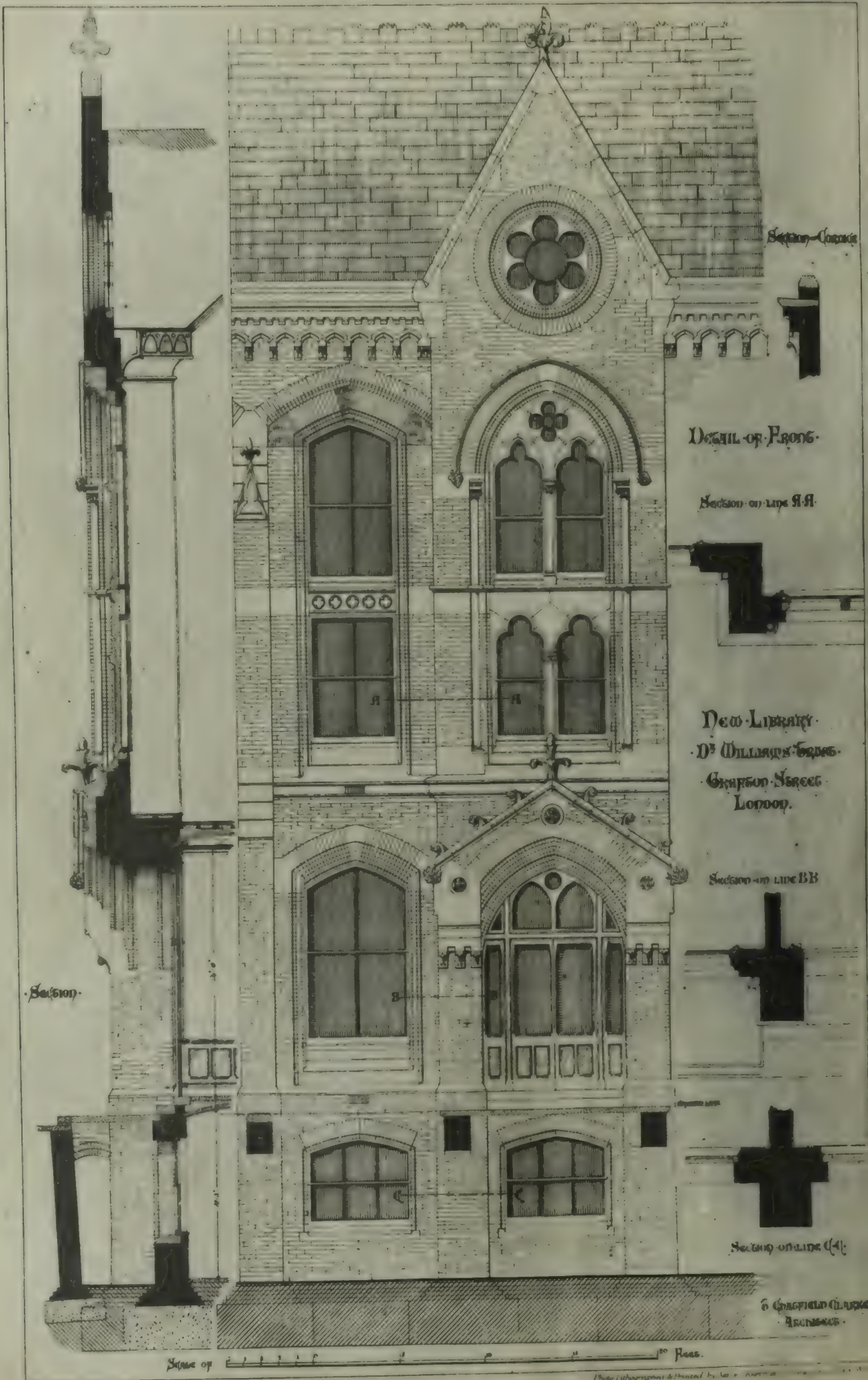
Note - Dotted lines indicate
Galleries to be added on the
Book Room.



GROUND PLAN

- A - Entrance Lobby.
- B - Hall.
- C - Book Room.
- D - Committee Room.
- E - Writing Room.
- F - Reading Room.
- G - Dressing Room.
- H - Lavatory.
- I - W.C.





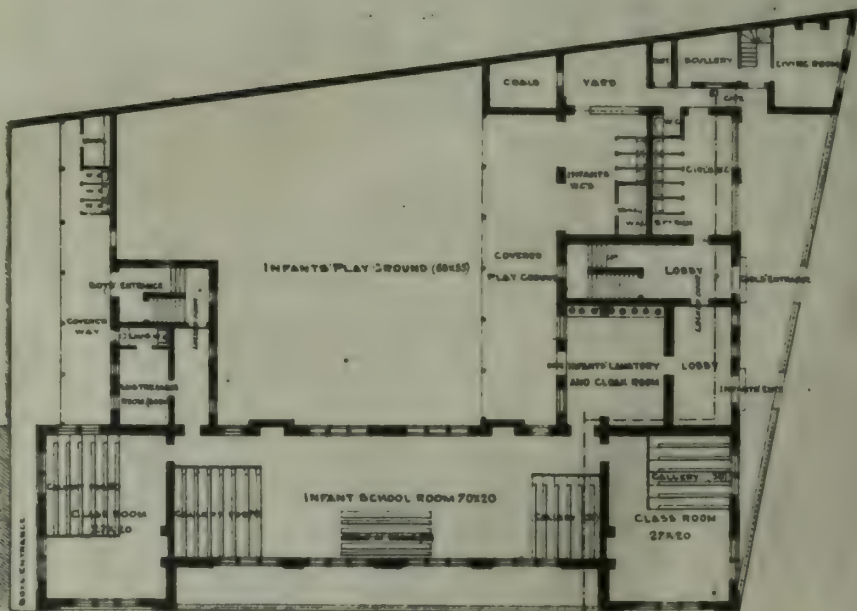
NEW YORK
ENGINEERING
SOCIETIES
OF THE
CITY OF
NEW YORK
PRINTED

BUILDING-NEWS SCHOOL

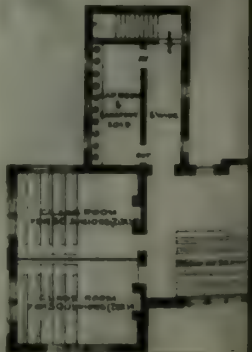
SECOND PRIZE



ELEVATION TO CROSS STREET



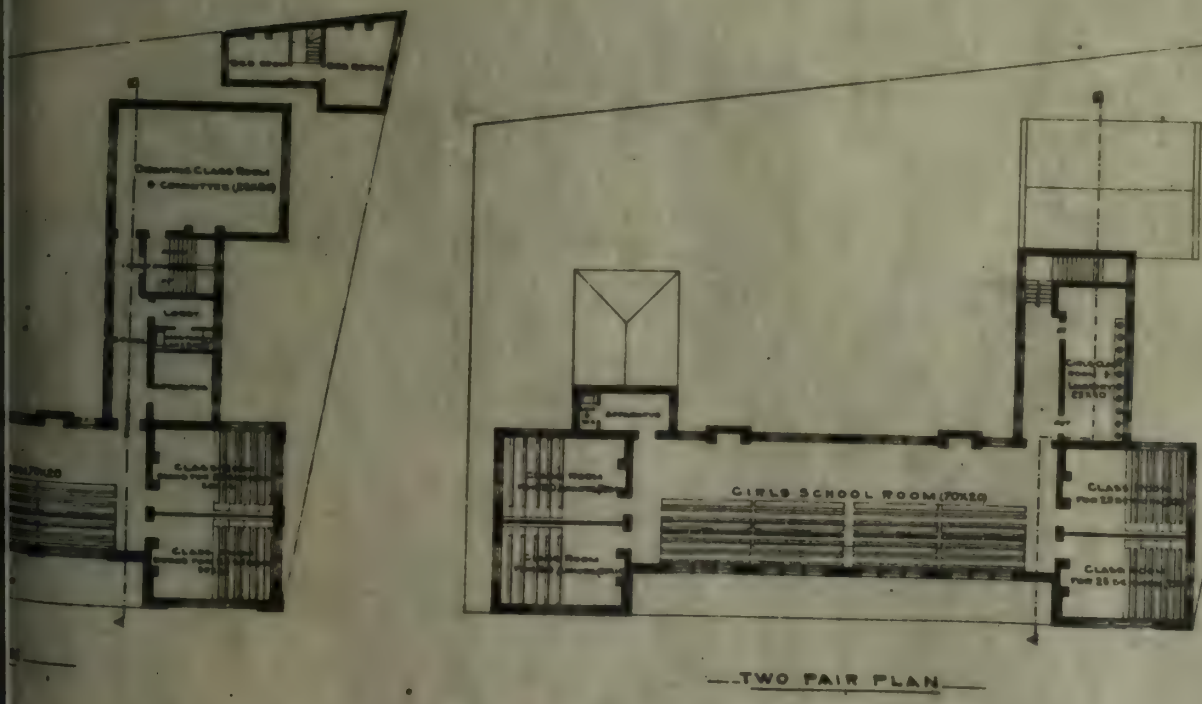
GROUND PLAN



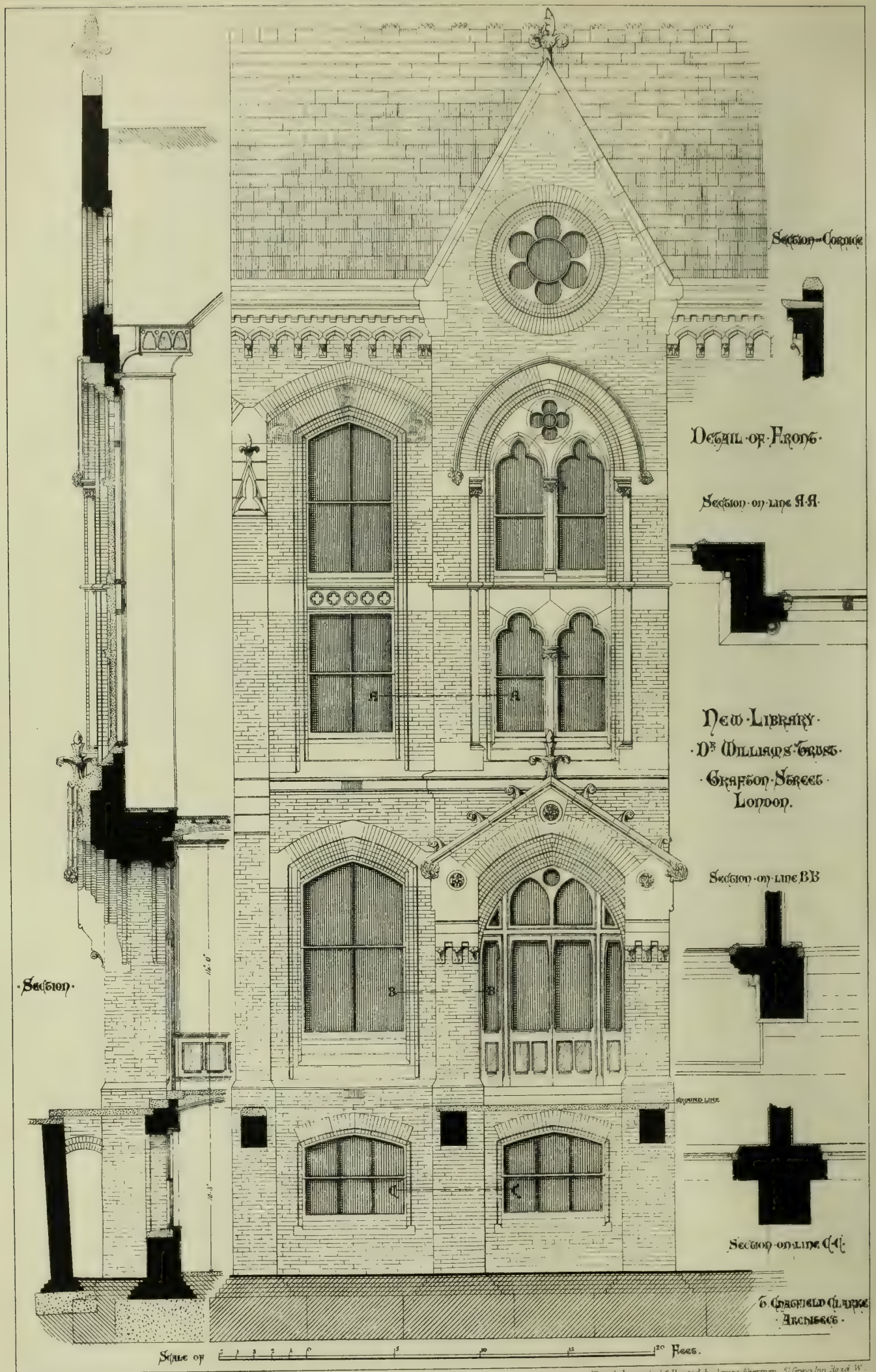
"NUNQUAM EXSPES"

MAR. 28 1873.

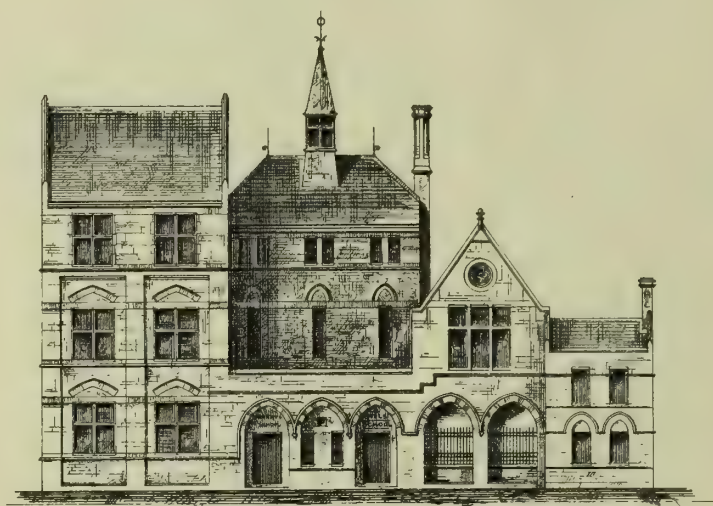
ANNING COMPETITION.
WARD STREET.



NEW YORK
SOCIETIES
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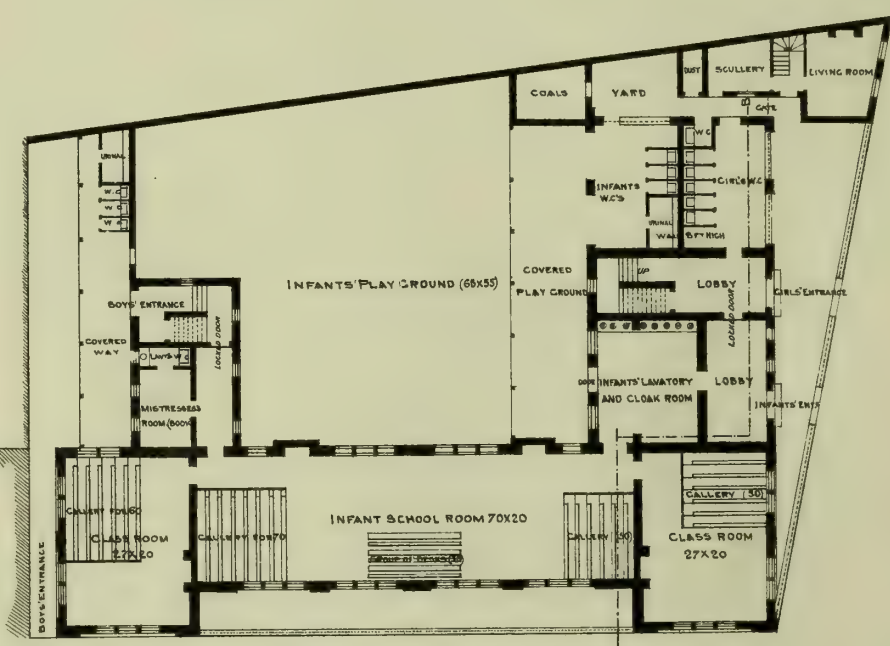
BUILDING-NEWS SCHOOL
SECOND PRIZE



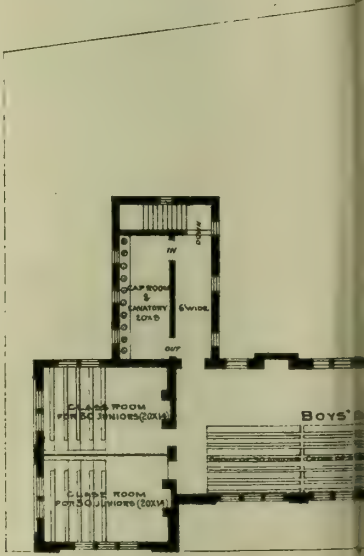
ELEVATION TO CROSS STREET



PRINCIPAL FRONT



GROUND PLAN

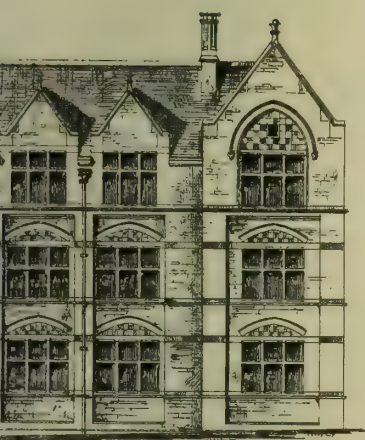


ONE

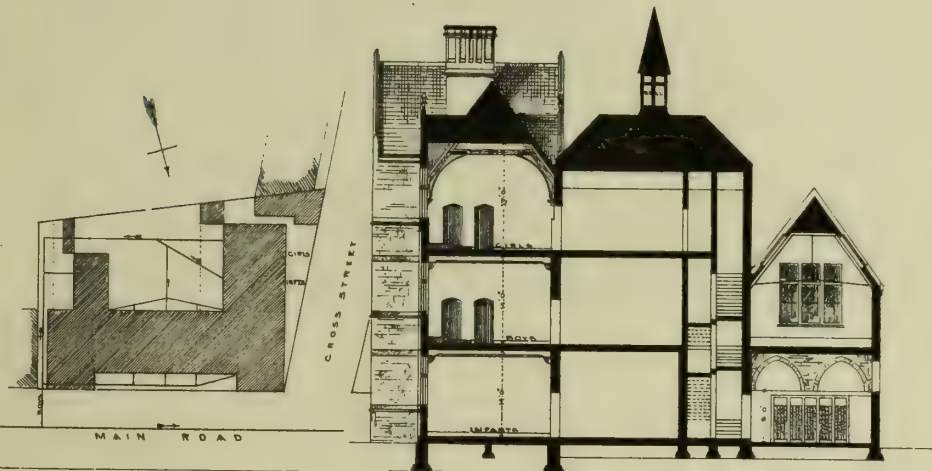
"NUNQUAM EXPES"

PLANNING COMPETITION.

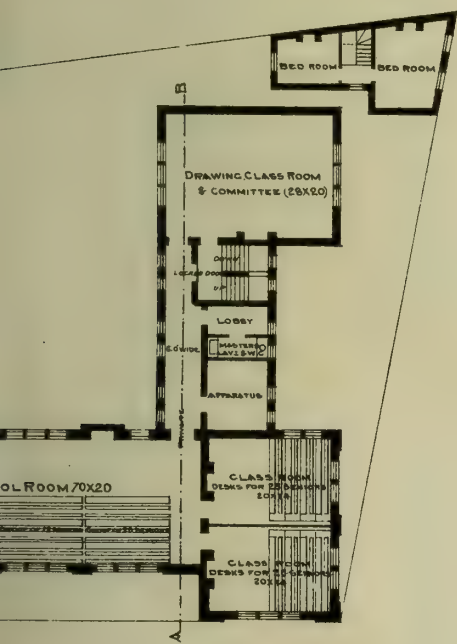
EDWARD STREET.



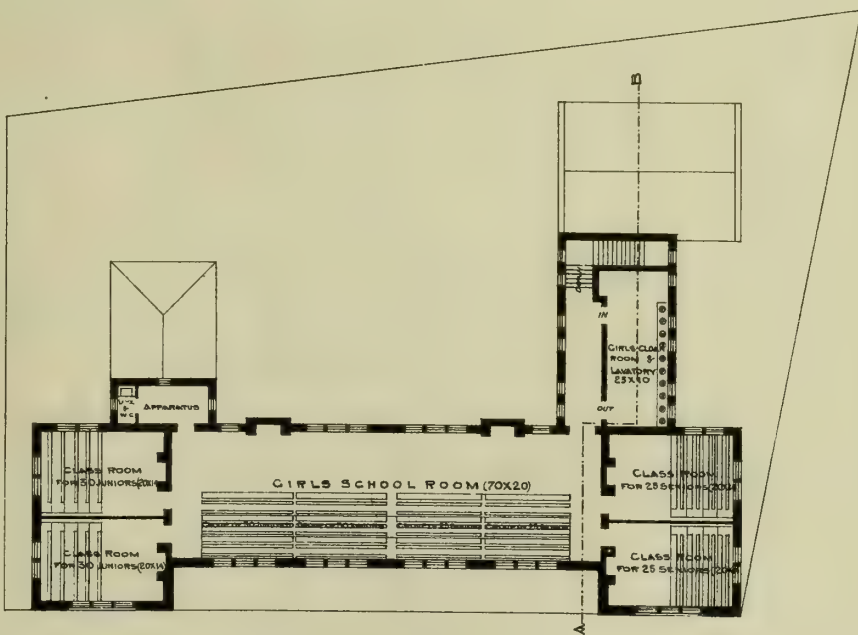
ELEVATION



SECTION ON LINE A. B.



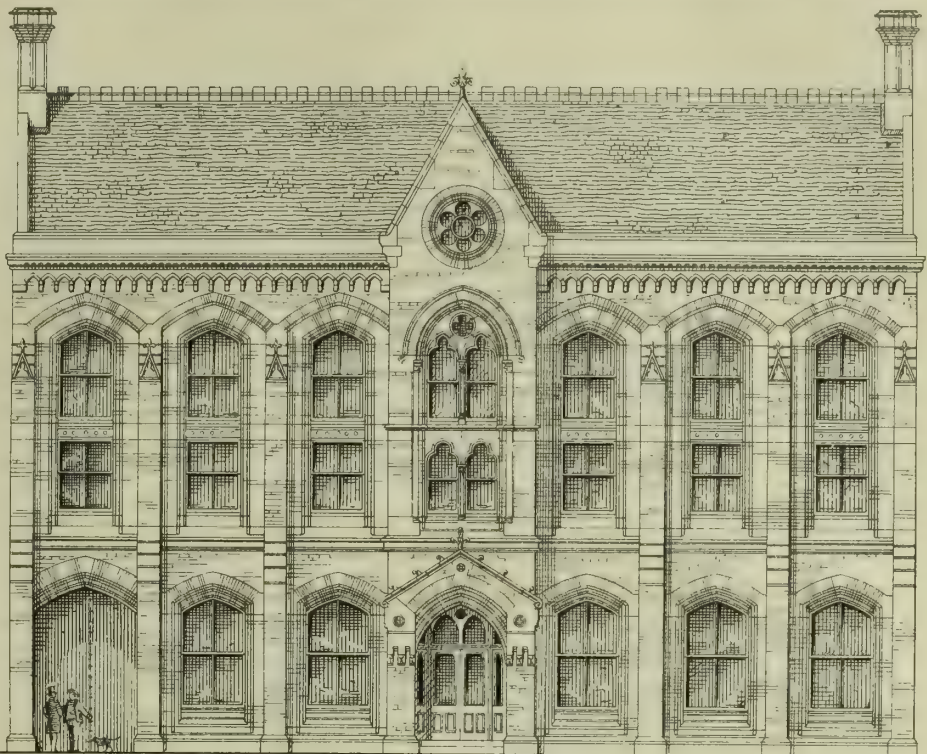
PLAN



TWO PAIR PLAN

NEW LIBRARY.
DR. WILLIAMS' GUEST.
GRAFTON STREET.
LONDON.

G. CHAPPEL & CLARKE.
ARCHTDS.

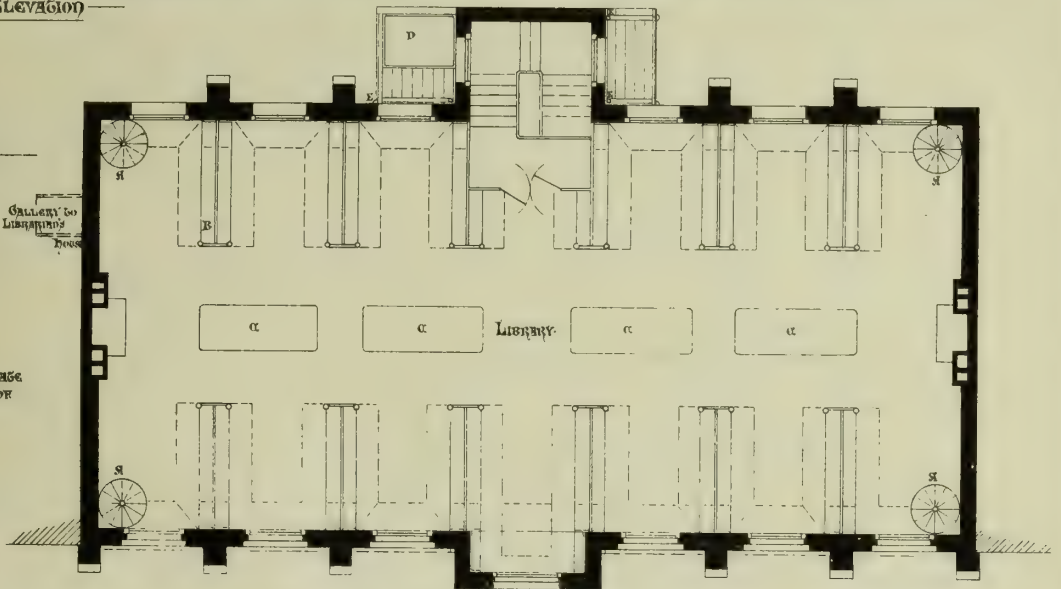


FRONT ELEVATION

UPPER PLAN

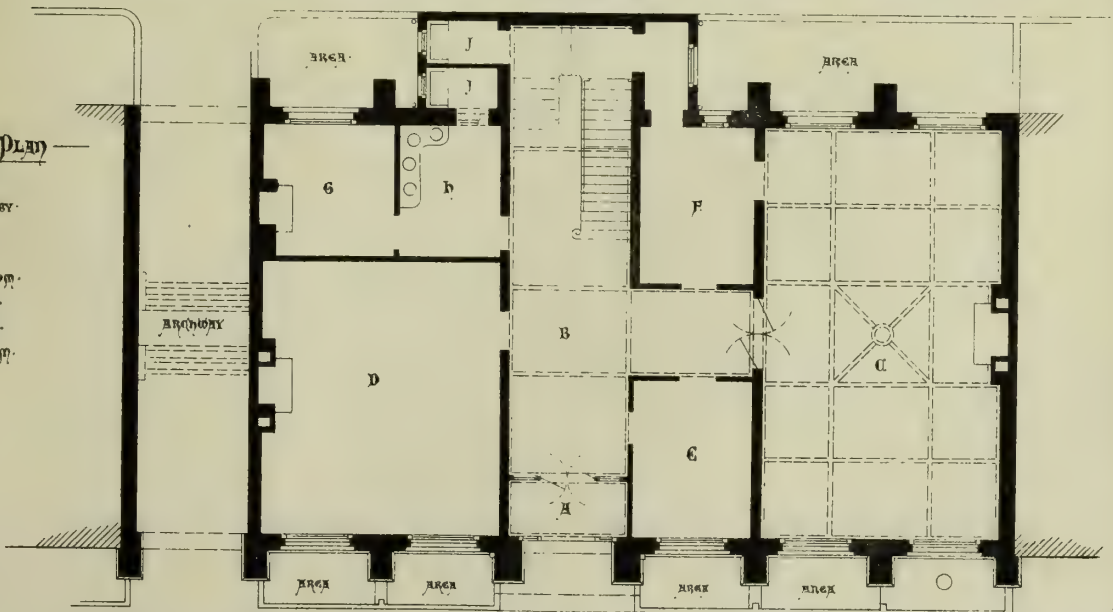
- A - Staircases to Gallery.
- B - Bookcases.
- C - Tables.
- D - Entrance.
- E - Rain-water Pipes.

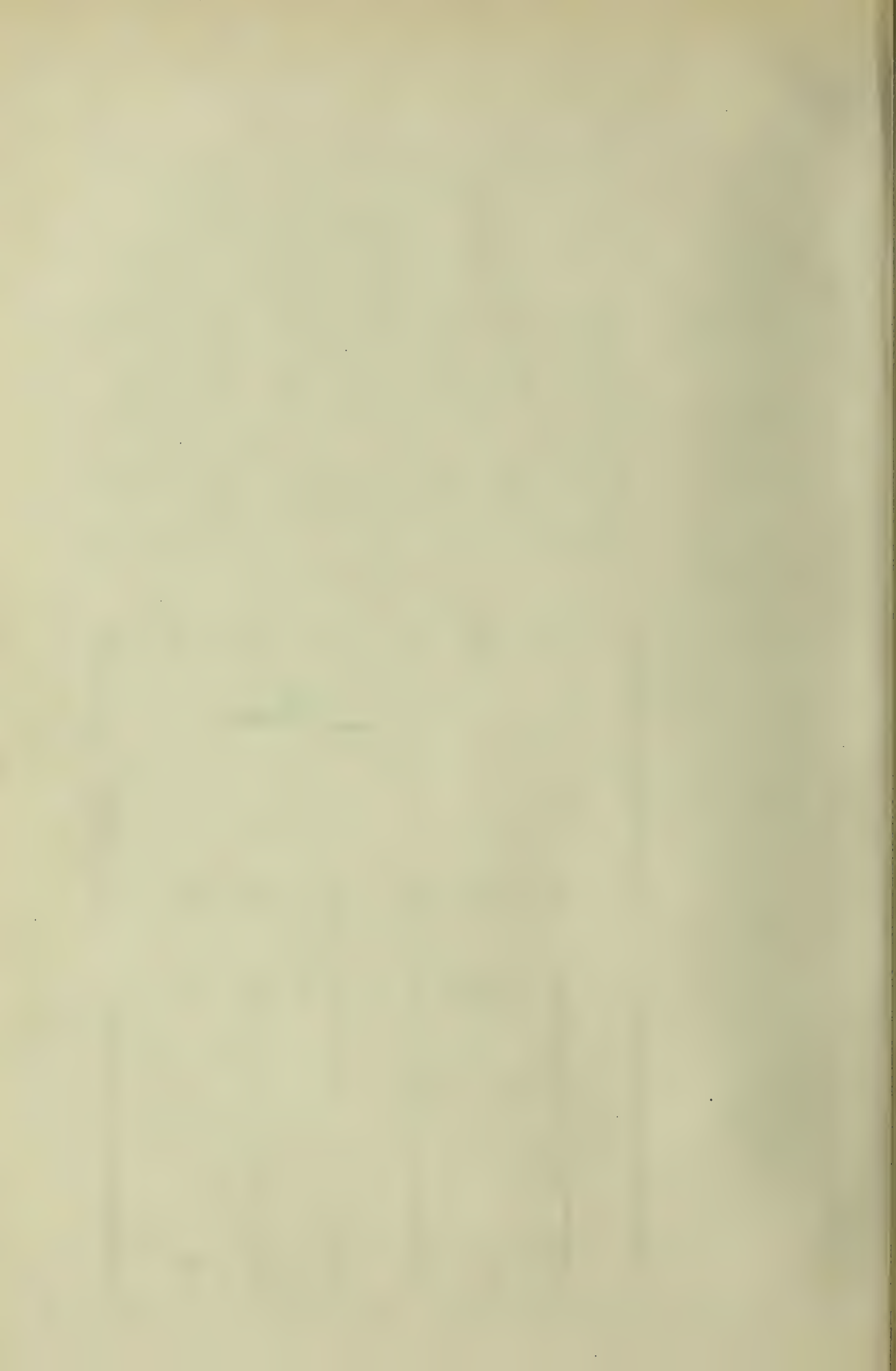
Note - Dotted lines indicate Galleries to receive books on Bookcases.



GROUND PLAN

- A - Entrance Lobby.
- B - Hall.
- C - Board Room.
- D - Committee Room.
- E - Waiting Room.
- F - Reading Room.
- G - Dressing Room.
- H - Library.
- J - W.C.





HISTORIC ART STUDIES.

BY DR. G. G. ZERFFI.

INDIA.—(With Illustrations.)

ART in India, as everywhere else, is the clear reflection of the ethnological origin of the people, the aspect of nature, and the religious as well as social conditions of man. Whilst "matter-of-fact" reality is the element of Chinese art, in India everything takes a dreamy and fantastic form. Whilst formerly it was enough to study the canons of Classic art, we, in modern times, are no longer contented to know that so many modules are required for the height of a well-proportioned column, but want to know much more. We have become extremely philosophical in everything—even in art. Whenever we contemplate a given form, we want to know why the straight line or the curve is used so, and not otherwise. Why rocks should have been pierced with an incredible amount of labour, in order to produce the Grotto of Ellora. Why the Temple of Chillumbrum, or the Choultry of Madura should have been constructed. We are affected by the inquiring spirit of our times; we want to every "Why" an answer. History has become as indispensable to art, as oxygen, in its combination with hydrogen, to water. No water without oxygen; no real art without a correct understanding and appreciation of the historical causes which influenced humanity at certain periods to construct, carve, sculpture, ornament, or paint in one form rather than in another. The artist who would try his powers at Indian or Classic forms, without being acquainted with the spirit that produced them, would be merely a dry soulless copyist; his reproduction would have the outer form of Indian or Greek pattern without their spirit, and a capacity to work independently in the spirit of a certain period of art would be entirely wanting. The first thing an artist has to do is to trace the origin of the nation whose works he intends to study. Our first question then must be: To what group of humanity do the Indians belong? The second: What is the nature of the soil the Indians live upon; how are they influenced by plants, animals, mountains, and rivers? and thirdly, What are their religious opinions and social condition? Upon the answers to these questions will depend the correct understanding of the gorgeous, striking, and imposing forms which we give in our illustration. We shall understand how intimately the peculiarities of a race are connected with the impressions of nature which are reflected in their religious conceptions, these again forming in their turn the very essence of their art.

The governing, literary, and artistic classes in India are undoubtedly Aryans. Their language is ours. Without the Sanskrit "pita" we should not call our sire, "father" (*pater, vader*), without "mata" we would have no *mater, mother*; "mother;" without "brhata;" there would be no *frater, brother*, "brother," and without "dubita" no *tochter*, "daughter." The word "badja," gave us "bed," "vidava" became *wittwe*, "widow," and "osmi," "osi," "osti," became *epui, esti, esti, sum es, est, bin, bist, ist*, "am," "art," "is." Philologically and ethnologically, the far distant Indians belong to the same group of mankind as we ourselves. By the everlasting law of attraction we have been driven over thousands of miles of watery high-road to seek for our Indian ancestors, and we, their children, have settled down amongst those who possessed a language, philosophy, and art at a time when we still tattooed ourselves. We try to renew our old relations with them, and to give them commerce, science, and a more humane social organisation. Unconsciously we are paying them a debt of gratitude for what they did in time immemorial for the higher culture and refined development of humanity.

The geographical position of the Indians is very peculiar. Their country consists of

receding terraces and valley-plains, traversed by three gigantic rivers, the Ganges, Indus, and Brahmaputra. The land forms a triangle, the point of which reaches into the ocean; the base being formed by the highest mountains reaching in eternal snowy brilliancy into the clouds. Visibly they had before their eyes the real seat of the gods—the *Merv*, or *Meroe*, or *Moriah*—to which fact we may trace the belief that the gods dwelt on the lofty summits of mountains, and that all the different laws and codes of revealed morality were handed down to the peoples dwelling in the plain from some misty heights. These lofty mountains, no less than the immense plains with their many-branched rivers, embracing earth with mysteriously winding arms, struck awe, terror, and a craving for the supernatural into the mind of the Indians, and filled it with the elements of the marvellous. The struggle of spirit with matter, and the incomprehensibility of both elements may be clearly traced in Indian religion and art. Flora and Fauna contributed to nourish on all sides not only a belief, but a positive conviction regarding the divine powers of nature. The visible water-artery of India, the Ganga, was personified as a goddess, taking her name from her majestic "gait" or flow, the German "going," English "going." The lotus-flower, which emerges from the water with the rising sun, imbibing the blue ether and the red tints of the morning dawn, and sinks into a watery grave at eventide, was transformed by the Indians into an emblem of the mysterious triad: creation, preservation, and transformation. Their fauna abound in obnoxious creatures; the tiger, leopard, lion, and above all the serpent, with its gliding treachery, filled the Indian mind with horror. The *Oran-utan* (man of the wood), believed to have been the aborigine inhabitant of Borneo, who lost his speech for blaspheming, furnished mankind—through the Indians—with the legends which we meet in the different records concerning Demons and Titans rising in overbearing violence against the Supreme Deity, and being vanquished and condemned to a lower kind of animal or infernal life. The elephant, again, with his silent sagacity, his superior intelligence became an emblem of Divine power and wisdom. Surrounding nature had much to do with the dreamy and metaphysical character of the Indians, who in religion and poetry as well as in art were addicted to the gorgeous, incomprehensible, incredible, and marvellous. When Manu gave his laws under the title "Manava-dharma-Sastra" (Manu's law-book), which purported to have emanated from the very mouth of Brahma, the Indians had already had their three holy Vedas for thousands of years; they had a language and a mode of writing which must have taken thousands and thousands of years, before the Vedas were written, to reach that admirable and complete form in which they were capable of expressing the most abstruse metaphysical conceptions. The Vedas are an abstract poetical dome, resembling the concrete rock-hewn grotto of Ellora (see Fig. 1), full of lofty grandeur and simplicity, bearing already the germs of later possible superstructures, which reach their acme in the Choultry (cloister) of Madura, built 1623 (see Fig. 6), when Brahmanism and Buddhism had swayed for thousands of years the Indian mind; when the simplicity of the Vedas had been superseded by a complicated mythology; when history and myths, allegories and facts, realities and dreams; changes in the organisation of society; wars, plagues, and famines; thunderstorms and earthquakes, were all interwoven into one inextricable chaos of imaginary marvels. This state of thought is clearly reflected in the superabundant varying patterns of grotesque ornamentation in the Choultry of Madura. We see, in our illustration, geometrical figures interspersed with winding and creeping plants, open and closed, leaves and flowers, impossible animals,

and innumerable gods and men, blessing, fighting, crouching, and praying. Monsters engender monsters (see pillar, Fig. 7), adorned with a profusion of textile ornamentation; tassels and cords unite to produce new hazy creatures. It is as if we could see through one artistic stratum of forms another, always renewing its power of combinations and startling us at every turn with fresh surprising forms. As clouds are chased by clouds in a violent wind, so pattern chases pattern, form hunts form, visions dissolve themselves into other visions. All and everything is combined to produce an over-awing, oppressive effect. The delicate taste, the beautiful patterns in isolated portions of the ornamentation, and the variety of design, though exquisite in detail (see Cornices, Figs. 10 and 11) fail to make a general impression of æsthetic feeling; symmetry and proportion, and an intelligible simplicity in the combination of sculpture and ornamentation, are wanting. One perceives in the mass of columns, which are 124 in number, each made from one block of granite, with the exception of the capital and the too-much projecting cornice, the forms of the Himalayan mountain range. The long lines remind us of the endless plains of the Indian lowlands. The variegated Hindoo mythology, worked out by an ingenious and subtle priesthood, that knew how to combine divine mysteries and mystic abstractions; theogonies, and cosmogonies of every variety, clothed in wild hypotheses on a future state, diluted with philosophical and psychological theories, and wrapt in an incomprehensible situation, is distinctly reflected in these pillars; columns, and cornices, as also in the Pagoda of Madura, with its high, fantastically-terraced pyramidal entrance-gate the gopura, reaching a height of 153ft. in twelve sub-structures, emblematic of the twelve signs of the Zodiac (see Fig. 2). A nation that counted from Mahasmata to Ixvaku, not less than 252,539 kings; a nation whose two heroic national poems, the "Ramayana" and "Mahabharata," are composed of not less than 276,000 lines, about eight times as much as the contents of the Iliad and Odyssey taken together, or 25 times the extent of the "Niebelungenlied," must have built and ornamented in the way it did. Who can fail to be struck by the resemblance between Indian forms and modes of decoration, and those of the early ecclesiastical style of Christianity, especially in comparing the art production and architecture of the faith of the Indians as reformed by Buddha. The Temple of Vishvakarma, at Ellora (see Fig. 1), is more simple and regular. Two rows of octagon pillars divide the grotto into three aisles, expressive of the trinitarian idea of the Buddhists. Buddha was born of the Virgin Maja, he had to fly from his birthplace, and was brought up by shepherds, amongst whom he developed his contemptative powers. He preached equality of man, opposed the old divine laws of the Brahmins, on the plea that mere talk on supernatural matters was of no avail, and taught that God was everywhere, and must be especially studied in His works; that this world was a mere illusion; that the only duty of man was to pray, or rather, to sink into his own consciousness in order to feel his spiritual union with God, to whom to return was the only bliss to long for. These ideas are palpably reflected in the Buddhist temples. They were first hewn into rocks with gloomy piety, and an amount of patient labour which has been equalled only by the builders of the early Christian churches and the admirable Gothic domes and cathedrals. The pointed arch was adopted by the Buddhists, so much so that we advance no particular paradox in stating, that in the same way as Renaissance was a revival of Greek and Roman forms, Gothic architecture was but a revival of Buddhist and Egyptian temples, grottoes, catacombs, cloisters, and monasteries. The same spirit of quietism, and

the same contempt for this world, are to be traced in the plan, disposition, and ornamentation of the Buddhistic temples as in those of the Christian churches. The daylight was excluded from both. The altar is adorned with the quiet, contemplative form of Buddha, surrounded by ministering servants, and angels floating above him; it is surmounted by a globe-like structure, representing the water-bubble-like transitoriness of life; the two side aisles have flat roofs, whilst the arched nave represents the vaulted heavens, to which the mind of the believing masses is to be drawn by the concentric lines of the flat rafters.

Two elements form the basis of Indian art in general—wood-carving and weaving. Wood and ivory-carving was, without consideration of the material, transferred to granite and marble or tufa; and the textile patterns were carried out with all their delicate intricacies on pillars, ceilings, and walls; so that the columns look as if hung with costly shawls, and the ceilings as if carpets had been spun overhead. The columns (see Figs. 8 and 9) of the Choultry of Madura, constructed in a more modern style, look as though they had been manufactured by an ivory or wood-turner for some delicate purpose; they certainly do not convey the idea of supporting some powerful superconstruction.

Referring to the ground-plan of one of the four gates of the Pagoda at Chillumbrum, to the south of Pondicherry (see Figs. 3, 4, and 5), we find our statements still more confirmed. On a structure 36ft. high rises the pyramidal form of the gate, overcrowded with sculptures. The width of the opening of the gate is 21ft., its height 32ft. The walls are interrupted by four pillars, of which we give (Fig. 4) the side and (Fig. 5) the front view, which are also covered with sculptures. On the front we have a fluted column ending in a fantastic capital, surmounted by a powerfully projecting cornice; these pillars are united in pairs by a colossal chain. Chain, pillars, column, and cornice are all worked from one single block of granite of at least 60ft. in length. What industry, power, and patience the Indians must have employed in erecting such marvellous buildings to the glory of Brahma and S'iva! The general feeling which Indian architecture calls forth is that of astonishment. Our sense of beauty is rarely affected. As in their poems and philosophy, so in their religion and art: we are overawed by their power of working out and constructing Titanic conceptions. We see in all their products the tendency to use up concrete matter for the expression of abstract notions. Their monstrous divinities take their origin in the struggle to shape what is formless, to represent what can only be worshipped, but not brought into a visible form. The infinite substance from which all and everything emanates was to be carved or sculptured.

The emanation theory pervades every design of the Indian artist; there is nowhere rest and moderation; a succession of periodical developments is to be traced; but whether we divide their buildings into the Dravidian, Bengallee or Chhalukyan styles, or accept with the learned Brahman, Ram Raz, seven orders of columns (two of which are given in Figs. 8 and 9), the general features in all instances show a painful struggle on the part of the Indians to become masters of matter for an artistic purpose. In this they entirely fail. Harmony between form and material—between matter and spirit, is wanting. In studying their works of art we must always regret that so much industry, time, and material has been wasted to attain so poor an æsthetic effect. Art with the Indians is an everlasting absorption of the finite by the infinite. This element which is antagonistic to all real art, predominated in all they produced. A wild imagination, if not trained and cultivated, is as dangerous in art as mere technical skill without

imagination. In studying their mythology, poetry, philosophy, and art, we become convinced that they could do anything if once they were to sober down, and bring themselves to understand that in art there are certain rules which must be observed, and that any amount of technical skill will not make up for a want of æsthetic knowledge. We must learn how to regulate our inborn dynamic force of artistic productiveness, in order to effect something beautiful. Law rules the universe; law must also be traced and known in art. Our modern times must, through diligent historical studies, arrive at a thorough consciousness of these laws; for there must be a relation between form and material, spirit and execution, subject and treatment, with which we become only acquainted through a careful analysis of the social, religious, and poetical elements of the atmosphere in which certain art products have been conceived and executed.

A new court will shortly be opened at the South Kensington Museum, in which gigantic casts of works of Indian, Roman, and Gothic art will be exhibited to the art-students, and they will be capable of drawing comparisons and finding analogies between Indian and Gothic forms in the general treatment, the arrangement, grouping, and especially in the tendency to endow forms with some higher spiritual essence. In this the Indian artist did not succeed. Gothic art had already to deal with a humanity freed from the fetters of matter, "in abstracto" through Christ, and "in formâ" through the Greeks, and was therefore enabled to be more intelligible, though it often lost itself in mere technicalities, neglecting the idealisation of matter.

ON THE FIGURE-SCULPTURE IN THE ARCHITECTURAL MUSEUM.

LECTURE II.*—EARLY CHRISTIAN, BYZANTINE, AND EARLY NORTHERN SCULPTURE OF THE MIDDLE AGES.

MR. J. F. REDFERN delivered his second lecture on this subject at the Royal Architectural Museum on the 1st inst. After giving a brief summary of what he had said in his first lecture, he said that in this lecture he had first to consider a period in art which had to grow out of a state of things where the mind was for the most part at war with nature, and in the deep and passionate struggles between the two, the plastic arts, at least, while often assuming great beauty of expression, never rose to perfection; but it was in this, its very imperfection, that the charm of Early Christian art lay, for its very failures to reach to the extent of its aspirations showed how much higher was its aim than that of any art produced in any former time. The greatest danger that the Early Christians had to fight against was the sensually-passionate and depraved state into which the antique world had sunk, and the natural reaction to this resulted in asceticism—that crucifying of the flesh which waged war against all beauty, and even went so far as to declare that the Son of God appeared on earth in a form of positive ugliness. From His faithful disciples, however, we knew that a different and loving tradition descended; but when the desire came to produce His human form in art, both the plastic arts and painting had sunk to so low an ebb that any truthfulness of resemblance could not be attained. It was true that Alexander Severus gave orders for the execution of a statue of Christ, but if this was ever produced it undoubtedly appeared in the form of some antique god—most likely Apollo. The earliest representations of Christ that had come down to us, indeed the earliest works of Christian art, were to be found on the sarcophagi at Rome, but there we could trace no attempt at actual resemblance. The figure was invariably youthful, beardless, and, like the rest of the work, in a genuine antique style. The favourite manner of representing Him was either as Christ the Teacher or Christ the Good Shepherd. He also frequently appeared as performing His miracles, and the

Adoration of the Magi was constantly represented; but scenes from the Passion were almost entirely omitted, with the exception of two—Christ before Pilate, and Peter's Denial, the characteristic cock in the latter subject always forming a great feature. Many scenes from the Old Testament were represented, but the most favourite were the Offering up of Isaac and Daniel in the Lions' Den. From this choice of subjects it would be seen that such as were theological or dogmatical were avoided, but those which simply pointed to the certainty of redemption, or man's unworthiness of that redemption, were selected. Sometimes among these sacred subjects were introduced some of a purely Classical nature. For instance, side by side with the Good Shepherd was a Cupid and Psyche in loving embrace, or Ulysses tied to the mast of a vessel and straining to join the alluring sirens. The first had evident reference to the soul of man, and the last pointed to the temptations of the world. It should be remembered that the first efforts of Christian art, as well as that of Greek art, were exhibited in the production of symbols and emblems. As used by the Christians, these were very few and simple—the cross, frequently combined with the lamb or the monogram the Alpha and Omega, the fish, the dove, the peacock, the laurel-wreath, the vine-stock, and the palm. On some of the sarcophagi one or two of these emblems repeated formed the only embellishment; on others it would only be an intertwining of the vine, with numerous genii pressing the grapes, which evidently was taken from antique myths, but adopted from the frequent reference to the vine in the Scriptures. Others, again, had all these emblems and symbols combined, forming a simple and telling ornamentation, in the manner shown in Fig. 4 of our page of photo-lithographic illustrations. The spirit of these works, both figures and ornament, was quite that of the antique. The style, attitudes, and draperies of the figures were identical with the old work, but, above all, that pregnant and simple treatment of employing as few figures as were absolutely necessary to tell the story, was rigidly retained—an example which we might follow with profit at the present time. There was but one thing in the treatment of these works which distinguished them from the antique, viz., the combining of several incidents in the same scene. Thus the subjects were generally arranged in two continuous rows, as shown in Fig. 1, with perhaps the portraits of the deceased introduced in a shell-like frame in the centre. Occasionally they gave to the arrangement an architectural character, separating the scenes by columns, and covering them with shell-like arches, as shown in Fig. 2; but the former frieze-like arrangement was the more general, the latter being found to occupy too much space. All these works, of course, were in relief, but there were a few separate statues of this period still in existence at Rome, representing, for the most part, our Lord, as we found Him on the reliefs. But by far the most important of the Early Christian statues was the large bronze figure of S. Peter, at S. Peter's in Rome (shown in Fig. 3). It was produced about the fifth century, and showed an amount of technical skill and truth quite surprising for that time. It could not, however, be called an original work, for every line betrayed it to be a close copy of some antique senatorial figure; it had, however, exercised influence in forming some characteristics of Mediæval art, the head, with its short curly hair, the stubby beard, and general fretful expression of face being the type by which we recognise the Prince of the Apostles in subsequent art. The left arm was folded in the drapery in that sling-like manner which formed such a feature in the disposition of Gothic drapery, and the thighs were sloped and shortened in the manner invariably seen in succeeding seated figures, the upright attitude of the body which was adopted being often exaggerated afterwards. Another work of importance of this period was the statue of S. Hippolytus in the Museum of the Lateran, but its general treatment was very like that of the S. Peter. Although painting was practised in the Catacombs almost as extensively as sculpture, yet it might safely be said that Early Christian art, like Greek art, had its beginning in the plastic arts; but while the glory of the Antique ever remained in its sculpture, Mediæval art soon found its strength to lie in painting, and sculpture, as early as the Byzantine period, had to sink to the second place, where through all the middle ages it remained. Not only did it take this second place, but it

* Lecture I. was reported and illustrated in the BUILDING NEWS a fortnight ago, and on another page of this impression will be found illustrations of some of the works described in this second lecture.

borrowed most of its characteristics from the dominating art. All who desired to thoroughly study Mediæval sculpture should therefore give equal attention, if possible, to the sister art of painting during the same period. About the time of Constantine numerous general laws were imposed upon architecture throughout the Roman world to restrain the Oriental gorgeousness which had then crept into use. But when the capital was transferred to Byzantium, these bonds were relaxed, and the arts, under the direct influence of the East, soon sacrificed the beauty of line and form to the overwhelming masses of colour and ornament, and sculpture sank into all but insignificance, the small ivory carvings, such as diptychs, by which we knew Byzantine sculpture best, being for a long time the only carved productions of the Eastern metropolis. Not that no larger works were ever produced in Byzantium, for the monument which Justinian erected in 543 was one of the most colossal works ever produced. The small ivory carvings referred to, apart from anything that might be learned from their style of art, were really interesting as showing the influence they had on the subsequent form of altars and altar ornaments. The style of these works in their ornaments and architecture was after the Antique, but the figures, year after year, became further removed from the perfection of the old work, till at last they became more stiff and motionless by far than the earliest efforts of Greek art, and they were generally not much improved by the draperies being overloaded with embroidered and other patterns. Sometimes, however, the figures were improved by being overlaid with this ornament. Fig. 6a, for example, although simple, certainly had not the simplicity of beauty in its naked outline; but when the beads and diapers, &c., were added, as in Fig. 6b, it became quite a respectable figure. After the sixth century Byzantine art for several centuries spread over almost the entire West, but sculpture, as combined with it, never attained importance at any time or anywhere. Romanesque work was at first severe and simple, its large smooth surfaces only giving scope to painting, but afterwards it began to admit a profusion of ornaments, and sculpture, now become very rude, but, in grouping at least, still very ingenious, was again united to architecture, and as a natural consequence, began to assume new life and vigour. In the first epoch of Romanesque work, what sculpture was then done was almost entirely confined to the production of small ivory carvings adorning the inside of small portable altars, after the fashion of the Byzantine triptych; but about the twelfth century, when the ornate Romanesque architecture (then freed from antique restrictions) was being adopted with enthusiasm, the plastic arts were pressed into co-operation to an unlimited extent—so profusely, indeed, that in succeeding styles of architecture certain limits on the use of carved work had to be enforced; for instance, the practice which in this period obtained of crowding the capitals with figure subjects was in later styles quite abandoned. The new kind of portal and *façade* adopted in the Romanesque gave the utmost scope to the sculpture, as in such works as Notre Dame de Poitiers, for instance, which was one immense bas-relief, extending from the basement to the summit of the frontage. The altars, pulpits, and screens were now all embellished with sculptures, and the old metal fonts had now to compete with the richly-carved stone ones which were now used. It was, perhaps, by these fonts and the carved tympani of doorways that we in this country were made most familiar with the sculptures of this period, which, while admirable for a certain quiet dignity, were exceedingly rude, and showed but little evidences of a definite conception. In the museum there was a cast of the most celebrated font of this period that we had in England, *i.e.*, the old black marble one at Winchester, and Fig. 7 represents one at Kirkburn Church, Yorkshire. It would strike the observer how this and kindred works resembled the Early Christian sarcophagi in the setting out of the subjects; there was the same economy of space, often identical in the ranging of one row of figures above another; the same running of one scene into another; the same pregnant manner of telling the story; but how different was the execution; every vestige of antique truth was lost, and grotesque disproportion became the rule (see Figs. 7 and 8). In Fig. 7, the man leading the fox was nearly all head, and this poor attempt at the human figure was seen in conjunction with the near approach to nature attained in the animal figure, and a similar result was

seen in most examples of this period where man and beast were illustrated together; indeed, this did but illustrate a well-known characteristic of all primæval efforts, from the Egyptian downwards. In Fig. 8 the limbs of the angel and fiend engaged in weighing souls were drawn out to great length, and the head was very small. The nimbus was first introduced in the Byzantine period; at first it was very large, and set low down behind the head; but during the whole of the Romanesque period it was rarely given to any figure but that of Our Lord. Sometimes no circle was used, but simply a cross behind the head, as shown in the upper part of Fig. 7. At no period of Mediæval art was profound symbolism so much affected as during the time of the Romanesque; and hence the most often-repeated subject was that of the Majesty of Our Lord enthroned and encompassed by the vesica, the rainbow at his feet or forming his throne, and in his left hand a sceptre, orb, or book (more often the latter), while the right hand was raised in benediction. Occupying the four angles formed by the outline of the vesica were invariably to be found the emblems of the Four Evangelists, and sometimes Cherubin and Seraphim; but these last were greater favourites with the painter than with the sculptor. A fine example of a "Majesty" was the one at Durham, shown in Fig. 9. The dignity of the figure was very great, and the composition of the Evangelistic emblems could scarcely be improved. One thing to be studied in Mediæval art—perhaps the thing of all others—was its excellent drapery, and the mode in which this was treated in seated figures was well worth notice. In the seated statues of Egypt, Assyria, or of Early Greece, there was little attempt to bestow the drapery covering the lower part of the body in anything but parallel lines to the limbs, and it was just so with the earliest seated figures of the Romanesque period. In the right of the tympanum of Barfreston Church there was an instance of this treatment of the drapery. Egyptians and Assyrians might be said never to have departed from this mode, but the Greeks and Mediævalists soon did so, and the example from Durham (Fig. 9) was a successful effort to get some cross-fold to give the required unity in the composition of the figure, and we have here the diagonal leading fold between the knees which afterwards became such a feature in Gothic drapery. The chief characteristic in this drapery was its winding ropy nature, following the course of the limbs, as particularly shown in Fig. 5, and this was but the crude rendering of Classic lines. At no time in the middle ages were the people more deeply sunk in superstition than during this period; hence grotesques and goblin-like forms of all kinds were very abundant. About the latter end of the twelfth century the sculpture in central France began to gain in excellence with the changes which were being wrought in architecture—changes which were soon to develop into the glorious style which we knew as Gothic. At Chartres we found the best evidence of this commencing vitality, and there was to be seen for the first time a perfect system of arrangement of subjects so as to form an intelligible scheme; but the ruling laws of the architecture were so strong that sculpture had to be the veritable slave of her exacting mistress. A glance at the column-like figures of the portals of Chartres would show this; yet from this subjection there was about to spring the freedom and life in the plastic arts, the advent of which will be treated of in the next and concluding lecture.

ON THE APPLICATION OF ARCHITECTURAL DESIGN TO ENGINEERING WORKS.

AT the ordinary fortnightly meeting of the Civil and Mechanical Engineers' Society on Friday evening last, a lecture was delivered on this subject by Professor Kerr, Mr. C. W. Whitaker, President, in the chair.

Professor KERR, in commencing, introduced his subject by showing that architecture was artistic construction, or, in other words, graceful and decorated building. Grace embodied in the structural contrivance, and grace superadded, were necessary in the form and ornamentation. The enjoyment of art was therefore nothing more than the perception and appreciation of the effort made by the designer to please by means of the introduction of the element of grace. It was therefore, obvious that the building work of the en-

gineer should be, equally with that of the architect, the legitimate subject of graceful design, *i.e.*, of art. There would so far, indeed, be absolutely no difference between the engineer and the architect, the distinction between those two classes of building designers being only one of convenience in the division of labour, whereby the architect devoted himself more to ordinary house-building, and all that was connected therewith, and the engineer took up the more simple and massive order of undertakings, such, for instance, as bridges and quay-walls (leaving out of the present question such works as canals, harbours, and railways), and those collateral works which, although pertaining primarily to the architects' province, had been recently carried to an unusual pitch of advanced mechanical contrivance, such as the great roofs. But there was no reason why engineers' work should be ugly, as was sometimes thought it must be, because it was taken out of the hands of the architect for convenience. Not only should it be not positively ugly, but it should be rendered positively graceful. To this end it would not be enough merely to take the ordinary details of architectural design, and apply them, somehow or nohow, to the engineer's work. The Professor said he was old enough to remember when a book was to be had which treated of the application of the Five Orders of Architecture to the steam engine, so that one could have an engine of the Doric, Ionic, or other style, according as his so-called "taste" dictated. This, however, was radically unsound in principle, because the subject so treated was one of mechanical engineering, and therefore out of the architect's range altogether. But, in like manner, the mere attachment of columns and a bit of entablature, or of the corresponding features of Gothic work, to the piers of a bridge, was little less objectionable, because the treatment was a sham as regarded the proper purposes of the architectural work so applied. Above all things in engineering, there should be no shams; the existence of the construction, in all its articulation, was essential, and the art of the matter must be inflexibly based upon the fundamental condition that it was to be involved in the science of structural contrivance—admitting, in fact, of no modification thereof except the minimum of necessity to meet the requirements of grace as a subsidiary element in the contrivance. Much had been said about a new style, as if it only required a sufficiently intelligent effort of will to invent an entirely novel method at request; but nothing of this sort could be achieved in any art, and in architecture particularly it required the concurrent influences of a variety of essential purposes to produce anything really new. Herein consisted the chief advantage of the proposal that engineering should be made artistic, for in engineering we had new purposes. The objects of the work were frequently altogether different from those of past architectural effort; the materials, either in themselves or in their application, were often different, and the manner of conducting the scientific design, if not new in mechanical principle, was in many kinds of work quite novel in administration. This it was which more than any other consideration encouraged the lecturer to press upon the engineering profession the necessity for rendering engineering works artistic. He said he proposed to divide his subject under four heads: (1) Wall-work, (2) Arch-work, (3) Iron Truss-work, and (4) Iron Girder-work. These four divisions would include almost, if not quite all, the varieties of construction and design which needed to be looked upon as being essentially involved in the subject. With regard to the first division, Wall-work, there was less to be said than in the case of the other divisions. It might further be suggested that in this particular matter the resources of architecture were exhausted. For three thousand years, to our certain knowledge, men had been continuously working at the more or less artistic designing of wall-work. It was perhaps the first and foremost of the subjects of ordinary architecture, and taking into view the wall-work of the Egyptians, that of the Greeks and Romans, that of the various schools of the Mediæval period—Byzantine, Romanesque, Gothic, and Saracenic—with all that had been done in the present or modern European era, there seemed to him no field in which the engineer could hope to introduce much originality. At the same time, as regarded that novelty of purpose which was spoken of as the essence of artistic treatment, he felt that even in wall-work there was a peculiar majesty and great massiveness in certain en-

gineering projects which, if fairly taken up in the artistic spirit, might produce an interesting character equivalent to novelty in a certain sense. And here probably the Egyptian type of treatment would be found the most suggestive, owing to its great simplicity and its Herculean characteristics of detail. [The Professor here illustrated on the blackboard the mode in which the Egyptians disposed their typical wall, with a batter on the face, and a plainly-covered crowning course or cornice, and no stylobate, comparing this with the Greek mode of treating perpendicular faces with stylobate and entablature.] Asexamples of architectural wall-work taking the place of what too many engineers and others at the present day would make crude plain stone or brick facing, the lecturer showed the mode of treatment adopted in the Roman Coliseum, the Bank of England, and Newgate Gaol, and pointed out the application of artistic principles therein visible. The lecturer concluded his remarks on this section of his subject by suggesting that sculpture on a colossal scale, probably in *basso-relievo*, might be attempted with great promise. If he had a vast expanse of naked wall to deal with, nothing would delight him more than to hand it over to the sculptor, with directions to trace thereon the outlines of some stupendous figure-work, and then simply go to work and cut it in low relief, like that of the Egyptians, to stand before the multitude in its sheer vastness and simplicity. Turning to the second section of his subject, viz., Arch-work, the Professor said he felt bound to acknowledge that it was in Mediæval architecture that arcuation was carried out to perfection. At the same time it should not be forgotten that the Romans had previously introduced the mode, and had pursued it with great success, both structurally and artistically, as shown, for instance, in the Coliseum *façade* before referred to. Speaking to engineers, he knew they would understand him when he pointed out that the pointed arch was essentially stronger than the semi-circular form. Still, Mediæval building, with all its wonderful and elaborate system of counterpoise, was but crudely designed as regarded what we should call science—in other words, Mediæval science was in such a backward state that few, except archaeologists, would recognise it as science at all. Gothic work, in short, was done very much by rule of thumb—arrived at tentatively; and a great many churches which were not strong enough to stand had disappeared. Those Gothic buildings which existed at the present day were merely those which happened to be better built than others which had fallen. The Mediæval men, for instance, knew nothing whatever of the truss. But the excessive lightness of their arch-work was most remarkable. This characteristic of complete lightness, however, was obviously a step in the opposite direction to the simple majestic repose which seemed so essential to the idea of engineering arch-work rendered artistic. At the present day, unfortunately, Gothic work—more particularly as practised in secular buildings—was too often rendered ugly of *malice prepense*; it was intentionally ugly, for the sake of violating what were considered to be the effeminate rules of the Neo-Classic mode. The “muscular Christians” of the modern Gothic school sought to cure this effeminacy by showing the world how masculinely ugly they could make their buildings. If the engineer’s work was to be ugly, let it be ugly because he could not make it present a better appearance. One characteristic difference between Gothic and Classic was one which engineers would readily appreciate—namely, the difference between the merely picturesque and the architectural. The latter word was a pet phrase of the lecturer’s own, but he maintained that it had a meaning which could not be expressed by any other term. “Picturesque” was the character of being picture-like, and “architectural” was the character of being architecture-like. If engineers wanted to make their work picture-like, he had nothing to say against their adoption of the Gothic style; but if they wanted to make their work architectural, they would not, in his opinion, adopt that style. Mediæval work was picturesque or nothing. On the other hand, Classic buildings—such as the Bank of England, the Royal Exchange, and Somerset House—were characterised by architecturalness, possessing a character of repose which was totally independent of picturesqueness, and which could scarcely exist in common with it. It would, he thought, be suicidal for engineers to

fix their attention upon the Gothic style of the present moment as the *point de depart* for rendering their works artistic. If their works were to exhibit any real feeling for art, they must develop a new style of their own, suited to the special circumstances of their work; and he ventured to say that for the basis of such a style, engineers must look to Neo-Classic work (or, in other words, to the Modern European style of architecture) as their type. It was from the comparatively solemn, muscular, majestic work of the Classic type that engineers must expect such a development as would suit the circumstances of their works. With regard to arch-work particularly, one thing that had never been done in architecture, but which it was open for engineers to do, was the equilibration of the arch. Increasing the depth of the voussoirs from the haunches to the crown of the arch was clearly not the thing, and where it was done, it was obviously nothing in the world but a mere piece of show, manifestly unscientific. There was no reason whatever why engineers should not equilibrate their arches, and show it honestly; and particularly, there was no reason why they should not treat in the most artistic way their bridges upon the very basis of the equilibration of the arch. Coming thirdly to the question of iron roofs and trussed work, the Professor remarked that this was ground more peculiarly modern. Such a thing as a truss was unknown in the middle ages. In Mediæval work, the tie-beam, strange as it might appear, was always a beam. It was never in tension, but was always subjected to cross strain. The king-post also in those times was a post, and was in compression, not tension. Nothing could be more remote from trussing than that system; and nothing in mediæval carpentry was much better than that. The great arched ribs of the middle ages derived their strength from being pinned together in the manner of our own semicircular ribs. The idea of trussing, like all other good things which belonged to modern European enterprise, was discovered in Italy in the sixteenth century. He was glad he was speaking to engineers, for architects would not believe this; they were too often lost in the whims and fancies of mere archaeology. The truss, then, was the product of the Classic, or rather Neo-Classic period, i.e., the period of the fifteenth and sixteenth centuries, because Italy of that period was the cradle of our age in architecture as in all other things. Of course we had made immense strides in construction from the primitive truss of the sixteenth century in Italy to the wide-spanned spider-weblike roofs with which we were now so familiar at our railway stations and elsewhere. The introduction of rolled iron had been not only the making of England as regarded railways, but it had been the making of engineers as regarded trussing, allowing them to introduce scientific construction to the utmost limit. It was a curious fact that trussed roofs had never been thoroughly architecturally treated, and the reason of this might be profitably inquired into. He did not know, for instance, of any ordinary roof truss which had been artistically treated in itself, showing the articulation of its construction honestly, and yet presenting elegance of appearance throughout all its parts. Suppose the architect were to set himself the task of rendering the truss architectural, the first consideration was that the conditions of the most absolute science should not be sacrificed to design. Art was not to supersede science, nor was it opposed to science. Art was merely something which was introduced as an element of pleasure, incorporated with and not merely super-added to science, its introduction modifying the forms of science a little, although very little—only just sufficiently indeed to secure the maximum of artistic effect with the maximum of scientific strength. In treating a truss artistically, therefore, it was necessary, in the first place, to design it in strict accordance with the necessities of scientific construction. Art should be introduced into it only in such a way as to suit certain modifications of the scientific forms, always remembering that it was better in works of that kind to sacrifice art to science than science to art, although in the generality of cases the two might go hand-in-hand, without the necessity of sacrificing either. Taking next the case of road bridges, the Professor said he supposed the day had gone by for making such bridges with cast-iron ribs. But in the case of a built-up iron girder in the form of the arch, how ought it to be treated? To take the beams divided into the proper number of lengths in imitation of stonework, and so connect

them, was not art. The circular form had, in reality, nothing to do with the theory of such an arch. The circular form of the arch was that in which it became ultimately developed in stone, provided certain conditions were fulfilled, and not otherwise. It was a great mistake, therefore, to set out an iron road-bridge on the segment of a circle and there leave it. The intrados of each beam ought scientifically to be straight or convex, and why then should it be made concave? It was utterly wrong in principle to take the mere form of the stone arch as the model for an iron bridge. A stone bridge assumed the circular form merely because the voussoirs were so short that it was not worth while to make them straight at the intrados. With regard to suspension bridges, Professor Kerr said he did not think that anything like the principles of architectural design could be applied to them, because they were obviously more of the nature of mechanical engineering works than of what he might term architectural engineering works. It was of course true that the piers might be rendered architectural features, and the roadway might be treated to some extent on architectural principles, but he did not see how it was possible to treat the chains architecturally; it was obvious, indeed, that no architectural principles could be applied to chains. With reference to the great iron roofs of which so many examples were now to be seen, the Professor said that if there was any one description of engineering work which ought to be rendered artistic, it was these great railway station roofs. There was no reason in the world why such structures should not be rendered elegant and graceful in the extreme, inasmuch as they possessed primarily in themselves all the elements of gracefulness, impressiveness of outline, and grandeur of form; and it would be possible to introduce something at any rate, of an artistic nature, without materially adding to the cost. Excepting at the Great Western Station, Paddington, scarcely anything had been done in that direction. He considered Mr. Barlow’s roof at St. Pancras Station to be in itself one of the most elegant roofs he had ever seen; still, no attempt had been made to introduce art into the work. He did not blame engineers because they did not introduce art into all their works, for, like architects, they had to abide by their instructions, but he thought that they might often do better if they knew how, as of course they generally had unlimited funds to deal with. (laughter.) In endeavouring to render such roofs as he had referred to artistic, the articulation of the construction should always be left apparent. If the construction were concealed, the chief element of proper building art was destroyed, and the domain of sham was entered; and when once shams were resorted to, it was impossible to tell where their employment would end. He could not but reiterate, most emphatically that the first great rule was to exhibit the science honestly and faithfully, however much they adorned it, and to be by no means ashamed of true construction. In trussed work it seemed to him that there were two new elements quite capable of being made the basis of new means of architectural design. Firstly, there was the rodwork, comprising the slender iron tie-rod performing the duty formerly undertaken by the cumbrous tie-beam, and the king and queen rods, fulfilling the duties of the old king and queen posts. At the same time, within such limits as those to which it was usually applied, it introduced a new element which must be treated on new ground. No architectural ornament would do for a rod, unless it was something derived from the brass pipes with which candelabra were suspended, the application of this kind of treatment being quite out of the question for the rods of our great iron roofs. Rolled sections of iron, again, were a novelty in construction, and any application of art to them must be on an entirely new basis. Indeed, the invention of a new style of construction—a method suited to new materials and conditions—was a problem really in the hands of engineers. The Crystal Palace might be said to have introduced, almost by accident, an entirely new mode of wall construction—an iron framework filled in with glass—a method of construction which was capable of being developed into something extremely graceful and beautiful. The worst feature, artistically, of the generality of that class of work was the arceding, not but that the *ensemble* of the arcade was exceedingly good, but it was not the result of constructive necessity, and why should the form of the arch be intro-

duced in such work merely for the sake of customary outlines? Such an appropriation of forms was not art. The Crystal Palace style of work properly consisted of uprights, cross-bearers, and brackets to shorten the bearings between the uprights. Why, then, should not the Crystal Palace arches be made brackets in outward appearance as well as in constructive reality? This Crystal Palace work was an apt illustration of the danger of introducing architectural forms into the ironwork of engineers' structures; although it was questionable whether the results would have been surpassed, or even equalled, had an architect been the designer. With regard, lastly, to girder work, it should be remembered that a built girder of plate-iron was comparatively a constructive novelty, although it had been in use long enough to make it discreditable to architects and engineers that no attempt had been made to render it ornamental. He remembered some girders of this kind which he himself had put in about twenty years ago at the offices of the National Provident Institution, in Gracechurch-street, which he thought afforded satisfactory evidence that plate girders could be ornamentally treated in architecture; but very few attempts had been made in this direction since. It was very easy to attempt art in this way, and yet to pay due regard to all the requirements of constructive science. Here, again, he would repeat (for it could not be too often reiterated), that it was necessary, first, to design any work of engineering in strict accord with the absolute necessities of science; and then the same work might be re-designed, so to speak, on another sheet of paper, retaining all the essential constructive features, and modifying the forms only so far as would be necessary to render the constructive perfection agreeable to the eye. In a plate-iron girder the work of the structure was performed by the flanges, the web doing nothing more than to hold the top and bottom flanges at a certain distance apart. The diagonal braces of a lattice girder fulfilled the same office, and the work, therefore, might be open or pierced, because there was no need for the web to be solid. Why, then, should not the webs of plate girders be pierced in varied patterns, or *guilloches*. A web pierced in this manner would serve all the purposes of a solid web, and would present a very pleasing appearance. It was difficult to account for the thing not having been more generally done, especially as the extra cost would not be great. As to the flanges, they were very generally put together and rivetted in an exceedingly rough, not to say unworkmanlike manner. A little more finish and neatness in the workmanship would vastly improve the appearance of plate girders. Every rivet might be made ornamental. In the girders before referred to, the Professor said he had caused a little patera to be screwed on to the head of every rivet, and these, being gilt, presented a very good effect. A box girder might be ornamentally treated by attaching light iron castings or wrought-iron scrollwork on the outside of the webs. Lattice girders, which were now so largely used, were capable of being rendered particularly artistic, and something more pleasing than the ever-recurring diamonding on a huge scale ought to have been done before now. At a glance, it seemed to him that if architecture were applied to lattice-work, very little trouble and expense would suffice to make lattice girders most beautiful objects in detail, instead of being left, as at present, in all their nakedness; but it was of no use to stick on a few wretched castings, or to rest content with facing the abutments or piers with polished granite shafts. Tubular work was the last he should mention, inasmuch as it presented a comparatively restricted field for anything like treatment on architectural principles, although it had produced objects most imposing in their character, and was possibly destined to produce still more majestic and magnificent structures. Of course, outline was the important consideration in such works as these, and what ornamentation was used should be simple and grand. But why should an ordinary railway viaduct crossing a street be so intolerably ugly—almost intentionally ugly—as was usually the case? Such structures as he was referring to, the engineer might surmount with a cornice—not an architect's cornice, but an engineer's cornice (a thing yet to be invented)—and below he might have his sill moulding—also yet to be devised. Between these he might fill in with good bold ornament in relief, and so render the structure beautiful. In this connection the sculptor might

advantageously assist the engineer by modelling relieves, to be cast in metal, or even hammered out. A few figure-subjects might be so used with marvellous effect. In conclusion, Professor Kerr again enforced the necessity of designing artistic engineering work in the right and only way. He would first design the work on one sheet of paper as at present, with regard solely to the necessities of scientific construction. These requirements fulfilled as it were in the skeleton, their constructively-perfect forms should be translated, so to speak, into what would be essentially the same forms slightly modified to suit æsthetic requirements. The ornament should not be designed first, and the construction suited to the ornament, nor should the construction be merely clothed with ornament afterwards; the only true way was to make the ornamental element an integral portion of the whole design, which could only be done in the way he had indicated. The ornament should never hide the articulation of the structure, but the construction should always be honestly and fearlessly shown, elaborated to any extent in artistic grace, but never compromised in its essentials. This would be true engineering art, and the sooner it was fairly tried the better.

DISCUSSION.

The PRESIDENT remarked that Professor Kerr's admirable lecture had afforded much matter for discussion, and he should be glad to hear the members give their opinions on the subject.

Mr. HAUGHTON, A.I.C.E., remarked that the learned Professor seemed to look upon engineers as a race of artistic Pariahs, but there were a great many good reasons why engineers were not so fully artistic in their works as could be wished. He (Mr. Haughton) thought that engineers ought to be artistic as well, but the reasons were numerous why they could not be so at all times. To mention no other reason, they had to deal with inartistic people—men who had no taste for art, but regarded its exhibition as a weakness on the part of the engineer. That it was possible for engineers to be artists, or to exhibit artistic powers in their works, the works of some of the greatest luminaries of the profession testified. In the foreground he must refer to Telford; he had never seen a bridge of Telford's that had not beauty about it. The Britannia Bridge, by Robert Stephenson, was very graceful, considering the materials that its builder had to deal with. Brunel again, in the Saltash Bridge and other works, had evinced no small degree of art-power in dealing with the enormous masses of his structures. The Saltash Bridge was a purely engineering work, and had not a particle of ornamental detail about it, and yet its appearance was exceedingly graceful, while possessing the indispensable characteristics of majesty and repose. The Paddington Station, also by Brunel, evidenced great taste on the part of the engineer. Straight lines instead of curved lines would be the most productive of good effects in engineering works, simply because they would generally be found to be the outcome of engineering constructive principles; but that marvellous effects might be produced by straight lines was evidenced by the works of the Greeks and Egyptians. Indeed, the engineers' line of beauty was the right-line. One reason why engineers were not artistic in their works was that they were a profession of yesterday—and a profession which, at the outset, was thoroughly swamped with work, which necessarily had to be got through as quickly as possible, consistent with the public safety, and for the first few years of their existence as a profession they had no time to think of art, and had they found time they would have been before their age. Now, however, that greater attention was being paid to artistic matters, and when the engineering profession was less glutted with work, he believed that engineers would not be content to ignore the claims which are made upon them. He could not help saying, however, that many of the architectural productions of the present day were not at all up to the mark. One great work recently completed—great as to extent and importance—viz., the new S. Thomas's Hospital, was, he thought, extremely discreditable to the architect who carried it out. He was often very much surprised at the wretched architectural attempts to be seen sometimes.

Mr. WALTON, A.I.C.E., said that with a great deal of Professor Kerr's remarks he entirely agreed. He fully concurred in the sentiment that engineers should first of all be truthful in their construction, and he agreed that the method

laid down by the Professor for rendering engineering work artistic was the only right one. He confessed, however, that after all the Professor had said on the subject of the design of girders, he did not think he could do much better than he had hitherto done. He should have liked to hear the professor lay down some rule or principle for the treatment of such a girder as that spanning the approach to the London Bridge Railway station. In a case of the kind, where the single span was 100ft. or so, it did not appear to him how such a girder could be rendered artistic. As to the introduction of cornices, that had been done, but with very little or no satisfactory effect. He was, however, particularly struck with one thing, viz., the total absence from the Professor's discourse of the word "shadow." It seemed to him (the speaker) that if engineers were to get good shadows into some of their performances they would certainly gain in effect. Mr. Haughton had referred to beauty of outline, and herein, he (Mr. Walton) thought, consisted the only generally available element of beauty of works of engineering. No amount of applied ornament would look well on an ugly shaped structure, but a structure with a good outline would always look well without being ornamented in detail; indeed, so vast were the works of engineers that they must trust to outline alone, for detailed ornamentation of their structures was out of the question on the score of expense.

Mr. REW having made a few remarks,

Mr. PAIN endorsed what had been said as to the necessity of engineering structures having a good outline. With regard to what had been said by the Professor as to the unsuitability of Gothic forms for the purposes of the engineer, Mr. Pain said that Westminster Bridge was certainly more allied to Gothic than to Classic art. [Professor Kerr: There is nothing Gothic about it.] Mr. Pain said that in his ignorance, as an engineer, he had always looked upon it as a Gothic bridge, and he believed that the engineer, Mr. Thomas Page, called in the aid of the architect of the Houses of Parliament to advise and assist in the ornamental features of the structure. In his (the speaker's) opinion, Westminster Bridge was a great step in advance in the alliance of art with engineering. The Newcastle-upon-Tyne Railway-station was another very excellent illustration of the combination of art and engineering. Robert Stephenson was the engineer, but the architectural work was by a Mr. Dobson, a local architect. He knew of no building of its kind, whether architectural or purely engineering, which was a finer structure than that station.

The discussion was continued at great length by Messrs. Yolland, Ussill, Butler, Walmisley, Sandall, and others. Two or three of the speakers spoke in highly appreciative terms of Mr. Ruskin's writings, and one gentleman would like to know what suggestions the Professor could give for rendering such works as gasometers artistic. One speaker, on the question of shams, denied that Portland cement was a sham, when properly treated.

A cordial vote of thanks having been given to the lecturer,

Professor KERR, in reply, said that most of the speakers seemed to have misunderstood the drift of his remarks. From what he had heard, however, he perceived that the members of the Society very fairly represented the inquiring turn of mind which characterised the members of the engineering profession. But he advised the members not to trust too implicitly in Ruskin's teaching; for Mr. Ruskin had defied himself over and over again, and had publicly declared that he never considered himself right until he had contradicted himself four times. One gentleman had been good enough to ask him to say how a gasometer could be designed, and another how he would treat a large girder such as that at London Bridge. He could only repeat that engineers very often had it in their power to very greatly improve the effect of their works; and if they bore in mind the principles he had laid down, such works, whether gasometers or bridges, were capable of being made more pleasing than at present, without detriment to the science of the construction.

The top of a leaden coffin, ornamented with Medusa heads and lions in the Roman style, together with several small vases, have just been found near Sittingbourne. The objects will be described and figured in the forthcoming number of the Kent Archæological Society's journal.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

OXFORD ARCHITECTURAL AND HISTORICAL SOCIETY.—The last walk during the present term of the members of this society took place on Saturday week, when the town of Abingdon was visited. The party first visited S. Nicholas Church, over which they were conducted by the Rev. E. Summers. Mr. James Parker said the church was built, according to Leland, by one of the Abbots of Abingdon, Nicholas de Culham; and that most of the Abbots of those days took their names from the places from whence they came. Nicholas de Coleham was Abbot from the year 1289 to 1307, so that they were able to fit the date of the church pretty nearly. The west front, which was a good specimen of its style, from the Norman to the Early English, was the only part of the original building still standing; and the Norman ornaments remaining combined with the light thirteenth century arches, &c. The foundation of the church had been followed when it was rebuilt. Of the thirteenth century work there was still to be seen a small window, but the other windows were of different dates. The chancel seemed to have been re-built; and it had since that period been so restored that there were none of the original features remaining. The company were then conducted over the ruins of Abingdon Abbey, the only parts of which now standing are built into a brewery. Mr. Parker observed that they possessed three almost complete records respecting every other portion of the Abbey, but, singularly enough, they had no history of the only part which now remained—namely, the room in which they were then assembled, and the cellar which was underneath. The portions of the building inspected could not be traced to an earlier period than the beginning of the thirteenth century. The windows of the building were also of the thirteenth century style, and a thing to be observed was the ingenious arrangement of the doorways. The work was begun by Abbot Faritus, and continued by Abbot Vincent, and afterwards by Abbot Ingulph. The party then passed over the bridge to the little island of Andressey, which was said to have been occupied in turn by Offa, King of the Mercians and West Saxons, about the year A.D. 760; by his son Egfrid, who died on the island in 794; by King William the Conqueror; and afterwards by William Rufus. Abingdon Bridge, which was said to have been built in the year 1416, was next visited, and about which Mr. Parker read an interesting extract from Mr. Cobham's book on the Abingdon Hospital. In S. Helen's Church, which is now undergoing restoration, Mr. Parker pointed out that the fabric possessed a very fine spire and tower, both of the thirteenth century, the windows being also of that date. There was nothing in the church earlier than the thirteenth century. In consequence of an important road running on the west and east sides, the only chance of enlarging the church was by extending it on the north and south, which made it one of the very few churches which are broader than they are long. An extra evening meeting of the Society was held on Thursday week. Professor Westwood gave a lecture on the Utrecht Psalter, with especial reference to the recent controversy about the Athanasian Creed. He treated his subject under four heads—namely, the historical, paleographic, celiographic, and iconographic character of the manuscripts, which led him to the conclusion that the Psalter dated not earlier than 800 or 850.—Mr. J. P. Earwaker, one of the hon. secs., then read an interesting report of the archæological discoveries in the neighbourhood of Oxford during the past year.

ARCHÆOLOGICAL SECTION OF THE BIRMINGHAM AND MIDLAND INSTITUTE.—Last week Mr. J. H. Chamberlain, F.R.I.B.A., gave a lecture to the members of the Archæological section of the Midland Institute, on "The Influence of the Archæologist upon Revivals of Architecture." The lecturer said that in the present day there were two art revivals which had been brought to pass within the last 500 years, and he proposed to sketch some part of the work that the archæologist had done in promoting them to the best of his ability, and in spoiling them to the best of his ability, the latter having been managed by him far more successfully than the former. The two great revivals of past art were those of Italy and England—that of Italy being known as the

Renaissance, and that of England having no particular name, except, as it was called in a clumsy and roundabout fashion, the revival of the Gothic. Italian revival had lasted somewhere about 500 years, during which time it had done, for good or for evil, a very great deal of work. It had covered the whole of Europe from one end to the other with various buildings, and it had influenced the art of painting and sculpture. In Italy, art revival was essentially a literary revival, and was owing to the discovery of ancient manuscripts and to literature, rather than to the buildings which adorned and still adorned Italy. In England it could not be said that the author, the poet, and the "literary man" (to use an ugly phrase) had very much to do with art revival here. Neither in the case of Italy nor of England was there a complete break between the past and the present in art. In England there had been no time in which Gothic architecture had ceased to be practised, although towards the middle of the fourteenth century the Classic change began, and was at last forced into an original style called Elizabethan. The Italian revival had a marvellous influence on the art of the world, which was encumbered with buildings erected according to the rules and laws laid down in Italy 500 years ago, and erroneously supposed to be the laws by which the ancient builders were governed in putting up their temples and buildings. In Italy the chief cause of the revival of Classic art in the first instance was the man of letters, and the laws, after being discovered, were then moulded and fashioned by the archæologist. In England we might dismiss the man of letters altogether, and the archæologist might lay what claim he pleased to having seen the principal cause of the foundation of art revival here. The archæologist was influenced by the power of admiration, and that had led him to try and adapt what he saw in old work to what he wanted to produce in the present day. In the way of doing this, however, lay the whole difference between the good and the evil effect of the archæologist upon art. The Elizabethan style was an example of the way in which a man used that which he admired. In Italy there were only six copies from which to take the revival, while in England the principal remains of the buildings were ecclesiastical. In all revivals, the little and good word "use" was never whispered; if this had been done, nine-tenths of the results obtained would have been impossible, and the other tenth would have been good. The lecturer then gave numerous illustrations in which the archæologist had influenced the architecture and style of public buildings in accordance with his taste, and especially referred to the dome of S. Paul's.—Some discussion followed, and a vote of thanks was passed to Mr. Chamberlain for his lecture.

PARLIAMENTARY NOTES.

THAMES EMBANKMENT (LAND) BILL.—This bill was read a second time on Thursday week, and was referred to the select committee appointed on the Charing-cross and Victoria Embankment Approach Bill.

Building Intelligence.

CHURCHES AND CHAPELS.

GATESHEAD.—The foundation-stone of the new (Roman) Catholic church of SS. John the Baptist and Patrick, was laid at the Felling, Gateshead, on the 17th inst. The style selected by Messrs. Dunn and Hansom, the architects, is Middle Pointed Gothic. The body of the edifice is to consist of a broad nave, 90ft. by 30ft., with a narrow aisle on each side, making the total width 55ft. The chancel will add 30ft. to the length of the church, and it will have a side chapel and vestry on either side. The tower will be perforated by a doorway in order to give access to the nave from the street on which it abuts. The height of the tower and spire is designed to be 180ft. The special features of the interior are to be the very tall arcades, and the absence of a clerestory. The church is estimated to accommodate about 800 persons.

TORQUAY.—The foundation-stone of a new Wesleyan chapel has been laid at Torquay. The building will comprise a nave, having side aisles, separated with clerestories and arches, supported on Bath stone columns. The chapel will

be 78ft. long, by 50ft. wide, with a chancel 11ft. deep at the further end. Seat accommodation will be provided for about 900 people, principally on the floor. The tower will rise about 60ft., terminating with a spire about 70ft. high. The building will be of a simple Decorated character throughout, local limestones of different tints, obtained from the nearest quarries, with Bath stone dressings being used, and the interior mouldings will be formed of Watcombe terra-cotta plaster and stone. The contract was taken by Mr. E. P., Bovey, builder, Torquay, at about £3,600, making with the cost of the site, £4,100. The plans were kindly furnished by the Rev. John P. Johnstone, of London, who is the architect; but in his absence Mr. Bridgman, of Torquay, will watch the progress of the works.

TOTNES.—The restoration of the parish church of S. Mary, Totnes, has been effected, under the care of Sir G. G. Scott. Additions have been made of north aisle and new vestry. Inside, the transformation is almost complete, by the removal of two-thirds of the unsightly old pews that choked the nave and aisles, and the introduction of low, open benches. In the new north aisle a gallery has been erected. The columns of the north and south arcades have been straightened, as far as possible, and cleaned down. The huge cornice by which the pulpit was surmounted has given place to a light and elegant one, and the paint and white-wash accumulated during the last three or four hundred years have been scraped off. Three new windows have been put in on the south side of the church, and two others for the west end are now in progress. The works have been carried out principally by Mr. Reeves, builder, of Totnes. The stone work in the south aisle, and of that portion now in progress, is by Mr. J. Pulsford, of Barnstaple. Mr. Harry Hems, of Exeter, has executed the stone and wood carving. The beautiful rood-screen of Bear stone sadly needs attention, and the chancel is still in as neglected a condition as it is possible to conceive. An ugly iron stove stands right in front of the altar. Five or six great pews are fitted up right against the screen, and a hideous stucco altar-piece rises above the altar some thirty-five feet, in which Cupids and urns are liberally introduced.

UPPER HOLLOWAY.—The new chapel which has been erected at the corner of Archway-road and St. John's-road, Upper Holloway, occupies a most commanding position facing the Junction-road. The architectural style of the building is Romanesque. The ground was of a somewhat peculiar form, and it required considerable skill to plan a large commodious structure. The Building Committee therefore invited several architects to submit designs, and after great deliberation, those submitted by Mr. John Johnson, of 35, Moorgate-street, were chosen as most suitable. The foundation-stone was laid by John Radmall, Esq., in April last year, and the works proceeded satisfactorily, although delayed about two months by the strike in the building trade. The west front is of imposing appearance, and has a noble flight of steps leading to a landing the whole width of the building. There are three circular-headed entrance-doors, with columns with carved capitals and enriched arch soffits; above is a large light window with rose window in head, the spandrels being carved with Romanesque foliage. To this front there are two turrets, containing gallery stairs, with pointed domical roofs of Blue Bath stone and iron finials, the height from ground to top of finials being 85ft. The elevations next the Archway and St. John's roads are similar, having three bays of two-light windows. The transepts are 33ft. wide, with entrance-porch in centre, with two-light windows on each side, and large rose window, above 12ft. in diameter, surmounted by stone pediment with acroteria terminations at angles and apex. The chapel is in plan a Latin cross, the total length east and west being 110ft., and the total width across at transepts 95ft. The width of the nave is 44ft. The communion recess is arched similarly to the western recess, the span of the arch being 31ft. The effect of the arch and the ceiling, being concentric curves, is extremely fine, and the acoustic properties are excellent. As there is only a western gallery, there are no iron or stone columns to prevent seeing and hearing; consequently a vast area, seating nearly 900 persons, is entirely free and unobstructed, and all can see and hear the preacher. The western gallery has space for the organ, and about 140 sittings for the choir and Sunday-school children. The stewards' and ministers' vestries are each 16ft. square; they

adjoin the communion, and have external doors and stairs. The decoration of the interior is very effective, the ceilings being in blue and white, with blue and red lines and ornaments. The timbers of the roof are light brown, the walls and dado being Pompeian buff and brown, with panels of blue with red and blue enrichments, the plaster cornices and mouldings being left white. The appearance of the whole is quiet and chaste. The communion, however, is rather richly treated by arcades and diapers. The architect kindly prepared the designs, and himself executed a portion of decorative work. The basement has a large school-room for 200 boys, 200 girls, and 150 infants, also four class-rooms, each 18ft. by 16ft. To the boys' and girls' schools and class-rooms there are separate external entrances. There are also apartments for the chapel-keeper, heating chamber, &c. The walls are of brick, with light yellow facing, with bands of dark malm pavours, and dressings of Bath stone, &c. The warming is by hot air and hot water, executed by Mr. Waller, of Fish-street-hill. The gas-fittings are by Mr. Glass, High-street, Islington. The foreman of the works was Mr. Taylor, and the general contractors, Messrs. Dove Bros., of Islington. The cost of the building is about £5,600, but the total cost, including land and all charges, is about £7,200.

WINCHCOMBE, GLOUCESTERSHIRE.—The parish church of Winchcombe, Gloucestershire, has been reopened, after a thorough restoration under the direction of Mr. J. Drayton Wyatt. The parish is one of the most ancient in the kingdom—in fact, it dates from the earliest days of the Mercian settlement. The present church, however, is a Perpendicular structure, but it is of considerable dimensions and architectural merit. Its length is 155ft., and its peculiarity is that it has no chancel-arch. Till lately it was full of all manner of unsightly excrescences, including what was called a "ladies' gallery" at the east end, by way of balancing a similar erection which blocked up the handsome tower-arch, and hid its exquisite groined ceiling. All these things have been swept away, and the church has been restored to something like its pristine character. A chancel-arch of oak has been inserted, the architect being of opinion that something was needed to break the monotony of so long a stretch of roof. The works have already cost £3,000 and there remains still a good deal to be done when the funds in hand permit the complete execution of Mr. Wyatt's plans.

BUILDINGS.

S. GEORGE'S UNION.—It has been determined to convert the workhouse at Kensington, belonging to this union, into an infirmary, and plans have been prepared by Mr. H. Saxon Snell for raising the building another story, and adding other additional structures, besides entirely remodelling the administrative offices. Before carrying out the whole of the alterations, the guardians await the suggestions which the Local Government Board are preparing for entirely rearranging the distribution of the various classes of paupers in the several workhouses belonging to the Union. They have, however, just completed, from designs prepared by Mr. Snell, the erection of a wash-house and laundry with steam machinery and hot-water apparatus for supplying the whole house as proposed to be enlarged.

S. LUKE'S WORKHOUSE.—The Local Government Board have called upon the Guardians of the Holborn Union to complete the carrying out of their proposed scheme for the reconstruction of this workhouse, delayed for some time in consequence of the indisposition of the Guardians to incur so large an outlay. Accordingly their architect, Mr. H. Saxon Snell, has prepared plans for an administrative block of buildings to contain accommodation for the various officers of the establishment, besides clerks' offices, stores, and committee room. On the second floor, accommodation is provided for the pauper helpers employed in and about the establishment, and on the top floor provision is made for lying-in patients, for whom a bed lift is provided from the ground floor in close proximity to the porter's entrance lodge. The cost of the building, for which tenders are now being invited, is estimated at £8,000. When completed, the workhouse will contain all the old, infirm, and sick paupers of the Union, amounting to 1,500 inmates.

S. MARYLEBONE WORKHOUSE.—The reconstruction of this building, which is in a very dilapidated condition, has been delayed for some time, owing

to a difficulty in arranging the conditions of the lease with the ground-landlords. Terms having at last been arranged, the Guardians have requested their architect, Mr. H. Saxon Snell, to prepare plans for laying out the building upon an entirely new plan. Working drawings and estimates are being prepared for the first portion, which will consist of a block of buildings extending the whole length of the Northumberland-street frontage. This building will contain accommodation for 608 chronic and infirm inmates, and probationary wards for 20 paupers, besides a porter's lodge, master's residence, stores, board and committee rooms, clerks' offices, and rooms for the district registrar. The estimated cost is £26,000.

SCHOOLS.

BIRCLE.—On Saturday last the corner-stone of a new school in connection with the parish church was laid at Bircle, Lancashire. The building will be in the Gothic style. Mr. S. H. Brocklehurst, of Manchester, is the architect; Mr. James Hill, of Bury, is the contractor for the mason work; and Mr. S. Horrocks has the contract for the wood work. The school-room will be 80ft. by 21ft.; and there will be one class-room, 16ft. 6in. square. The school and teachers' house are estimated to cost £1,000. The school will afford accommodation for 230 scholars.

DRIFIELD.—The foundation-stone of the School Board new schools was laid on Tuesday week. The schools will accommodate 250 boys, 250 girls, and 200 infants, with master's residence. The buildings are in the Lombardic style, with brick facings relieved by arches and bands in red stock bricks, with slated roofs, and the floors are composed of upright blocks of larch set endwise. Mr. H. J. Paull, of Manchester, is the architect, and Messrs. Hewson Brothers, Driffield, the contractors for the work at the sum of £4,566. 6s. 6d.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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WALTER J. N. TOMLINSON.—Declined with thanks.

R. B. MARTIN.—Declined with thanks.

C. HODGES.—Drawing to hand; not suitable for publication.

M. CARPENTIER.—We cannot send the back numbers. They are out of print.

A COUNTRY JOINER SAYS:—"I accept a bill payable at three months hence. Is it customary in the trade for the timber merchant to charge his customer interest for the three months?" We should say there is no established custom in the matter. It is purely a matter of convenience and arrangement. Had you paid ready money, no doubt the merchant would have allowed you a discount.

E. J. C.—We cannot promise without seeing the sketch.

J. HILL.—Consult back numbers of BUILDING NEWS.

J. A. R.—Ask Mr. Banister Fletcher through "Intercommunication."

Correspondence.

THE DESTRUCTION OF NORTHUMBERLAND HOUSE.

To the Editor of the BUILDING NEWS.

SIR,—As an endeavour to conserve an historical monument, we may regard with satisfaction the recent utterances of Lord Elcho and others as to the preservation of Northumberland House by substituting for the plan proposed by the Metropolitan Board of Works that prepared some years ago by the late Sir James Pennethorne. The readers of the BUILDING NEWS are aware that in order to form a noble approach to the Victoria Embankment, a new street is proposed to be constructed from Charing-cross to the Embankment, involving the demolition of Northumberland House and other property adjacent. The plan of Sir James Pennethorne also shows a new street from Charing-cross, skirting by a curved line the western side of Northumberland House, taking in a considerable portion of the garden thereof, but leaving the house itself standing. It is this plan which finds favour in the eyes of Lord Elcho, and it may be worth while to point out its demerits, putting aside the question of cost, as I believe that no reliable estimate was made by Sir James of the expenditure to be incurred by his scheme. The would-be preservers of Northumberland House base their reasons on the antiquity, architectural interest, and associations of the structure. The majority of them are familiar only with the screen-wall in front, and, with the exception perhaps of the centre, there is not a feature in it, speaking architecturally, worth a moment's consideration. As regards the old associations of the spot, if the new street were opened up on the western side, the house itself would stand between two thoroughfares—the western flank walls would be exposed in all their architectural nudity—part of the garden would be lost—and who then would recognise the old favourite spot so completely changed and contracted? Sir James Pennethorne's scheme was clever, as most of his schemes were, but it had as a *"sine qua non"* the retention of Northumberland House. Had his views been taken as to the formation of a noble thoroughfare and, at the same time, an important public improvement, it is more than probable that a plan similar to that now put forward by the Metropolitan Board would have been favoured by him; and I sincerely trust that one of the most satisfactory moves of that Board will not be hampered by the almost childish desire to preserve what is nothing more nor less than a ducal residence of a by no means high architectural character.

W. W.

BATLEY MARKET COMPETITION.—A MANIFEST INJUSTICE.

SIR,—I should be glad if you would insert the following letter in your next issue, as it is an account of one of those unhappy competitions architects would do well to consider before entering rashly upon these hazardous undertakings.

Some six months ago I prepared a set of competitive drawings for a new covered market for Batley, in Yorkshire, in answer to an advertisement which appeared in your paper. There were two premiums offered, and in about two months after the drawings were sent in I received the somewhat quaint information that my drawings, together with those of two other competitors, were selected as being the *three best*, but of *equal merit*, and that the committee *now* having decided the exact dimensions and position on the site, would be glad for us to revise our drawings, and again submit them in competition. This I complied with, and according to their definite instructions in writing to send in my drawings not later than the 7th day of January last, I did so, but heard nothing of them for nearly two months, when in answer to my inquiry about them, I was informed that only *one* set of drawings were then received, which he (the town clerk) supposed must be mine, but, astonishing to say, that the other two sets were expected in on the 28th of February: thus giving my two adversaries nearly two months longer for the preparation of their drawings than I had.

Upon my remonstrating with them for such conduct, I was informed that I should have received—intimation of the extension of time beyond the 7th January, had not my drawings been received, thus proving that such extension was not decided upon until after that date, owing

perhaps to the two other gentlemen not having sent in their drawings, which should most decidedly have excluded them from the competition altogether. I was thus placed at a serious disadvantage, the time allotted to me being so very short that I could not give my drawings that consideration I might otherwise have done.

I need scarcely say the two successful competitors are local gentlemen. 1st premium to Mr. Stead Ellis; 2nd do. Messrs. Sheard and Hanstock, A.R.I.B.A.—I am, Sir, yours respectfully,
JOHN W. HURRELL.

48, Market-place, Burslem, Staffordshire.
19th March, 1873.

THE GULF OF BOTHNIA.

SIR,—The information at p. 348 of your journal of March 21st as to felling timber on the Gulf of Bothnia is incorrect. I have been up the gulf, calling at all the town stations; landed at Lulea, at the head of the gulf; and walked 120 miles inland to the celebrated Gellevara mountain of magnetic iron ore. I visited some of the large saw-mills, and saw the people; but I witnessed none of the misery and oppression indicated by the writer. On the contrary, I saw robust and apparently-contented, well-cared for, and well-to-do working-men. There is a cold and severe winter, with very hot summers, and swarms of mosquitoes; the land is forest, swamp, river, lake, and open plain; the trees are self-sown, fir, and birch—the fir being cut for exportation. The trees on the margins of the lakes and rivers—say for some five miles in—are cut in the winter, taken to the water, and thrown on to the ice, when in spring, such as escape smashing at the break-up float down, to the saw-mill stations on the margins of the gulf at the mouths of the rivers. The peasants are as well aware of the value of their labour, I should say, as any peasants in Europe. The vice of Sweden, however, like our own, is drunkenness. Spirits are cheap, and, as in Ireland and Scotland, are largely partaken of. *This dram-drinking, in all countries, is the curse of civilisation.*

Winter in the north is not the dreary time we imagine it to be, as it is the season of visiting, balls, and parties; and the Swedes, even on the bank of the Gulf of Bothnia, know how to enjoy themselves during their winter, as witness their large ball-rooms in the towns, only used during this season. When the whole country is under snow, and with a still, bright, dry atmosphere—moon and stars shining as we never see them shine—the aurora magnificent to a degree beyond our conception—the people do not think their long winter by any means the worst part of their year.—I am, Sir, &c.,
R. R.
March 21, 1873.

MASONRY.

SIR,—With your permission, I should like to make a few observations upon the paper with the above heading which is reported in the BUILDING NEWS of the 14th and 21st inst. These practical papers are of immense advantage to all those desirous of obtaining a sound practical education, but it is obvious they should be perfectly correct, if they are to accomplish this end. Unfortunately, the paper in question contains many things more calculated to mislead than enlighten. Indeed, masonry, of all subjects, seems to be least understood by professional men, it being very rare to meet with published statements about the every-day working details of masonry which do not sound unfamiliar and outlandish to the craftsman.

With respect to the paper under consideration, In the first place, I note with pleasure the correct essentials given for a good wall—namely, stone laid on its natural bed. The wall to be well filled and bedded in mortar—not, as is too often the case, the heart filled with loose dry stones, and some mortar flushed over the top. The stones also not to be too dry, so as to absorb the moisture quickly from the mortar, and so destroy its adhesive properties. With respect to “bond,” it is stated that the usual practice is one bond-stone, or as it is there called, “header,”—a very unmasonic name, by the way, and one which smacks strongly of the bricklayer—in every 4 or 5ft. super. Now practically it is found, and almost always acted upon, that one bond-stone, or “through” to every 8 or 9ft. super makes excellent work, where the walling is otherwise good. And it is, as the author states, important that these bond-stones go through the entire width of wall, and are not spurious bonders. If, however,

the wall be of great width, say 3ft. and upwards, I prefer having the bond in two stones instead of one, the entire width of wall, each of these stones being two-thirds the width of wall and overlapping each other as section A; thus, if the wall be 3ft. wide, each of the above stones would be 2ft. on bed and overlap 1ft. The reason for this is, the heart of a wall is never so firm as the faces, and is liable to yield a little, leaving the bond stone hollow, when it is in danger of being snapped, and thus be no bond whatever. In the church I am now superintending, the outside wall is one kind of stone and the inside another, and the bond is thus formed.

Now comes the subject which has induced me to trouble you with these lines, in order to correct some of the errors the author of the paper has fallen into respecting the technical definition of the kinds of stonework. I am led to do this in the hope of, in however humble a way, assisting those who desire to acquire a sound knowledge of this, the oldest, as well as the noblest, of crafts. Pray, sir, pardon this bit of enthusiasm, but when I regard a building, beautiful in proportion, and dignified in repose, I think there cannot well be any work of man more impressive, and this feeling is quickened and the pleasure very much heightened, if you should have personally worked some of those individual stones which collectively go to make up the perfect whole. I can very well imagine, from experience, the pride it must have caused the late Ivie Mackie, Esq., who on one occasion formed part of an influential deputation from Manchester to the Post-Master General, and having to wait at the General Post-office for an audience, took the opportunity to point out to the late Sir John Potter some of his own workmanship in the pillars in front of that building.

But I find I am digressing, and must return to the matter in hand. Well, in the paper I am speaking of, it is said:—“Ashlar consists of masonry in which every stone is wrought on all its sides, and generally to specified dimensions. . . . If the faces of the stone are worked beyond the first cutting, it makes what is called ‘plane’ (surely this must be a misprint for ‘plain’) ashlar.” If it is figured it becomes ‘tooled’ or ‘chiselled ashlar,’ and if the main faces of the stone project beyond the mortar joint, it is called ‘rusticated.’”

Now, the term “ashlar” is used in practical masonry as the name of a class of stonework, in contradistinction to another class called “walling,” and consists of courses of stone nearly always higher and longer than the courses in work called walling. Moreover, wallstones—that is, the stones that form walling—are generally dressed with the hammer or pick, and ashlar never. As to the different kinds of ashlar, it can be “rough-chiselled”—“boasted”; that is, its finished face is carefully batted over with a chisel about 2in. wide (called a “boaster”) to one regular angle; or it can be “tooled”—that is, a chisel, double the width of a boaster, is passed over the face in slow careful strokes, causing little ridges and furrows exactly like the finer kind of woollen cord, and, unlike boasting, these strokes or bats are in continued lines at right angles to the beds. Specimens of each are given above. Lastly, ashlar can be “rubbed” or “cleansed,” that is, all the chisel-marks are obliterated by rubbing with a stone and sand, together with water.

There is also, as the author of the paper remarks, ashlar with rough projecting faces, called “rusticated.” This is nearly exclusively used in basements and in the piers of bridges. In the quotation given from Donaldson’s “Specifications,” the “axed” work referred to is the limestone used in the South of England, which is cut with an axe instead of being worked with a chisel, as more expeditious. The term “headers and stretchers” is here used: it should read, “one bond-stone to two stretching-stones.”

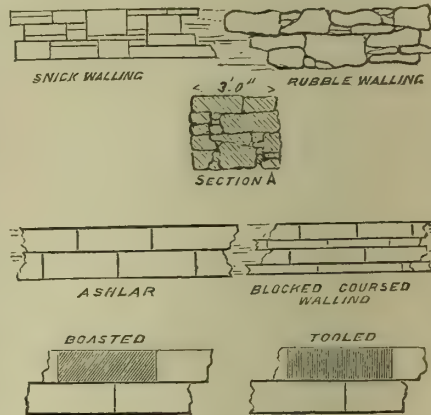
I now come to the term “block-in-course,” given in the paper. There is no such kind of masonry. There is “blocking-course,” the course of stone which finishes a parapet or chimney. There are also “blocked courses” of wallstones, or, as they are sometimes called, “scapped courses,” which, when put together in the wall, form what is called “blocked coursed walling,” or, walling in “blocked courses,” consisting of courses of wallstones “blocked” or hammer-dressed. This kind of work can be specified to be executed with more or less care, according to what is required. This blocked, coursed, walling is the better kind of work, and rubble the less expensive kind. The

quotation given appears to be walling with hammer-dressed or blocked beds, and a chisel draft run round the edges of face, the rest of face left rough—at least so a mason would understand it. But it is by no means clearly defined. If work as above, it should read thus: “Coursed walling with hammer-dressed beds and joints and drafted face,” or if a superior kind of work to the above was wanted, it should run as follows: “coursed walling with chisel-dressed beds and properly squared joints and drafted face.”

Next comes what the author of the paper calls “coursed rubble.” There is not such a thing as “coursed rubble.” If you course it, that is select the stones and wall them in uniform thickness, so as to keep horizontal or parallel beds, it is no longer rubble walling. Rubble wallings answer to the description given in the paper of “random,” or “common rubble,” that is, it is walling done with stones just as they come to hand, without any concern about their being not parallel, and are fitted one into another as the skill of the mason may dictate, and very clever some men are to instantly pick up just the stone required to fit into the unshapely one in the wall, and so rapidly form a well-bonded and neat looking wall. To do this class of work expeditiously and well requires much practice and cleverness.

There is a kind of walling which comes between regular blocked coursed work—that is work in which each continued course is of one gauge—and rubble work, and which may answer to the “coursed rubble” spoken of—which is called “snick walling.” In this kind of work the stones are scapped or blocked in parallel thicknesses, but they are in a great variety of thicknesses—some very thick and others as thin. These are wallled without regard to long courses of one uniform height, as in coursed work, but are just used as convenience dictates, though always keeping the stones horizontal; thus abrupt breaks or sneeks are formed. This kind of walling looks very well, and where there is much inequality in the thickness of the rough stones, it is the only class of walling that will scapple up without waste of stone or extra labour.

I give the following illustrations of the kinds of stonework referred to.—I am, Sir, &c.
T. W.



CHEAP COMPETITIONS.

SIR,—We inclose you a circular which has been sent to us, and addressed to “Architects.”

We should like to have your opinion upon the subject. It might be a very cheap way of obtaining two designs, with sets of drawings and specifications for a speculating builder to carry out himself.—We are, Sir, &c., M. & W.

“TO ARCHITECTS.—The purchaser of the Clarendon Hotel, Bond-street (which is to be pulled down and rebuilt), is desirous of receiving plans, with specifications and estimates, for the erection of a building on the site to comprise shops on the ground floor, with suites of rooms or chambers over, after the manner of the Belgrave Mansions, Grosvenor-gardens.

A premium of £50 will be given for the most approved design and one of £10 for the second.

The designs which obtain premiums are, with the plans, &c., to become the property of the advertiser, who does not bind himself to employ any competitor to superintend or carry out the work.

A tracing from the ground plan and further particulars with conditions may be obtained on application to Mr. Goddard, 1, — street, — street, W.”

[We look upon the advertisement as disreputable.—Ed.]

S. MARK’S CHURCH, SOUTH SHIELDS.—Thirty-two competitors sent in competition designs for this church. Messrs. Clarke & Sons’ (of Nottingham) designs have been selected, and they have been instructed to carry out the works.

Intercommunication.

QUESTIONS.

[2815].—**Measurement of Timber.**—Seeing an article in your issue of 14th instant, headed "Measurement of Timber at Liverpool," in which it is stated that a change is proposed to be made from measuring timber by string, and in future to measure by calliper, thereby causing the purchaser to pay for more than he receives, I should like some information about the respective modes of measurement, and what difference is made by them in the total quantity of a piece of timber, and how it arises.—J. G. G.

[2816].—**Building Stones.**—If there are any readers of your valuable News who could inform me the good and bad qualities of Bristol Blue or Blue Pennant stone, also what difference exists between the same and the Forest of Dean stone, I shall feel greatly obliged.—F. M.

[2817].—**Discoloured Mortar.**—I have just erected a large building with an ornamental frontage, and, now the weather is warmer, there exudes from the joints and through the bricks a white efflorescence, with an alkali taste. The mortar was made from fuller lime and cinders, the latter from a copper works. Will some of your readers oblige me with some receipt to remove and prevent the efflorescence, and oblige.—AN OLD SUBSCRIBER.

REPLIES.

Mounting Tracings.—In answer to many unanswered queries on the above subject, I beg to give the following method from experience:—Take a sheet of common cartridge paper the size of the tracing; wet it both sides; lay it on one side while you paste the tracing over with a sponge on the back, and let it lie flat for about ten minutes, so as to allow both paper and tracing to expand well; then carefully lay the paper on the back of the tracing, and rub it all one way with a cloth; turn it over, press out the air-bubbles or bladders, and then pin it down to your drawing-board, and when it is dry, if your paste is clean, it will look almost like a drawing, when you can colour the same as if it were one.—A PLAN-DRAWING CARPENTER.

[2797].—**Durability of Stone.**—"H. T." is but a sorry champion on behalf of granite if the best he has to say in its favour is that he has seen a monument of such material, which, although erected twenty years ago, indicates no signs of decay at present, and that the vicar in whose churchyard it has been put up says in "one hundred years hence it would be in the same condition as now." Vicars do say such strange things sometimes, as many of us well know; and how the rev. gentleman can conscientiously define the state his monuments will present in a hundred years to come, is rather vague, to say the best of it. Mr. Goad, of Plymouth—who, if I mistake not, is the proprietor of the well-known marble quarries in that neighbourhood, and hence should be a good and reliable authority upon the matter in question—certainly stands upon fair argumentative ground when he maintains that where stones of various materials have laid side by side for centuries, the state of preservation they are now in affords a fair test and a good criterion as to the individual merits of each, on the score of durability. Few will deny that Plymouth limestone does stand better in the long run, as a rule, than Cornish granite, a notable instance of this being the parish church of S. Andrew, Plymouth (fifteenth century Gothic), in the building of which local limestone was used in unison with granite. There, as in other examples in the locality, the latter has decayed, whilst the limestone appears to be as fresh as when first built up. In the same issue as "H. T.'s" reply appears it will be seen that Mr. C. H. Rew, in his admirable and instructive paper upon "Masonry," particularly refers (p. 328) to the resisting and enduring powers of the sea-wall at Exmouth, which he mentions as being built of the Plymouth limestone now quoted, and he there specifies it as offering a singular and very curious contrast to Brunel's sea-wall at Dawlish, situated only upon the opposite side of the same bay, though built with other material, and which amuses the public and drives shareholders to their wits' end by being washed away or coming to grief with curious regularity every other winter. Of course, in this instance, construction has more, perhaps, to do with these misfortunes than has the materials used, but, nevertheless, the quotation speaks well for the stone. That granite will not stand fire, the late conflagrations in America went a long way to show.—J. V., Exeter.

[2803].—**Clerk of Works' Duties.**—I agree with all "B. B." says, in your issue of March 7, on the above subject, except the last sentence, in which he says to "set out the drawings full size from the details furnished by the architect." Now, I do not think this is the universal practice; but where it is so, from my experience as a Clerk of Works, I do not think it should be made a part of his duties, because it is quite easy for a builder or foreman who wishes a piece of "scampering" done, to keep the Clerk of Works for hours at a drawing-board, and seize the opportunity to get on with a bad piece of work, and have it covered up with a passable piece before it is noticed. This is no supposition, for I have known it done over and over again, and would recommend it to the consideration of architects.—J. W.

[2811].—**Party Gutters.**—If it be actually a party gutter, it is the duty of the occupier who is building to put it in as good order as it had been before he commenced to raze his building.—M. GLENN, Dublin.

[2811].—**Party Gutters.**—While unable to give an opinion upon the legal status of the case, I should judge, as a matter of equity, and my opinion as a practical tradesman is, that the party who, for his own purposes, and to alter his own building, removes the party gutters, ought, at his own expense, to replace them in a tradesmanlike manner, and in an altered shape as may be necessary, so that the purpose they formerly served as gutters may still be carried out, all so far as the property of "A Regular Subscriber" may require.—W. P. B.

[2811].—**Party Gutters.**—If "A Regular Subscriber's" neighbour has, as he states, taken away the party gutters for the sole purpose of carrying his new premises

above the usual height, and to answer his own ends, he most decidedly ought to replace it in a satisfactory manner, and I should say, compensate him for any damage done to his premises from rain, &c.—W. W. G.

[2813].—**Timber Roof, 100ft. Span.**—"Inquirer" has called my attention to a misprint in this article in No. 945. The lattices are 21½ inches apart, the same as the purlins, not "2½ inches," nor "2½ feet." The line of the bow intersects the string at the eaves line of the roof. I found, on working out roughly, that the radius, as stated, was a trifle too short.—CORRESPONDENT.

STAINED GLASS.

BARNSTAPLE.—A memorial west window, containing five lights, has been fixed in the parish church of Barnstaple. The circular tracery work at the top of the window contains three shields—viz., those of the Prince of Wales, the borough of Barnstaple, and the see of Exeter, each supported by cherubs. The central subject is the miracle of our Lord raising the son of the widow at Naim. The lower compartments represent five of the Apostolic miracles. The glass has been designed and executed by Mr. W. F. Dixon, 113, Devonshire-road, Holloway, London.

EAST LONDON.—Messrs. Cox and Sons, of Southampton-street, Strand, have recently placed a large three-light window in S. Paul's Church, Dock-street, London Docks. It has been erected by the vicar in memory of Sir John Franklin, one of the founders of the church, and as the church is principally attended by sailors, nautical subjects from the Bible have been chosen. The subjects are illustrations of the following passages:—"He rebuked the winds and the sea, and there was a calm;" "He that hath ears to hear, let him hear;" "Fear not; from henceforth thou shalt catch men;" "Oh, thou of little faith, wherefore didst thou doubt?" The centre light is about 23ft. high, the side-lights about 19ft. high. A portion of the window was exhibited in the late International Exhibition. The style is thirteenth century, the best period of glass-painting, when the pure mosaic method alone was used, the glass not being overlaid with paint [or disguised with smear shading]. While the whole of the window is carried out strictly to the style of the thirteenth century, there has not been such a straining after mediæval quaintness as to induce inaccurate drawing, and disregard of anatomy.

LEEDS.—In the new Roundhay Park, a "Ruin," built of stone from a quarry at hand, has been erected. Mr. W. J. Booser, stained glass artist, has erected a window in the Ruin in commemoration of the Royal visit. The window, which is geometrical in form, consists of three lights, with foliated designs. The arms of Prince Arthur occupy the sinister light, and those of the Leeds Corporation the dexter light, while a likeness of Prince Arthur is inserted in the centre light. This window was presented by Mr. Booser.

LAND AND BUILDING SOCIETIES.

BIRMINGHAM UNITED BUILDING SOCIETY.—The sixteen annual meeting of this Society was held on Wednesday week. The revenue of the financial year has been over £16,500, being a large increase on the previous year, and making a grand total of upwards of £214,500. Compound interest, at the rate of 5 per cent., has been added to each investing member's account, and more than £240 has been carried to the deferred premium and reserve fund, which now stands at £1,805. 18s. 10d.

HALIFAX PERMANENT BENEFIT BUILDING SOCIETY.—On the 11th inst. the twentieth annual general meeting of this society was held. The annual report congratulated the members that the society was progressing, as a proof of which it was stated that there had been an increase over 1870 in the subscriptions of £32,218. 5s. 4d., in deposits £1,790. 4s. 8d., other receipts £4,407. 18s. 8d., making a total increase of £38,416. 8s. 8d. From all sources the receipts during the past year had been £173,540. 0s. 4d., being an increase of £12,118 over the previous year. The number of new members was 1,218, taking up 3,469 shares; being more by 250 members, but less by 425 shares than the number shown in the previous report, but an increase over 1870 of 1,116 shares. Applications for advances had been made from 163 members for a sum of £101,712, and the directors had made advances to the extent of 84,798. The profit for the year amounted to the sum of £3,132. 6s. 5d., showing an increase over 1870 of £1,377. 11s. 11d. The sum of £2,839 was recommended to be appropriated for division amongst members, borrowers, and investors, and the balance, £293. 16s. 3d., to be carried to next year's account.

THE BIRMINGHAM FREEHOLDERS' BUILDING SOCIETY.—The twenty-fourth annual meeting of this Society was held on Tuesday week. The Secretary read the report, which stated that the receipts have been £21,005. 10s. 7d., and the aggregate income now amounts to £384,724. 0s. 9d. After defraying all expenses incurred during the year, paying 5 per cent. to depositors, and placing to the credit of investing members compound interest at the same rate, the balance in favour of the society is £5,202. 8s. 10d.

Much anxiety is felt in Russia regarding the destruction of forests, which proceeds very rapidly, and threatens to deprive the country of one of the most valuable of its export products, wood for building purposes.

CHIPS.

The members of the Architectural Association will visit the Alexandra Palace, Muswell-hill, tomorrow (Saturday) afternoon. For further particulars see advertisement on front page.

The north aisle of the parish church of Kington, Herefordshire, is about to be rebuilt. Messrs. Edwards and Hind, of Leominster, are the builders.

The church of S. Wilfrid, Coventry, is being restored, under the superintendence of Mr. Bodley, of Harley-street. The expense of restoring the chancel (£500) is born by the rector, Rev. F. R. De Castro, while that of the nave is supplied from funds of a charity in the parish. The works will probably be completed by Easter Day.

A lectern for the Cathedral Church of S. Saviour's, Maritzburg, has just been completed by Messrs. Benham and Froud, of Chandos-street, Covent Garden, from designs furnished by Mr. Mowbray, architect, of Oxford.

A new block of buildings for a local firm of drapers has just been completed in Bury, from the designs of Messrs. Maxwell and Tuke.

Trade News.

WAGES MOVEMENT.

ABERDEEN.—The operative joiners in Aberdeen demanded an advance on their wages of 2s. 6d. per week, to take effect at 1st April next. The masters have offered 2s., to commence on 20th June next. This the men have declined, and there is every probability of a strike.

NEW YORK.—It is announced that about the 1st of May there is to be a general strike among the building trades of New York for higher wages. In this strike all these trades will join, and they are to be supported by about 100 trade unions, among them a number of societies not in the building trades. The employers, warned of the movement, are beginning to concert measures to resist the strike. In Brooklyn the bricklayers already announce that on the 31st March they will demand 4dols. wages for a day's work of eight hours, and in default of it will strike.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.				
24 by 12	22 by 12	20 by 10	18 by 10	18 by 9
420s.	370s.	285s.	215s.	222s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8½
222s. 6d.	170s.	123s. 6d.	130s.	77s. 6d.

Per m of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A & G's Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BEDFORDSHIRE.—For the restoration of Tempsford Church, Bedfordshire. Mr. Edward Browning, architect, Stamford.

Foster	£2,655	0	0
Thompson	2,641	0	0
S. and W. Pattinson	2,414	0	0
Halliday and Cave	2,386	0	0
Perkins and Sons	2,327	0	0
Law and Son	2,292	0	0

BRIERLEY HILL.—For Board Schools and teachers' residences. Mr. T. Smith, architect, Stourbridge. Quantities by Messrs. F. C. and J. P. Sharp.

Thompson	£8,623	11	7
Lovatt	6,100	0	0
Nelson	5,665	0	0
Horton	5,498	0	0
Stockton and Son	5,479	0	0

BUCKS.—For Amersham and Woodrow National Schools.

	Amers.	Wood-	Total.
Taylor	£1,625	£195	£1,820
Snell	1,421	190	1,611
Child	1,392	184	1,576
Stone	1,360	200	1,560
Fincher	—	—	1,500
Baughurst	1,350	145	1,495
Sexton	1,320	168	1,488
Batchelor	1,290	173	1,463
Spicer	1,272	181	1,453
Woodbridge	1,275	170	1,445
Reavell (accepted)	1,275	155	1,430
May	1,200	150	1,350

CRYSTAL PALACE PARK ESTATE.—Plot 19.—For villa residence for Mr. H. Grain. Mr. John Norton, architect, Quantities supplied by Mr. S. J. Thacker.

Gooding	£2,508	0	0
Oldrey	2,440	0	0
Aitchison and Walker	2,395	0	0
Boden	2,390	0	0
Blandford and Jones	2,130	0	0
Blackmore and Morley	2,100	0	0
Keast and Co.	2,040	0	0
Clarke	1,990	15	0
Guest	1,983	0	0
Tibbett, jun.	1,838	0	0

ESSEX.—For the erection of a villa at Leytonstone, Essex, for Mr. P. F. Lironi. Mr. William Mundy, architect. Quantities supplied.

Rivett	£1,789	0	0
King and Son	1,780	0	0
Brown	1,750	0	0
Smith	1,687	0	0
Emor	1,684	0	0
Chapman	1,660	0	0
Forrest	1,611	0	0
Arber	1,575	0	0

HACKNEY.—For the erection of schools at Globe-terrace, Hackney, for the London School Board. Mr. E. R. Robson, architect. Quantities by Messrs. Northcroft, Son, and Neighbour.

Langmead and Way	£8,821	0	0
Conder	8,475	0	0
Sewell and Son	8,090	0	0
Hearle	7,948	0	0
High	7,921	0	0
King and Son	7,846	0	0
F. and F. J. Wood	7,704	0	0
Niblett and Son	7,297	0	0
Perry and Co.	7,178	0	0
Shurmur	4,840	0	0

KENT.—For new wing to residence, Bickley-park, Kent. Messrs. John Young and Son, architects.

Hart	£1,488	0	0
Kirk	1,435	0	0
Newman and Mann	1,435	0	0
Fish	1,430	0	0
Conder	1,297	0	0
Arnau	1,295	0	0
Merritt and Ashby	1,235	0	0
Burrows and Brooker	1,075	0	0

LONDON.—For Metropolitan Meat and Poultry Markets, Smithfield, Western Extension. Mr. Horace Jones, architect. Mr. William Reddall and Messrs. Williams and Taylor, surveyors.

Cubitt and Co.	} No Tender.		
Dines and Bandet ..			
Geo. Smith and Co. ..			
Higgs	£103,232	0	0
Myers and Son	99,980	0	0
Baker and Son	99,483	0	0
Lucas Bros.	99,448	0	0
Peto Bros.	95,870	0	0
Webster	93,950	0	0
Hart	88,946	0	0
Perry and Co.	88,875	0	0
Henshaw and Co.	88,845	0	0
Trotlope	86,743	0	0
Ashby and Horner	86,917	0	0
Conder	84,520	0	0
Ashby and Sons	84,250	0	0
Hill and Sons	83,827	0	0
Browne and Robinson	83,180	0	0
Holland and Hannen	82,848	0	0

LONDON.—For new warehouse, 52, Bow-lane. Messrs. John Young and Son, architects.

Kirk	£1,718	0	0
Hart	1,682	0	0
Fish	1,650	0	0
Ashby and Horner	1,627	0	0
Newman and Mann	1,656	0	0
Sewell and Son	1,648	0	0
Merritt and Ashby	1,525	0	0
Conder	1,494	0	0

LONDON.—For the rebuilding of No. 313, High Holborn, for Messrs. Wm. Watson and Son. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. L. C. Riddett.

Haylock and Son	£4,075	0	0
Kilby	3,640	0	0
Wagstaff and Son	3,605	0	0
Patman and Fotheringham	3,583	0	0
Browne and Robinson	3,435	0	0
Sabey and Son	3,399	0	0
King and Son	3,304	0	0
Axford	3,268	0	0
Elkington	3,065	0	0

LONDON.—For alterations, &c., in rear of No. 26, Red Lion-square, Holborn, W.C. Messrs. Davis and Emanuel, architects, 2, Finsbury-circus, E.C.

Goodwin	£390	15	0
Vernal	336	0	0
Williams and Son	327	0	0

LONDON.—For the erection of the Craven Schools and Lecture-hall, Marshall-street, Golden-square. Mr. R. H. Burden, architect.

Hill and Sons	£3,980	0	0
Macey	3,825	0	0
Dunn	3,813	0	0
Axford	3,657	0	0
Stoner	3,595	0	0
Keyes and Head	3,385	0	0
Scrivener and White (accepted)	3,357	0	0

LONDON.—For wrought-iron railing, in Marylebone-road, fronting the workhouse. Mr. H. Saxon Snell, architect.

Main and Co. (accepted)	£441	0	0
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FOR GRANITE CURB AND FOUNDATIONS.

Howard Bros. (accepted)	£375	0	0
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NOTTINGHAMSHIRE.—For the erection of twenty-eight houses, fence walls, and conveniences at Newstead, for the Newstead Colliery Company. Mr. S. Rollinson, architect, Chesterfield. Quantities supplied.

Wilcockson	£3,750	0	0
Bramwell	3,740	0	0
Pattinson	3,584	0	0
Marriott	3,500	0	0
Hadfield	3,349	0	0
Stevenson and Weston	3,255	0	0
Forrest (accepted)	3,175	0	0
Hays	3,140	0	0
Greenwood	3,005	0	0
Hadfield	2,900	0	0
Green	2,810	0	0
Attenborough	2,615	0	0

NOTTS.—For co-operative stores and dwelling-house, at New Basford, Notts. Mr. Herbert Walker, architect. Quantities supplied.

Parker	£298	0	0
Cooke and Broomhead	989	19	0
Wool and Slight	979	0	0
Hind	970	0	0
M-Pherson	928	0	0
Horsfield	920	0	0
Marriott and Co.	880	0	0
Cooper	816	0	0
Cargill (accepted)	805	0	0

PORTSMOUTH.—For the erection of stables, carshed, and offices, in Broad-street, Portsmouth, for the Provincial Tramways Company (Limited). Messrs. Davis and Emanuel, architects, 2, Finsbury-circus, E.C. Quantities supplied.

Burbridge	£1,625	0	0
Morey, jun.	1,650	0	0
Bramble Brothers	1,625	0	0
Cooper	1,498	0	0
W. R. and C. Light (late)	1,490	0	0
Ward	1,467	0	0
Quick (late)	1,455	0	0

RICHMOND.—For rebuilding premises for the London and County Bank, George-street, Richmond. Mr. Richd. Brewer, architect. Quantities by Messrs. George Lansdown and Pollard.

Hill and Sons	£2,340	0	0
Gascoigne	2,316	0	0
Sweet	2,040	0	0
Sims	2,020	0	0
Carless (accepted)	1,967	0	0

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Quarrymen and Stone Merchants.

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[ADVT.] BATH STONE OFFICE: CORSHAM, WILTS.

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Do. do. 13 by 7	2	3	0	14s.	6d.
Do. do. 12 by 7	1	18	6	13s.	6d.
Do. do. 12 by 6	1	7	6	11s.	6d.

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MESSRS. RANDELL & CO., Corsham, Wilts.
Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tuford-street, Westminster

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—ROYAL INSTITUTE OF BRITISH ARCHITECTS.—“On the Laying-out of Cities.” By Mr. J. B. Waring. 8 p.m.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS, 8 p.m. ARCHITECTURAL ASSOCIATION.—Meeting of Elementary Class of Design. Subject: “Half-timbered Cottage.” 8 p.m.

WEDNESDAY.—SOCIETY OF ARTS, 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—“On Dilapidations.” By Mr. Banister Fletcher. 7.30 p.m.

CIVIL AND MECHANICAL ENGINEERS’ SOCIETY.—“Our Past and Present Navy.” By Mr. C. J. Samuda. 7.30 p.m.

COMPETITIONS OPEN.

CREWKERNE BURIAL BOARD, April 14.—For designs for the erection of two chapels, lodge, and other necessary buildings for a new cemetery. E. Budge, Clerk to the Board, Crewkerne, Somerset.

BOND-STREET.—For the erection of a building on the site of the Clarendon Hotel, to comprise shops on the ground-floor, with suite of rooms or chambers over. Premiums of £50 for the best, and £10 for the second best designs. Mr. Goddard, 1, Great Portland-street, Oxford-street.

YEovil SCHOOL BOARD, April 14.—For plans for the erection of school buildings in Rickleford to accommodate 300 children. G. W. Custard, Clerk to the School Board, Yeovil.

LEICESTER, May 14.—For designs for municipal buildings, to comprise all public offices, assize court, and police buildings. Premiums of £200 for the best, £100 for the second best, £50 for the third best designs. T. Standbridge, Town Clerk, Leicester.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard square. See BUILDING NEWS, December 27, 1872, *Mechanics’ Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY (Whitehall), April 1.—For the English oak timber, 2,600 loads; boat crooks, 1,100 No. F. W. Rowell, Superintendent of Contracts.

BRIGHTON, May 6.—Tenders for the supply of 130 fathoms of the best Baltic yellow deal ends for firewood. A. Morris, Clerk to the Guardians, Parochial Offices, Brighton.

BURLEY-IN-WHARFEDALE, March 31.—For the erection of entrance lodge and gate, Scaleborough-park. Mr. G. Foggitt, architect, Guiseley.

CAMBRIDGE, April 5.—For the erection of the new S. Giles’ Church. Messrs. T. H. and T. Healey, architects, Tyrril-street, Bradford, Yorkshire.

CARLISLE CORPORATION GAS COMPANY, April 2.—For the purchase of surplus tar. J. Hepworth, Gas Works, Carlisle.

CITY OF LONDON PAVING COMMISSIONERS, April 4.—For paving Duke-street, Smithfield, with wood. J. Daw, Principal Clerk, Sewers’ Office, Guildhall.

CITY OF LONDON UNION, March 31.—For repairing the workhouse at Homerton. J. Bowring, Clerk, 61, Bartholomew-close, E.C.

DOWNHAM SCHOOL BOARD (Norfolk), April 5.—For the erection of schools, &c. Mumford and Townshend, architects, Wisbech.

DRONFIELD, April 3.—For the erection of a school and master’s house in Cross-lane, Dronfield. Frederick Thos. Hawkin, Clerk to the School Board, 8, George-street, Sheffield.

EDGWARE HIGHWAY BOARD, April 2.—For the supply of granite, surface hand-picked flints, and double-screened gravel. W. A. Tootell, Clerk to the Board, Edgware.

EDGWARE HIGHWAY BOARD, April 2.—For mason’s work in the Kilburn and Willesden districts. W. A. Tootell, Clerk to the Board, Edgware.

EGHAM, April 3.—For making about 804 yds. of road on the Limes Estates. Mr. R. Oades, Land Agent, Egham.

GREENWICH DISTRICT BOARD OF WORKS, April 2.—For laying down York stone, Purbeck kerb, and for supplying various stones. J. Spencer, Clerk, Church-street, Greenwich.

GREENWICH DISTRICT BOARD OF WORKS.—For the supply of brooms, brushes, candles, oil, &c. J. Spencer, Clerk to the Board, Greenwich.

ISLE OF WIGHT, April 16.—For repairing the roads and highways. A. H. Estcourt, Clerk to the Commissioners, Guildhall, Newport.

KENSINGTON, March 31.—For the erection of a porter’s lodge, relief offices, and clerk’s office, and alterations to the receiving wards at the workhouse in Marloes-road. E. Herbert Draper, Clerk to the Guardians, 1, Devonshire-terrace, Marloes-road, Kensington.

LEEDS, April 9.—For the erection of a new Wesleyan Chapel in Beckett-street. Messrs. Hill and Swann, architects, Leeds.

LEEDS, March 31.—For the erection of a new chapel, Ladywood, Birmingham. Messrs. Hill and Swann, architects, Leeds.

MIDDLESBROUGH, March 31.—For the erection of winch houses and waiting rooms, the formation of roads and embankments, and the construction of iron draw-bridges, tramways, &c., required in carrying out the new cart ferry works on the north and south sides of the River Tees at Middlesbrough and Port Clarence. Mr. E. D. Latham, Borough Surveyor, Middlesbrough.

MIDLAND RAILWAY, April 2.—For the erection of wagon-repairing-shops and other works at Wigstone. Plans at the Engineer’s Office, Leicester.

NORTH EASTERN RAILWAY, April 3.—For the alteration of the Norton-road Crossing at Stockton. C. N. Wilkinson, Secretary, York.

NORTH-EASTERN RAILWAY, April 3.—For painting buildings, &c., on the Beverley and Market Weighton and Whitby Branches. C. N. Wilkinson, Secretary, York.

OXFORD, April 7.—For the construction of about 3,450 yards of brick sewers, and about 8,100 yards of stone-ware pipe sewers, with bell-mouths, manholes, ventilators, &c. Frederick J. Morrell, Clerk to the Board, 1a, S. Giles’s, Oxford.

PADDINGTON, March 31.—For the supply of Guernsey granite for repairing the roads. F. Dethridge, Vestry Clerk, Vestry Hall, Harrow-road.

PLUMSTEAD DISTRICT BOARD OF WORKS, April 2.—For kerbing, channelling, metalling, &c. J. M. Dale, Clerk, Old Charlton.

RAWDON, April 2.—For the erection of a residence at Buckstone-park. Messrs. Lockwood and Mawson, Architects, Bradford.

ROYAL EXCHANGE, LEEDS.—Extension of time.—The time for receiving tenders for the erection of the building is extended to Thursday, April 3, 1873. Henry H. Sales, Secretary.

TRINIDAD GOVERNMENT RAILWAY, April 2.—For the construction of about 16 miles of railway in the Island of Trinidad. P. G. Julian and W. C. Sargeant, Crown Agents for the Colonies, Spring-gardens.

WELLAND, WORCESTER, April 10.—For the erection of a new church. Apply to Mr. F. Rogers, 9, Serle-street, Lincoln’s-inn, W.C.

BANKRUPTS.

(To Surrender in the Country.)
James Neath, Bridgewater, April 9, at Bridgewater.

PARTNERSHIPS DISSOLVED:

Prestage and Co., Milbrough Tileries, near Broseley, brick and tile manufacturers.—Joseph Mountford and Son, Bewdley, carpenters.—Cambridge and Parham, Bristol, engineers.—Preston and Watson, Burnley, painters and decorators.—Nelson and Weymouth, Sunderland, engineers and ironfounders.—Daniel Doncaster and Sons, Sheffield, iron and steel merchants.—Tomlinson and Shaw, Clitheroe, slaters and plasterers.—T. and H. McIntyre, Kingston-on-Thames, slaters and slate merchants.—Edwd. T. Quiggin and Co., Douglas, Isle of Man, timber merchants, ropemakers.—Taylor and Firth, Halifax, slaters and plasterers.—D. and B. Tate, Knottingley, lime burners.—Collinge and Clegg, Burnley, joiners.—The Pentregwyddel Quarry Company, the Graiglywd Quarry Company, and Baines, Lupton, and Co., Llysfaen and Dwygyfylchi, and Liverpool.—Moore and Critchley, Chadderton, joiners.

ROYAL POLYTECHNIC, 309,

Regent-street.—LENT.—Fuel: what shall we burn? New and important Lecture, by Professor Gardner.—The Worlds above New Astronomical Lecture, by Mr. King, with Spectral and Dioramic Effects by Dr. Croft.—Hide and Seek: New Comical and Character Entertainment, by Mr. Percy Vere.—How Jane Conquest sang the Bell, by Mrs. Oswald Hughes: with splendid effects. Many other entertainments. Admission 1s. Open twice daily, 12 to 5, and 7 to 10.

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 4, 1873.

TROY.

IN the chronicles of cities, Troy, after Jerusalem, Rome, and Athens, might be said to stand foremost, provided only that the fact of its ever having existed be proved. The Society of Antiquaries, anxious upon this question, applied to the Chancellor of the Exchequer for help towards a solution of it. Mr. Lowe gave to this learned body a distinct refusal. We do not say that he was unjustified. It is among the pleasures and privileges of wealth to undertake these erudite investigations, and those who are so ardent over the supposed tombs of Achilles and Hector should loosen their purse-strings, in order that great historic doubts may be set at rest. Is the Troad any more than a tradition? Did Troy ever stand upon that plain, or is it as mythical as Helen herself and the Wooden Horse? We know what Ilium is now called—Bunar-bashi; but it is little more than a heap of huts, and the barrows which have already been examined disclosed not a trace of heroic skeletons. We are far from disparaging archaeological enthusiasm; but, before digging up the dust of centuries absolutely without a date, we ought to have some notion of what we are looking for. In the first place, Troy; in the second, Ajax, Achilles, and Hector. Now, before satisfying ourselves concerning Troy, we should, logically, be sure that Homer ever lived, though the epic should be regarded as sufficient to solve that problem. Well, accepting the poet, we may not be wrong in accepting, up to a certain point, the poem; and there is no substantial reason why Troy should not have been built and besieged. The Homeric plain is palpably there, dull enough of aspect, but containing indubitable evidence of a former period, when walls and palaces and tombs bore witness to the civilisation of a passed-away people; and why not Trojans as well as any others? The site of Priam's home, though covered over with hovels, has been immemorially indicated by sailors as a landmark. So, indeed, with all the *tumuli*, discredited or not. The very positions of the gates are marked, but this is a sort of modern topography not by any means difficult to compile. A writer on this subject once wrote, "If Bunar-bashi be not the site of Troy, what is?" Dr. Johnson used the same argument—"If Shakespeare did not write 'Titus Andronicus,' who did?" to which appeal to human ignorance the fittest answer is, "I don't know." We have, it is true, a work computed to be about three thousand years old, which is exceedingly circumstantial, yet in which gods and goddesses quarrel and fight with each other, and with men; in which rivers flow backwards over mountains; in which horses talk and shed tears; in which a city figures that had not left a trace of itself so long ago as the age of Alexander; and of which neither Julius Cæsar nor Strabo knew anything. It seems rather late in the day to excavate for proofs that *Ilium Fuit*. Of course, if individual scholarship is hungry upon the question, let it set to work and inform us whether the prominences of surface hitherto called *tumuli* or barrows are not merely natural hillocks; why certain fabulous names are attached to them; how previous ransackings have failed to detect anything beyond dust—not even ashes—in their depths; and what may be the antiquity of those small granite pillars still standing round the Port of Troas, which have an appearance considerably more Turkish than Greek? It is the shallowest absurdity to mistake the ruined walls in that neighbourhood for relics of the epic Troy; or the granite blocks scattered about; or the fractured arches borrowed from the water-works of a comparatively modern Carthage. The gymnasium

and the amphitheatre, Roman beyond a doubt, though a more remote antiquity may belong to the vast piles, unique in the world, constructed of petrified cockleshells, and, in all likelihood, originally encrusted with marble. But the earthen spouts and pipes are manifestly of a later time than we can attribute, with all our love of the "blind old man," to the days of his ideal Nestor. As well believe in the high-turretted Avalon of the Athenian epic. Acland says, "On one side is a ruin of brick, and behind, without the city wall, are sepulchres. One of these is of the masonry called 'reticulated,' or netted. An aqueduct begins behind the city, not far from the sepulchres, and is seen descending and crossing the country on the side next the Hellespont, extending several miles. The piers are 5ft. 9in. wide, 3ft. 2in. thick, the space between them 12ft. 4in. The arches are all broken." No mention of these structures is to be found in the "Iliad," though Greek writers have interpolated more than one, in accordance with the charge brought against them by their mighty dramatist, "What dares not lying Greece in histories insert?" Thus the traveller is inspired or cheated as the case may be, and comes home rejoicing in that he may have shaken from his shoes the dust of Hector. He has seen the site of "Windy Troy,"—he has stood upon the tomb of the swift-footed Myrina—he has followed in the footsteps of the Wooden Horse—he has even, with Bryant, not viewed the spot where Achilles was buried, but the very place where his tent was pitched. Cannot Lord Stanhope be satisfied when it is demonstrated by geography that the voice of Agamemnon was heard from the top of one mound to the top of another, a distance of three English miles? A poem, however, is not necessarily a falsehood. It may be simply a gathering up of legends from a land full of fable, and the weaving of them in one pattern, so as to produce a picture. We think none the less of Hector because it is impossible to credit the story of his running three times round Troy—an achievement which would have killed a racehorse. But there must be some limit to learned credulity, and to the practice of dovetailing every accident of ground in what is called the Troad with the chronicles of Homer's Troy. Where, then, shall the limit be fixed? Suppose we commence our scepticism with the statement that Helen, the cause of the war, was hatched out of a pigeon's egg! That will suffice, perhaps, without the hundred and forty-nine reasons alleged by Bryant for treating the whole epic as a fabrication, and that the "Iliad" is no more than an allegory; no such city having ever existed, and no such expedition having ever taken place. It is fair to add that Colonel Leake is not of this opinion; he distinctly credits the tradition of Troy,—"To doubt it would shake the whole fabric of profane history;" but even he was perplexed when challenged to identify the probable site. "With regard to the existing barrows, it seems incontrovertible only that those which stand in conspicuous situations on either side of the Scamander are the *tumuli* supposed in the time of the Romans, and probably with reason, to have been the sepulchres of Ajax, Achilles, and some other chieftains;" but he does not attempt a reply to the question:—Are they barrows at all? It might be easily answered, though not, as Mr. Lowe suggests, at the public expense. Sir William Gell was sceptical, although earnestly believing in the fact that a city of Troy existed *somewhere*. He thought that most of the mounds were apocryphal and capriciously named, especially those purporting to be the graves of Hector and Achilles. Even assuming, however, that among the turbaned monuments of the Trojan plains we found an urn or two which might once have contained human ashes, those tombs would remain impenetrably silent as to the individuality of the dead. Still, should Lord Stanhope and any scholarly friends whom he may gather round himself persevere, some

results are possible of interest to the antiquarian mind.

THE AVENUE AND THE CENTRAL HALL IN CHURCH DESIGN.

THE GOTHIC revival, however slowly and circuitously it may have progressed, seems at last to be nearing the point at which it will condescend to deal with the facts of the age. Some, at least, of its more advanced supporters have gone so far as to recognise the nineteenth century, even in ecclesiastical matters, and have felt that it is not a sufficient excuse for building churches in which a large part of the congregation are shut out from the service to say that such churches were commonly built in Mediæval times. There does appear just now to be a movement towards reality in design—slight, perhaps, and partial in its operation, but destined to strengthen and to spread, unless architecture is destined to perish.

The world has changed since the middle ages; and in spite of all sentimental regrets, it is well for art that it *has* changed. It is hard to raise a second crop from an exhausted soil, and the labour of clearing fresh ground may some day be repaid in a plentiful harvest. All deeply interesting architecture is that of men who have struck out something new—a new style, a new system of construction, or a new type of plan and arrangement. When these are new, the art-world is young: it is what we call an "Early" period. There are, then, endless problems to be solved; and the new style or the new system is the key which will solve them. The process keeps men's minds awake: their work is full of life, and hope, and earnestness. Generations pass on, and each finds less and less remaining to be done; the period becomes "later" and "later;" at length all the problems have been dealt with to which that particular method will apply; there is no more room for invention, and the art-world of that epoch passes away.

In some such way as this, perhaps, the rise and fall of Pointed architecture may fairly be epitomised, and we may write on its monument, "It died for want of difficulties." It had conquered the world, and then perished because there was not another world to conquer. There is another world now, and the only hope of its genuine revival lies in its attacking the world of to-day as vigorously as it did that of the twelfth and thirteenth centuries. Hitherto, in the last twenty or thirty years, it has been content to fight its old battles over, and thrice to slay the slain. In church-building, more especially, has this been the case. It was thought something like heresy not long ago even to suggest the application of Gothic principles to anything but the most stereotyped of church arrangements; and the worst proof that any one could give of his admiration for Mediæval art was to believe it applicable to any besides the commonest Mediæval form of plan. Happily, times seem to have changed; and it is no longer insisted on as a reason for perpetuating a very inconvenient form of building that it was thoroughly worn out and exhausted by our Middle Age predecessors. What is the best type for the purpose, is a question which may now be discussed on its merits, and on which a few remarks at present suggest themselves.

There are two grand types on which, at different times and places, churches, as well as other large buildings of a monumental class, have been arranged. The one is the principle of the central hall, and the other of the avenue. The architects of the middle ages recognised them both, but, whereas they worked the latter type so completely that we can hardly hope to do anything with it which they have not done before us, they only went far enough with the former to indicate its splendid capabilities. In taking it up, either alone, or in combination with the opposite system, we come at once into a new art world,

so far at least as church-building is concerned. If we have not a new style, we have what is quite as good—a new set of problems for the old style to deal with; a new series of difficulties for it, and therefore a new lease of life, for life is only the increasing conquest of difficulties. These difficulties, too, are by no means gratuitous ones; they, or others as important, *must* be encountered, if church architecture is to satisfy present wants. The common nave and aisles plan, that familiar example of the avenue system, is incapable of satisfying them: if it is not abandoned, it must be very greatly modified to make it do so. It would never have been designed at all for the conditions of modern society, or for the purposes of a modern congregation; and if we once admit that architectural works should fulfil and express their destination, there is no longer a choice about keeping or leaving it. The central hall arrangement, on the contrary, is one which, on the face of it, is convenient. It gives open, unobstructed spaces in which every one can see and hear the service, and the only fault which can be found with it is, not that it is unfit for its proposed use, but that we shall have the trouble, if we adopt it, of thinking out all kinds of puzzles before we can fairly put it into a Gothic shape. The same thing, of course, would be true about every novelty, and we may be sure that the designers of the pre-Gothic Transitional period, or of any other transitional period before a great advance, did not find their art an easy one. The history of groined vaulting and of buttress design, for example, shows plenty of failures in its earlier stage, and plenty of earnest, though unsuccessful effort: but the difficulties were conquered at last, and the reward was worth the labour.

The avenue type of arrangement, generally speaking, may be described as having been the common one in Western Europe, and the central hall one as having been more prevalent in Eastern Europe and Asia. But after all, it is a question of degree, and neither type was rigidly confined within geographical limits. The Greek Church had a preference for the one form, the Catholic Church for the other; but neither kept its favourite system quite unmixed. A pure example of the former class would have no aisles, and one of the latter class no central dome or tower; but each arrangement, it was soon found, had much to gain by borrowing from the other. In strictness, a building purely of the avenue type would be planned like an early basilica—for example, a longitudinal axis running from end to end; while a building purely of the central hall type, would be grouped round a vertical axis, standing in the middle of the central space. The former is the usual arrangement of our parish churches, whether with aisles or without, as long as they have no central towers: it is the arrangement of many Continental cathedrals, and of not a few Oriental buildings, both Christian and Mahometan. The latter is the arrangement of S. Sophia, Constantinople, and of the numerous mosques which were derived from it; of the Metropolitan and other Byzantine churches at Athens, as well as Ephesus, Thessalonica, and in Turkey generally: it is also the arrangement of many Saracenic buildings in Persia and India; and it is found all over Europe in aisleless cruciform churches, with a central lantern or dome. In nearly all the English cathedrals the two types exist in combination. They have the vertical axis in their central towers, round which the nave, choir, and transepts are symmetrically grouped, but they have also the longitudinal axis, running from north to south and from east to west. They display the central hall system when examined at the crossing, and the avenue system when observed from other points of view; and so far have an advantage, both within and without, over those foreign cathedrals, where there is no central tower or dome, or lantern sufficiently important to become a leading feature in the design. The union of the two

types is most marked, however, in such instances as Ely Cathedral and the Duomo at Florence, where the central space is not only crowned with a magnificent dome or vault, but has also the vast unbroken area which marks it out at once as the ruling idea of the whole composition. JAMES CUBITT.

(To be continued.)

THE SOUTH KENSINGTON MUSEUM EXTENSION.

WE briefly announced last week that a new court (to be called the South-East Court) would shortly be opened at the South Kensington Museum, in which gigantic casts of works of Indian, Roman, and Gothic art will be exhibited to the students and the public. It is nearly ten years, be believe, since the foundation was laid of the enormous brick erection which now towers so conspicuously, if as yet not very elegantly, above the old familiar Brompton boilers, and immediately in rear of them. It has no doubt long been a strange puzzle to the uninitiated to divine the purpose to be served by this odd-looking structure, bearing as it does a striking resemblance to a Thames-street warehouse, but without a single window in it. What could be the object of having such a mass of dead brick wall? The interior obviously was the point of interest, and what was the interior like, or going to be like? None but the officials of the department could tell, and they preserved a strict silence on the subject, while the approaches to the new court have been carefully railed off from public intrusion. Meanwhile a most important and interesting work has been going on for years, and is now far advanced towards completion. Deferring any detailed description or criticism of the structure for the present, we may note here one or two particulars concerning it. Many of our readers are probably aware that a considerable number of large casts of celebrated works to be found in different countries are scattered throughout the Museum in a fragmentary condition, there being no place therein affording sufficient room for their proper exhibition in a whole or complete state. These casts are increasing every year, the result of an arrangement come to during the exhibition year of, we think, 1862, whereby the different Continental Governments and our own agreed to allow each other facilities for acquiring casts of the most famous works of architecture and sculpture in their various countries. For these, then, a special building was necessary, and hence the erection of the new court, or courts, for there are practically two courts, identically similar in dimensions and general treatment, and differing only in the objects they contain or will contain. Each court is 135ft. long by 60ft. 5in. wide. From the floor to the spring of the arched light is 72ft. 6in., and to the highest part of the skylight 82ft. 6in. The great object being to secure the largest amount of wall space, the principal light is from the roof, which in each court consists of no fewer than 286 squares of ground glass, each frame being 3ft. 6in. square, and placed in the iron framework without any putty, so as to allow of the contraction and expansion of the metal. At the north end of either court are three windows overlooking the museum. Running round three sides of either court, and at a height of 50ft. from the floor, is a balcony or gallery with stone balustrade, which springs from the wall, and is supported by innumerable brackets richly ornamented. A central part divides, and at the same time communicates with, the courts. It consists of a corridor 16ft. 10in. wide, with three openings into the courts on either side, and overhead a gallery of similar dimensions looking into the courts and affording the visitor a good view of the upper portion of the more massive objects in them. One end of this corridor communicates with the museum proper, and the chief entrance to the new building is from the outside, at the right

of the main entrance to the museum. The decoration of the court not being yet finished, we reserve any remarks on it. It is here intended, then, to exhibit casts of many of the finest works of art and architecture that the world can boast of. Thus the most conspicuous object in one court will be the Trajan column—a facsimile of the famous pillar erected by the architect, Apollodorus, at Rome, A.D., 114. This column, as our readers know, is 132ft. high, with a spiral staircase leading to the top, and is crowded with bas-reliefs representing the victories of Trajan in Dacia, in exquisite workmanship, though unfortunately much injured by time. The column was originally surmounted by a statue of the Emperor in bronze, but this was removed by Pope Sixtus the Fifth, in the latter part of the sixteenth century, and replaced by a statue of S. Peter. In consequence of its height, it has been necessary to erect the model in two pieces, the larger of which is about 80ft. high, and the plaster casts, which have all been executed in France, are now being fixed to the body of the column, which is of brick. One of the principal features of the opposite court is a reduced copy of King Akbar's throne seat at Futtehpore, India. This model is 30ft. square, having a column 15ft. high, and promises to be a very striking object when once finished. Among the other monuments of architectural and sculptural genius, in which the art-student will find a mine of wealth, we may mention the following:—A cast of the Portico de la Gloria of the Cathedral at Santiago de Compostella, Spain, the work of Maestro Matteo, A.D. 1180-90. The Government sent out Mr. G. Brucciani, who was employed many months in taking castings of this magnificent work. The *facsimile* occupies the whole of the north end of one court. We have a fine example of Buddhist art in a cast of the eastern gateway of the Sanchi Tope, near Bilsah Bhopal, Central India—supposed date, A.D. 19-37. There are also casts from sculptures taken from the ruined city of Saitron Rajpootana (about 1100); of the porch of Sheikh Sulior Christes tomb, Fathpur Sekri, near Agra, Mogul art (1556-1605); and of the sculptured iron column of Delhi, which has this peculiarity about it, that while it stands 22ft. above ground, it goes much deeper into the ground—27ft. to 30ft. at least. As illustrating Flemish art in the fifteenth century, there is a plaster cast from the Tabernacle of the Church of Notre Dame, at Hal, near Brussels; and from the province of North Brabant we have the rood-loft from the Cathedral of Bois le Duc—an elaborate and splendid work, in black and coloured marble, which cost the Museum £900—March, 1623. [Such are a few of the principal contents of the new court, which, when completed, will be one of the most valuable and important sections of the South Kensington Museum.

QUANTITIES.—XII.

PLUMBER.

THE admeasurement of plumber's work, whilst perhaps more simple than that of the trades of which I have already treated, requires a greater degree of carefulness in taking the dimensions, as, owing to the expensive nature of the material and labour, an error which might appear at first sight to be small, frequently turns out to be an expensive one. Therefore, in all cases take the exact dimensions for the additions and deductions, making no allowances whatever. It may be as well to observe here that, whilst comparatively easy to the quantity-surveyor to take off the quantities and measure up the work appertaining to plumbing, it is often very difficult for a builder to prepare his estimate, owing to the peculiar circumstances under which the work may be executed, varying in almost every job; the difficulties of fixing pipes depending upon the situation of the

several cisterns, sinks, &c., and the construction of the different parts of the building—in some cases entailing considerably more cutting away and making good than in others—and as in many cases the builders do not even know in what portion of the building some of the connections are to be made, the force of this remark becomes the more apparent.

It is therefore sometimes on this account customary to charge plumbers' work as day work—that is, to charge the labour and material separately after the work has been executed; in which case the builder would obtain a fair percentage on the work without any risk of loss—and I do not know but what such a course is to be preferred; but where the job has to be estimated for in the usual way, it must be measured in manner hereafter explained, the material and labour being taken together. Sheet-lead is measured by the foot super., and reduced afterwards to weight, the specification stating the quality of the material—as 5lb., 6lb., or 7lb. to the foot superficial—and, of course, by multiplying the superficial area by the number of lbs. to the foot, we arrive at the weight of the required surface. Where the weight is not given it is simple enough to have a sample cut off, one foot square, and weigh it yourself. Where a builder is not to be trusted, it is advisable to check the quality of the lead in this way, and to ascertain whether it is in accordance with the Specification; indeed, such a course is advisable on all occasions.

Commence measuring the leadwork to roof, taking firstly any flats, then the gutter, and lastly the flashings. In abstracting, head a separate column for each of the different qualities of lead.

In flats take the extreme dimensions each way; but when out of the square take the average, so as to arrive at the net area. Include all turnings up, drips, and rolls; in the latter case the amount to add to the width would be, in a properly constructed roll, as shown in Fig. 31, twice the circumference of

FIG. 31



the roll, less the net width of the same. This would give about 6in. wide, and supposing the net size of flat to be 12ft. by 10½ft., and to have five rolls running the lengthways of the flat, and to be turned up each way 6in., this would appear in the dimension book as follows:—

Length . . .	12 . 0
Turns up 2/6in.	1 . 0
	13 . 0
Width . . .	10 . 0
Rolls 5/6in . .	2 . 6
Turns up 2/6in.	1 . 0
	13 . 6

13 . 0	6lb. milled lead in
13 . 6	175 . 6
	flat.

Where drips occur, add the width to the flat on waste, so as to bring the whole forward in one dimension.

Number the bossed and soldered ends to rolls, and also the extra labour in forming any cesspools in flats, in which case it will also be necessary to take outlet or socket pipes for communication of rainwater from flat to down pipe. These are also numbered, stating size and length. Collect the round of the walls for the flashing, on waste, adding for the laps at the angles, for the length; state the width, and the quality of the material, which is generally of less weight per foot than that to the flat.

In measuring gutters, take the entire length, adding for laps and turns up, and the sum of these by the average width will give the area. It is always advisable to show how the whole

of the dimensions are arrived at, on "Waste." Number cesspools and outlet pipes as before.

Coverings to dormers, cheeks, aprons, &c., are all measured by the foot superficial, including all laps, &c., as are also hips and ridges.

Flashings, where stepped, should be kept separate from the foregoing in the bill, and when against stone it is necessary to take a separate dimension of "burning in flashing," which would be simply a running dimension, stating the length.

Pointing to flashing is measured with the Bricklayer, as stated therein.

After abstracting the sheet-lead, it is brought into bill by multiplying the area by the weight per foot; thus, supposing the area of 6lb. lead to be 150ft., this would equal 900lb. or 8wt. 0qrs. 4lb., to which should be added the weight of the 5lb. and 7lb. lead, if any, ascertained in a similar way, and the whole brought into bill in one item.

Leadwork in dressing to finials is measured in with the foregoing, and where extra labour is required, it is expressed as "Extra labour and solder in dressing lead round moulded base of finial 12in. by 12in., and 16in. high, as sketch," or as case may be, giving sketch where necessary.

Leadwork to cisterns and sinks is kept separate from the foregoing in the bill, as shown in the table, but measured in a similar manner, taking care to add all laps, &c. Take a running dimension of soldering to angles, and also of nailing, stating whether lead-headed or copper nailing, and whether laid close or otherwise. Number the standing waste, and state whether trumpet-mouthed; also number washer and waste, and all other brass work hereafter described.

Lead pipes are measured by the foot run, and would be easier billed in this way, though many surveyors prefer to bill them as they are sold, viz., by weight. State the sizes and quality where taken at per foot run; also mention whether including all joints, &c., &c., although it is better to number the same as extra, which is seldom done. Number all cocks, stating sizes and giving full description, whether rivet or screw bottom, and if with screw bosses. Be particular to state whether stop, bib, or ball-cocks, and if the latter, do not omit the balls.

Also number all washers, plugs, unions, traps, gratings, giving full description in each case.

W.C. APPARATUS.—The w.c. apparatus is generally numbered complete, giving full description of the quality of the different parts, if with white or blue basin, patent valves, brass, flat, or sunk plate, &c., &c., and if patent closets, give name of patentee, and p. c. value of the same. Number the D traps, and take any soil-pipes by the foot run, stating the diameter and the weight of the lead it is made of per foot superficial. Number the joints, and take extra labour in forming any elbows or bends. Also number all service boxes.

Pumps are numbered, stating description and p. c. value, exclusive of fixing, the builder adding cost of carriage, profit, and fixing complete.

Lavatories and urinals are also numbered and described, and brasswork and pipes being taken separately, as previously described.

TABLE VIII.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement:—

Milled lead, and labour in gutters, flat, flashings, &c., including all solder wall-hooks, &c., complete	At per cwt.
Do. in step flashings	"
Do. in linings to cisterns, sinks, &c.	"
Close copper nailing	At per foot run
Zinc nailing	"
4in. strong drawn lead pipe and fixing	At per foot run
Joints to 4in. pipe	At per number
(Here follow other diameters of pipes, stating smallest first)	

4in. lead soil pipe out of 7lb. lead and fixing	At per foot run
Joints to do.	At per number
Elbows to do. (extra only)	"
Trumpet-mouthed standing waste, 2ft 6in. long	"
Brass washer and waste (stating size)	"
Do. with fly nuts for slate cisterns (do.)	"
Lead bell-traps with brass grates (do.)	"
Brass unions for lead pipe (do.)	"
Barrel do. screwed for iron pipe (do.)	"
Brass washer, plug and chain (do.)	"
Brass stop-cock, screw bottom with brass spanner (do.)	"
Do. bib-cock, screw bottom and boss crutch keyed (do.)	"
Do. ball-cock screw bottom and boss, and copper ball (do.)	"
Do. equilibrium ball valves and copper balls (do.)	"
Do. high pressure diaphragm stop-valves (do.)	"
Ends of rolls, bossed and soldered	"
Extra to forming cesspools.	"
3in. lead outlet pipes and soldering (stating length)	"
Full-sized bright pan closet, with copper fan, round valve, ball lever, cranks and copper wire	"
Do. pan closet with supply valve and Underhay's patent regulator, sunk dish and blue basin	"
Elastic valve closet with supply valve and Underhay's regulator, sunk dish with cut glass handle, blue basin	"
Lead D traps	"
Do. service boxes	"
Washhand basins and lavatories (stating sizes and description)	"
Urinals (do. do.)	"

ZINCWORKER.

The measurement of zinc work is so very similar to that of plumber's work, that I have thought it advisable to include it in the present article. The difference is that whereas leadwork is valued by weight, zinc is charged by the foot superficial, the different qualities of the material being specified by numerals. In billing, therefore, it is necessary to specify the number of the zinc, and any other observations which may be required as to materials, &c.

The following articles which I have not described in the Plumber, I will briefly enumerate here. Gutter and rainwater pipes are measured by the foot run, stating the sizes in each case, and the description. Number the stopped ends and outlets to gutters, and the heads and shoes to rainwater pipes, also the ears, swan-necks, &c., &c., giving sizes and descriptions where required.

Zinc tallboys, ventilators, and water-balls, are numbered.

Zinc skylights are generally valued at per foot superficial, extra being charged for sliding or other ventilators in the same.

Metal lights are also measured by the foot superficial. It is necessary that a full description should be given, stating whether plain or ornamental.

Speaking pipes are measured by the foot run, numbering all elbows as extra only; also numbering all mouthpieces, whistles, &c., and giving description.

TABLE IX.

This table has a double use: it shows the order of taking this Trade, and the method of measurement.

Malleable zinc in flats, &c., including all labour. No. 13 gauge.	Per foot superficial.
Do. in gutters. No. 12	"
4in. O.G. gutter	At per foot run.
Stopped ends	At per number.
Outlets	"

Sin. Rainwater pipe ...	At per foot run.
Square heads ...	At per number.
Shoes ...	"
Bars ...	"
Ventilators (giving de- scription) ...	"
Tallboys (giving description) ...	"
Metal lights (do.) ...	"
Speaking tube ...	At per foot run.
Extra to elbows ...	At per number.
Flexible tube ...	At per foot run.
Mouthpieces ...	At per number.
Whistles and chains ...	"

I have now completed all the Trades with the exception of the following:—The Stone Mason, the Painter and Glazier, the Paper-hanger, and the Gilder. B. F.

HISTORIC ART STUDIES.

By DR. G. G. ZERFF.

EARLY CHRISTIAN ART.—(With Illustrations.)

WE trace in Christian art a beginning, but not a beginning which by degrees develops itself into certain fixed and stiffened forms, and then has no more vitality to progress. We have, in studying Christian art, to go underground, and there watch it taking root in the heart of humanity, amongst dead bodies in the catacombs. Single savage-looking signs—a cross, a badly-carved dove, a palm-twig, a wreath of roses, a lily, a badly-drawn shepherd with a worse-drawn sheep on his shoulders—are the first Christian works of art. A few initials hewn into a rocky wall, and many tears, shed in the hope of a joyful meeting, were glorious emblems of the new faith. A semicircular table, covered with a white cloth, a coarse dish, and an equally coarse pitcher, to celebrate the feast of love, “the Agape,” were all that was required by the early Christians. In the beginning there were no temples, no churches, no cathedrals. There was no *special* form of worship, no *special* ritual, no *special* art. Nowhere can we trace the downfall of the Oriental and Classic world so clearly as in the works of Christian art. The struggle against over-awing matter was unsuccessfully attempted by the Orientals: by the Indians metaphysically, by the Persians politically, and by the Egyptians symbolically. The Greeks through art established a formal harmony between matter and spirit. The new faith, however, engendered new powers. The formal undoubtedly existed in the immortal marble works of Greece and Rome, but the spirit was not yet freed. The spirit learned, through Christianity, to renounce everything material, and to devote itself exclusively to the immaterial. This attempt was the glorious path to the infinite, to the symmetrically harmonious, to beauty and virtue. The essence of things was no more to be sought for in the variety of isolated phenomena, but in that which these phenomena had in common—that which made them *one*, and united them into a great total. The universal takes the place of the particular. The special phenomena of nature are no more to be personified. Time is no more the hoary old man Kronos: it becomes a mere notion of a succession of events; and matter is no more the thunderbolt-wielding Zeus, but a shapeless element, into which spirit has to bring order and form. The spiritual, the ideal, the general, becomes essential. This immersion into the universal appeared to those who were accustomed to the particular, madness or ecstasy. There is, however, a great difference in the meaning of these two words. Madness is excitement without aim, whilst ecstasy has a sublime purpose. Christianity in art was an idealisation of the form through spirit. The cross was badly drawn, the form of the Redeemer painted in a style of pre-historic art; but still the cross represented the instrument of redemption, and the badly-shaped, distorted limbs of the Redeemer were hallowed by an ecstatic love for Him who died on the Cross; the idea thus destroyed the shortcomings of the formal representation. The material form

was considered so entirely secondary, that we are at a loss to find any æsthetic form in early Christian art.

Ethnologically, the Christians belonged to all nations, races, and groups of humanity. Geographically, Asia, Europe, and Africa, furnished it with variegated influences. The valley of the Nile taught the Christian artists to construct catacombs. Greece gave them human forms. Apollo was turned into Christ; Herkules into S. Christopher; Jupiter into S. Peter; Venus into Mary Magdalene; Juno or Minerva into the Virgin Mary, and Hermes into the Good Shepherd. These forms, though borrowed from Anti-Christians, were deemed correct, because they served to express sublime ideas. The placing of the idea in an inordinate superiority inevitably produced symbolic mysticism, which was fostered by the converted learned of the different ancient religious sects. The Brahmins brought Vedantic, the Greeks Platonic, the Egyptians Ritualistic; the Persians, Dualistic; the Buddhists, Trinitarian Quietistic; the Jews, prophetic and typic; and the Romans, dialectic elements. From these, by degrees, formal and ideal Christianity was formed and transformed, in analogy with Early Christian architecture. The invisible idea of salvation, the New Covenant, was to receive a perceptible form as the mystic principle of redemption. Christianity issued from its pure and divine source as a fructifying spiritual rivulet, fed by all the previously existing religious springs and rivers, and at last expanded into a vast life-giving ocean of universal love. The outward manifestation of an inward idea, the self-revelation of the artist's feelings became the fundamental elements of Christian art. The “*νοος*” was assumed to be the creative principle; the “*λογος*” its embodiment, conveying some conception. The “*λογος*” were set down as the types of things real; but matter (the element of evil, of sin and corruption) was to be used as an instrument of expression. To bring these “*ideas*” into corresponding forms was the great difficulty. It could only be done (a) symbolically, (b) allegorically, (c) mythically, or (d) emblematically. Thus Christian art was launched into ikonology, which through the spirit dominated the outward form. The Christian architects, sculptors, and painters used very few new symbols, as they found nearly all the available forms had been exhausted by the ancient world. The symbol was to express a general idea through a special outward sign without any homogeneity between sign and meaning. A triangle with its point upwards was to mean fire; two interwoven triangles, borrowed from the Indians, expressed the mystic conception of the Trinity; the Cross, used by the Egyptians as “*crux ansata*” (‡) was the symbol of redemption. The allegory (from *αλληγορεω* “to speak so as to imply other than what is said”) conveys a hidden meaning in the sign, with a clearly perceptible connection between meaning and what is meant. The more clearly the meaning is conveyed in the sign, the better is the allegory. The art of painting was said by Simonides to be speechless poetry, using symbols and allegories to express itself. Myths often took their origin in symbols and allegories. They were used by priests, sometimes literally, sometimes metaphorically, and originated the endless commentaries, exegetical expositions, and dogmatic explanations which altogether smothered the first divine simplicity of the Christian religion. Emblems were applied by the Greeks to plastic art, the movable silver or golden figures on large vessels being designated by that name. Lucilius, the Roman writer, used the word in the sense of speaking figuratively. The emblem is a fixed outward sign of an inward idea. Thus, blue or white is the emblem of innocence; red that of joy; and green that of hope. These are the spiritual essences from which Christian art developed. To know only this art, and to ignore all that was taken from other previous art-forms from the very first,

is to know nothing of Christian art. Glancing at our twelve illustrations, our attention is directed to the struggle between the material and the form. Wood and stone are used, the stone often being treated as wood, and *vice versa*. Further, there is an uncertainty about the straight lines and the arches. We find the heights of the columns and the heights of the buildings disproportionate. In the section of the basilika of “S. Paolo Fuori le Mura” (Fig. 2), we observe that the columns were 33ft. in height, or one-third of the whole building—a proportion which certainly is not symmetrical. The arches also were not sufficiently bold. The basilika was 404ft. long by 208ft. broad; it was divided by rows of twenty columns into five aisles. Seven doors led from a vast portico to the interior (see ground plan, Fig. 4). The apsis or tribune (the concha, or shell) was separated by a broad transept from the nave. This was a later arrangement, separating the clergy and the sanctuary from the masses. The transept was connected with the nave by an imposing arch, called the triumphal arch, whilst smaller arches led to the side aisles. The upper walls of the central nave were broken by arched windows. The walls of the transept and the apses were adorned with mosaics. This church was built towards the end of the fourth century, and destroyed by fire in 1823. Our plans are taken from drawings of the old church before the conflagration. Fig. 1 shows us the construction of the framework of the roof. Fig. 3 is a section showing the proportion of the aisles, whilst Fig. 2 gives us a clearer idea of the arrangement of the apsis and transept. The scale is in Parisian feet (100ft. English = 93·829 Parisian feet.) We see the old Roman arrangement of a basilika, a court of justice, preserved. In these courts all nations demanded justice from the Roman incarnation of the divinity, the Emperor. Comfort and love were now to be gained in similar constructed buildings. The seven gates show us that the Christians, like the nations of old, believed in the sanctity of the planetary number seven. The five aisles clearly prove that the Trinitarian idea had not found a symbolic expression in the ground plan of the church. The basilikas of S. Clement (see Figs. 7 and 8), and of S. Prassede (Fig. 9), at Rome, give us the old Indian and Egyptian temple arrangement in a Christianised form. We have a *pronaos* (see Fig. 7) in the large square portico; the *naos* in the three central aisles, whilst the *adytum* is the apsis with the two side tribunes. The *naos* is a step lower than the apsis, and separated from it by a marble balustrade. The division between the lay and clerical world is always more and more marked. An improvement is to be observed in the straight architecture, supported by Corinthian columns, broken by massive pillars which support three heavy brick-built arches. The cross walls are provided with two windows, and each of the three divisions with three large arched windows. The basilika of S. Apollinare in Classe, at Ravenna (see Fig. 5), exhibits in its forms influences of a totally different character. Teutons, Ostrogoths, and Longobards (Langbarte, long-bearded men), Western and Eastern Romans, had in succession driven away four different dynasties, and undoubtedly changed the architecture of the Christian churches. A most important feature is the addition of an isolated round tower of Aryan origin, used long before the Christian era by Buddhists, in the distant South of India, and by Kelts in Ireland. The outward appearance of these churches differs widely from that of the temples of the Greeks and Romans. A studied simplicity, a barn-like roughness, and a want of artistic arrangement distinguish these elongated insignificant-looking places of worship. Pomp and splendour are lavishly expended on the inner decoration, in perfect accordance with the notion that the body (matter) was of evil, whilst the spirit, using for a short time the body as a despised residence, was eternal. This is the reason that the walls

of the churches of S. Apollinare in Classe, and S. Apollinare Nuovo, or as it is now called "S. Martino in Cielo d'Oro" (see Fig. 10), were, in analogy with Buddhistic temples, provided with a richly decorated triforium. The row of saints is as monotonous as the placid figures of Buddha in the temple of Vishvakarma. The Korinthian capitals do not directly support the arches, but are divided from them by trapezoid plinths adorned with a simple cross, strangely contrasting with the richly decorated Korinthian capital. At first sight one might mistake the plan of the cloisters of S. Gallen (see Fig. 11) for the plan of the Grotto of Ellora. It is still in existence, and dates from an architect of the court of Lewis the Pious, about 830 A.D. Two isolated round towers form a peculiar feature in the plan. The church is three-aisled; beneath the raised ground of the transept we have the crypt, of Egyptian and Buddhistic origin. There is an apsis at either end of the church. The church at Bethlehem (see Fig. 12) over the grave of Christ is a five-aisled building, said to have been erected by Constantine's mother, Helena. Grandeur and simple majesty are its characteristics. Korinthian columns, borrowed from some Greek temple, support a heavy straight architrave, above which rise the walls of the central nave, broken by oblong windows. These walls show traces of polychromatic decoration.

In the arcades, pillars, the disposition of straight and curved lines, in the use of Korinthian capitals, with or without an architrave, and in the general want of proportion, we see the struggle of the early Christian architects to free themselves from the strange influences of the ancient world. The churches in Ravenna are more proportioned in their plans and execution. The Teuton element, which possessed no temples, began to work with greater freedom and independence. In the stones and forms of Early Christianity we may, however, trace the yet unsettled state of society, and though already elevated to the dignity of a state church, the different dogmas had not yet been consistently petrified in the symbolic forms of the basilikas. The old Roman element that directed its energies outwardly began to tell on Christian art, which had by degrees to free itself from the eclectical influence of by-gone ideas and principles, and from by-gone forms and patterns. The power of selection was not yet developed in the artists. The dogmatic element too tyrannically swayed their minds; they could argue about the Christian faith, but could not yet bring it into correct forms. The spirit of the first centuries of Christianity was too much influenced by Platonic ideas. The great idealist heartily despised art and artists, accusing them of exciting our sensuality and evil passions (Rep. 10), and being of no higher standing than nurses, milliners, hetairai, barbers, and cooks (Rep. 2). Art had, therefore, great difficulty in maintaining a position in a world in which Plato had ruled more supreme than Christ!

WAGES IN THE BUILDING TRADE— FRENCHMEN AND ENGLISHMEN.

IN studying the Consular returns on the condition of the industrial classes abroad, one cannot fail to be struck with the bad position of the French workman compared with that of the Englishman. It was the same before the war. That, indeed, made matters worse. The political agitation which has prevailed throughout France since July, 1870, and the instability which still pervades society, render it extremely difficult to describe the actual position or to predict the future of the artisan and industrial classes. As these form so large a portion of the general masses, much interest must naturally attach to their fate and the difficulties which surround them. "It may fairly be estimated," remarks Consul Marks, writing from Marseilles, "that the demand for labour of all sorts has fallen off during the last eighteen months to the extent of 25 per cent. of the average of the last ten years. At Marseilles many establishments, both large and small, have dismissed a part of their workpeople; and many

of them have likewise reduced the stipends previously paid to their hands." The masons, carpenters, and others, connected with building, so largely carried out of late years in all the towns, have all been severe sufferers by the depression in trade and the previous over-building in most places.

Considering the severe disorganisation France has undergone since July, 1870, it is nowise matter for surprise that the normal scale of wages given to artisans and labourers should have undergone much variation. It is really difficult at present to say what may be considered the standard of wages. In the large engineering establishments of Marseilles the ordinary labourers are paid at the rate of 3½ francs a day (2s. 11d.), and the skilled workmen gain 5 to 6 francs (4s. 2d. to 5s.). Ship-caulkers, carpenters, and blacksmiths are likewise paid at the rate of 6 francs (5s.).

With the exception of fruit and wine, provisions are not cheaper than in England. Bread, meat, fish, and vegetables are not to be obtained in the south of France below English rates. Fuel is dearer than in England, but the winter being shorter in France, the annual expenditure thereon amounts to about the same thing in both countries; and house-rent in the large towns is higher proportionately than in England. Many a French factory-hand has never anything better for his breakfast than a large slice of common sour bread rubbed over with an onion, so as to give it a flavour; for dinner, some soup, potatoes, and carrots, and sometimes a small piece of pork, which costs about 10d. a pound; and for his last meal he eats the meat of which his soup was composed. The following is the bill of fare of a Rouen cook-shop frequented by none but factory-hands:—

A dish of meat and vegetables 3d.)
Bread (*ad libitum*) 1½d. 5½d. a meal.
7-8th pint of cyder and water 1d.)

At Boulogne the rate of wages for artisans employed in the building trades is per day—

	s.	d.
Masons	2	10
Slaters	3	8
Carpenters	3	3
Joiners	2	9
Locksmiths	2	10
Painters	2s. 2d. to	2 6

Many masters are, however, now adopting the system of piecework, as they find it more to their advantage. At Brest, with 12 hours a day, with with one to one-and-a-half hours for meals, the following is the rate of pay at private establishments:—

	s.	d.	s.	d.
Builders	2	11 to	4	2
Carpenters	2	1 "	2	4
Blacksmiths	2	6 "	3	4
Cabinetmakers	2	1 "	2	6
Painters and plumbers	2	1 "	2	6

At Government dockyards (hours 8 to 13, according to season):—

	s.	d.	s.	d.
Master carpenters	3	4 to	4	7
Foremen, first-class	3	1 "	4	4
Do. Second-class	2	11 "	4	2
Carpenters, first-class	2	6 "	4	2
Do. journeymen	1	8 "	3	9
Labourers	1	4½ "	2	1

These prices were based on an earlier rate of living, and although that has advanced, there is no prospect of their being advanced. Meat, by no means of the best, is 10d. per lb. Wheaten bread 10d. the 6lb. loaf. Tea, 5s. per lb.

This is a very different state of affairs compared with the account Mr. Thomas Brassey gives in his "Work and Wages," with reference to the British workman, and no more competent authority can be quoted. He says that Mr. Broadhurst, a trade-union officer, wrote to him in 1869, and informed him that in 1840 the daily rate of wages in the building trade was 5s. per day of ten hours, or a total of £1. 10s. for 60 hours. In 1850 the rate was 5s. per day of ten hours, Saturday excepted, when the men ceased work at four o'clock, being a total of £1. 10s. for 58 hours' work. In 1860 the rate was 5s. 6d. per day, or £1. 13s. for 58½ hours' work, and at the date of his letter it was £1. 17s. 8d. per week of 56½ hours. But this was written in 1872. In March, 1873, another dispute arose, but it did not much affect the price of labour.

There is, continues Mr. Brassey, a maximum limit beyond which wages cannot rise. If wages exceed the maximum limit determined by the

necessity of fulfilling the conditions enumerated, capital will no longer be embarked in undertakings from which no adequate return can be obtained. This withdrawal of capital we have already seen. Even a millionaire will not keep his iron or coal works open at a loss, and "the sweet simplicity of the three-per-cents." is evidently preferable to such a course.

It is only just to the British workman to say that his labour, though better paid, is cheaper to the contractor than that of the Frenchman. The elder Mr. Brassey once took 4,000 navvies from this country to assist in the construction of the Paris and Rouen railway. His son says: "There were four bridges across the Seine, and four tunnels, one of them one mile and five-eighths in length, and passing through hard limestone. The English were chiefly employed on this difficult work. The French labourers drew away the stuff, or wound it up the shafts, but the mining was done by Englishmen. In the tunnels, the skilled work was all done by them. At one time there were five hundred Englishmen living in the village of Rollebois, most of whom were employed in the adjacent tunnel. Although these English navvies earned 5s. per day, while the Frenchmen employed received only 2s. 6d. a day, yet it was found, on comparing the cost of two adjacent cuttings in precisely similar circumstances, that the excavation was made at a lower cost per cubic yard by the English navvies than by the French labourers. In the same quarry at Bonnières, in which Englishmen, Frenchmen, and Irishmen were employed side by side, the Frenchmen received 3fr., the Irishmen 4fr., and the Englishmen 6fr. a day. At these different rates, the Englishman was found to be the most advantageous workman of the three." Now, it must here be taken into consideration that this was not altogether due to the lower rate of living practised by the French, although that, of course, has of necessity much to do with it, for solid English fare must ever result in greater strength than more meagre diet. Want of skill was one cause why the Frenchmen were inferior to the English, and they did not fail to profit by the lessons which they acquired from the temporary introduction of English labourers into their country. For ordinary work, Frenchmen soon became almost as efficient as Englishmen, as the following dialogue with Mr. Milroy, an experienced member of Mr. Brassey's staff, very clearly explains:—

"Q. In the particular work you have been speaking of, the two great trades were masons and carpenters?"

"Mr. Milroy: Yes; I found plenty of good masons and carpenters in France. The latter are, in my opinion, superior for such works to English carpenters, both in the quality of the work done, and the price at which they do it. They seemed to have acquired a speciality for that work, and could do it better than any carpenter I have seen."

But, after all, the French workman is better off than the English. His wants are fewer, he is more provident, and is generally sober. He saves money where an Englishman would starve. His careful providence makes him lay by money out of 2s. 6d. a day, where an Englishman would not make 5s. do, and strike for an increase. In this respect only is he better off, and it makes just all the difference. English workmen would indeed be the political masters of the country were they as thrifty as their French brethren. As it is, the problem he appears to have set himself to solve, is how to make the employer give as much for his labour as he chooses to spend. The public voice is against him, and he will hardly be allowed to have everything his own way, and derange the whole trade of the country at the bidding of a few professional agitators.

ON THE PRODUCTION OF ARTISTIC IRONWORK.

LECTURE II.

MR. THOMAS PEARD delivered his second and concluding lecture on this subject at the Royal Architectural Museum on Saturday, the 22nd ult. The lecturer, in continuation of his remarks on the subject of the treatment of cast-iron, strongly insisted upon the absolute necessity of making all ornament in cast-iron part and parcel of the structure itself, and subservient to the structural form. Under no circumstances should cast work be stuck on and pieced together in such a way as to give the appearance of its being wrought work. Having pointed out the

necessary precautions to be taken in order to obviate the effects of shrinkage and contraction, and described the means adopted to soften or harden cast-iron, the lecturer proceeded to speak of malleable cast-iron, a material which, although it had been very much condemned (and rightly so) for certain work, was a very useful servant, but one which on no account should be allowed to gain the mastery. It might be cast into almost any form, provided precautions were taken to make the mould tolerably equal in its parts. But for castings of unequal parts, the expansion was unequal. Malleable cast-iron might be used wherever it could legitimately be employed, but it should never be used where it would present the appearance of wrought-iron. The art-workman should never attempt to use it for scrolls or branches growing from and into one another. The material certainly was used in this way as a matter of trade, but it was certainly not the right thing to do; and wherever a good ornamental scroll was required, it should be welded up. It was, however, perfectly legitimate to use malleable cast-iron for *pateræ*, &c., which had no connection whatever with the frame or ground-work of the structure, but were simply ornaments applied to the structure. They were, too, generally repeated to a large extent; and it would require an unnecessary as well as a lavish expenditure to execute large numbers of such ornaments in wrought-iron. Proceeding to treat of the art of the smith in relation to the production of wrought-iron, the lecturer remarked that while one smith would be very clever and expert in one branch of his art, he would often be found incapable of doing the work of another branch of the art. The man who was perfectly competent to weld up and forge a heavy piece of metal might be (and generally was) unable to produce the light scrolls so frequently required in art metal-work. On the other hand the skilful art workman was not only unwilling, but unable, to use a heavy file or to do heavy work. Others, again, in the ranks of art metal-workers, were adepts in welding together small groups of leaves or scrolls; while the men who were most skilful in the production of single leaves and scrolls could not properly put their work together. There were many difficulties with which the art workman who worked in iron had to contend with. All work had to be done red-hot (or rather "lazy hot"). It was impossible to do much in wrought iron unless the workman was well accustomed to the fire. The smith had to pay great attention to the quality of his fuel, and great watchfulness was required to prevent a "heat" being spoilt by remaining too long in the fire. He had constant need of help, and in reality required three hands instead of two. While, as pointed out last week, the art metal-workers of the present day enjoyed great advantages over their mediæval predecessors in the fact that iron was now readily procurable rolled to all shapes and sections, thereby obviating much heavy manual labour, on the other hand it required great care on the part of the smith in the selection of his material, in order to secure satisfactory results in workmanship. The only iron which was available for the purpose of the art metal-worker was a tough, fibrous metal, capable of being bent and twisted to the utmost extent without breaking. It was not at all unusual to hear the expression of "the grain of the metal" applied to wrought iron. "Fibre" was the correct term to use, as all wrought-iron that was fit for much should present a distinct fibrous appearance. There should not be the slightest indication of "grain" in any iron proposed to be beaten out by the art metal-worker, for in proportion to the amount of grain visible, in that degree was the iron unsuitable for being forged, hammered, or twisted. The granular appearance was peculiar to cast-iron, and whenever that appearance was presented, in however slight a degree, the iron was unfitted for the purposes of the art workman. The more iron was twisted about in its cold state the harder it became, and the more liable to fracture. The difficulty of dealing with cold iron was that the fibre ran the long way, and while it might be perfectly tenacious in that direction, it had very little cohesion in the opposite direction. [The effect upon different qualities of iron, under various bendings and twistings when cold, was exhibited to the meeting by actual specimens.] One point which should always be taken into account in selecting iron for art metal-work was the market value of iron. As this rose, the quality of all brands of iron was liable to deterioration, as

the scarcity or dearth of the raw material, or pig-iron, induced the manufacturers to use bad ores. Art in ironwork was, as in other things, evidenced by the fitness of the labour bestowed upon the work. For example, it was wholly unnecessary in making gable crosses, weathercocks, and such articles as were made to be seen at such heights as to preclude critical examination, to make them with such a high degree of finish as would be necessary were they intended to come more within the reach of the eye. In such works, good proportion and outline were the main essentials. Much more metal ridge work was used now than formerly; indeed, in the present day, a building was scarcely considered Gothic unless its hips, gables, and ridges were aglow with iron-work, which was mostly cast work, its only merit being that it was much more durable than the thin brown-paper-like wrought iron work which was sometimes put up. In designing work for the tops of buildings, of course great care should be taken to allow for foreshortening, &c., so that the work will look well from below. As to gilding, it was doubtful, Mr. Peard thought, whether the system of parcel-gilding was at all desirable. If the outline were good, the gold, if put on in patches, would not improve its appearance against a clear sky, although if the work were gilt altogether, its richness would be greatly enhanced, and the gilding would greatly aid the preservation of the metal. If, on the other hand, the outline were bad, no amount of gilding would make it look well; however richly gilt, it would always be an eyesore. Mr. Peard then proceeded to point out the difference of construction in mediæval vanes and weathercocks, and those of the present age. While great labour and expense were nowadays bestowed in making the stem or shaft all in one piece, the mediæval smiths made it in two or three pieces, and exhibited great ingenuity in joining them together. Coming to the subject of hinges for church doors, Mr. Peard pointed out the differences in the ironwork of the successive periods of English Gothic art, from Early Norman to late Perpendicular. He remarked that six hundred years ago people did not seem to have been so fastidious about draughts, for the doors were hung direct on to the stone jambs of the doorway, and draughts must have been readily admitted through the chinks. Later on, doors were hung in wooden frames, thus obviating their draughtiness. This alteration, however, was very frequently not taken into account in designing hinges for modern doors, and in copying the design of early hinges their structural imperfection was also copied. Early Norman hinges simply followed the outline of the framing of the door. The chief characteristics of Norman hinges were breadth, thickness, and strength. The Norman ironworkers did very little in the way of ornament, but copied that of the Early Norman work, depending upon good broad surfaces. Later on, as the taste for ornament progressed, such hinges as those which were to be seen at S. Albans were produced. They used scrolls more largely, and made them of almost uniform width and of tolerable thickness, and they were finally hammered and chamfered, in order to get as much ornament as possible on the surface. This work exhibited a freedom and vigour of treatment which was well worthy of study by the metal workers of the present day, for it was this kind of treatment which must be aimed at before really good work could be attained. Viollet le Duc had illustrated in his *Dictionnaire Raisonné de l'Architecture* a great many examples of early hinges, and had theorised as to the way in which the scrolls were produced, but Mr. Peard, as a practical metal-worker, was inclined to think that Viollet le Duc's theory was not correct. In the Early English epoch a different type of hinge was produced. Instead of the long and elaborate scroll of the late Norman work, there were a series of branches running into three. As the thirteenth century work became more rich, such hinges as those of Notre Dame, Paris, were produced. Several fine specimens of hinges of this period were still in existence, and among them were the very fine ones at the Grammar School, Norwich, which were illustrated some time back in the *Building News*,* and were well worthy of study. In almost all the Early English ironwork leaves were introduced either in threes, fives, or sevens. These leaves were evidently produced by a secondary process, or, in other words, were hammered out cold on moulds or matrices of hard metal previously prepared. Passing on to consider the later work, Mr. Peard

particularly dwelt on the excellence of the hinges at the Chapter House, York, which he considered were the finest specimens of iron hinges to be found. He had taken the trouble to measure one of the scrolls of these hinges, and he found it was something like 8ft. in length. Mr. Peard said a great many people were under the impression that in such a scrollwork as those hinges exhibited a great deal was done by splitting the iron and turning back the strips so as to produce such long scrolls and marvellous details. But it was not done in that way. The way in which it was undoubtedly done was to form each piece separately and to weld them on afterwards. The later hinges of the Decorated period reverted very much to the type of the Late Norman or very Early English period, the hammer being used more in the manipulation of the material than in the production of detail. Later still, the floral terminations were omitted from the stems, and separate masses of flowers put on. In the Perpendicular period elaborate hinges almost vanished from the doors. Of such hinge work as was done during this period, however, Mr. Peard said he did not know a finer rendering than was to be seen at the new Houses of Parliament. The art metal-worker, as well as the student of Gothic work in general, owed much to Pugin. As the hinge disappeared from the external door, delicate ironwork became in much more request for internal purposes, and the delicacy and intricacy of some of this internal metal-work must have rendered it very costly. South Germany was marvellously rich in work of this kind, and the smiths of Nuremberg would be held in renown to all time. Mr. Peard said he regretted that the time was so far gone as to preclude any remarks as to the treatment of grilles, gates, and railings, and the methods of their construction. The Renaissance brought with it an increased love of iron-work, and there were innumerable fine examples of this period still in existence in London or its neighbourhood. In the Temple Gardens there was a very fine pair of gates, dated 1730. In Gray's-inn Gardens was a perhaps finer pair, dated 1723. On Holborn Hill until the construction of the Holborn Viaduct there was a very fine pair of wrought iron gates giving access to S. Andrew's Churchyard. Whether corporate stupidity had insisted upon their removal Mr. Peard did not know, but they had been removed and replaced by a pair of cast-iron gates, which seemed to have been intended to look as much like wrought iron as possible. At Stepney Green there were some beautiful specimens of Renaissance ironwork. At Homerton, Stoke Newington, Clapton, and the surrounding neighbourhood this kind of work was in abundance; and Isleworth, Richmond Green, and Kew, were also rich in the productions of the same era. The Hampton Court gates, which had of late attracted some attention, and which were now to be seen in the South Kensington Museum, were very good specimens of their kind, but a closer inspection of them had caused Mr. Peard to very considerably modify his admiration for their designer, John Shaw. It was marvellous to observe of how many pieces those gates were composed, and how ingeniously they were riveted together. Shaw had shown wonderful ingenuity in hiding the rivets in these gates, though if wrought iron work might legitimately be riveted, the rivets should certainly not be concealed. In conclusion, Mr. Peard ably exhorted his fellow-workers in iron to learn, from the productions of the past, to give their whole attention to their work, under the conviction that work that deserved to live could not be produced merely at so much per hour.

On the motion of Mr. Edward Hall, F.S.A., a vote of thanks was unanimously awarded to Mr. Peard for his two lectures. In reply, Mr. Peard said that possibly next season he might deliver further lectures on the subject.

VISIT OF THE ARCHITECTURAL ASSOCIATION TO ALEXANDRA PALACE.

ON Saturday afternoon last about fifty members of the Architectural Association visited this large and imposing building, proceeding by Great Northern Railway to Wood Green station. The building, which to a very great extent consists of the materials of the 1862 Exhibition building refitted together, is intended to answer the same purpose for the northern suburbs of London, as the Crystal Palace does for the southern suburbs, and is situated on the crown of a very commanding eminence on the Muswell Hill Estate, the view from which is magnificent,

the landscape being exceedingly undulated, well-wooded, and picturesque. The building is only about twenty minutes' ride by rail from London, and has a railway terminus immediately alongside, similar to the high level station at the Crystal Palace, a short spur from the Edgware and Highgate branch of the Great Northern railway serving to accommodate the traffic. The building (which consists mainly of a nave 894ft. long, with central and end transepts) has been erected by Messrs. Kelk and Lucas, who are part proprietors of the building, and to whom, as contractors for the Exhibition building of 1862, belonged the materials of the latter building. Only one of the domes which formed such conspicuous features in the '62 building has been erected at Muswell Hill, and this has been stilted and surmounted by a kind of circular crown, instead of by the spiked finial as in the exhibition building. This great dome covers the crossing of the nave and central transept, and, modified as described, has a far superior effect to that of the domes in the Exhibition building of 1862. Over the crossings of the end transepts are, one at each end, squat octagonal towers, surmounted by large gilt ball-and-spike finials. The architects of the building are Messrs. Meeson and Johnson, Mr. Meeson being responsible for the architecture and construction, and Mr. Johnson for the decorations. The latter were executed about five years ago by a Mr. Schmidt, and still present a very fresh and effective appearance. In one of the transepts will be a theatre (now in course of construction), somewhat larger as regards the stage than the Gaiety Theatre, and far larger as regards the auditorium. In the transept at the other end will be a concert-hall, capable of seating 3,000 persons, 1,500 on the ground floor, and 1,500 in the gallery. This concert-hall will have separate means of ingress and exit, so as to be used, when occasion requires, independently of the main building. There is an orchestra in the central transept (though of course far smaller than the Handel orchestra at the Crystal Palace), with a large organ by Willis, and the smaller organ in the concert-room will also be by that builder. Many of the essential constructive features of the building are identically the same as in the Exhibition of 1862; for instance all the staircases, roof principals, clerestory windows, &c., are from that building. The façades of the building contain a good deal of brickwork in different colours, with cement dressings in some portions. The style of this part of the work did not seem very much to commend itself to the visitors on Saturday last, and we understand that the stability of the building does not depend very much upon its brickwork. On either side of the nave and transept will be raised flower-beds and ornamental vases containing plants, and between these flower-beds will be statues, &c. The visitors having inspected the heating arrangements (the building will be warmed by steam), and the machinery (by Penn) for blowing the organ-bellows, proceeded to the new Palace railway-station, which has been carefully planned to accommodate a large traffic. The ticket-offices are numerous, and the staircases and approaches and platforms are commodious. The visitors spent some minutes in a room which at present contains a very interesting collection of life-sized models of the inhabitants of the different countries of the world, showing the various national costumes. This collection will be well remembered as forming part of the Paris Exhibition of 1867. Having inspected the arrangements of the refreshment department, including kitchens and bakery, the members proceeded outside the building, and, after a walk round, returned home. Mr. Gilbert Redgrave, A.R.I.B.A., is manager of the building, but in the absence of that gentleman, the visitors were conducted over the works by Mr. Charles Spackman, who acts as Mr. Redgrave's foreman or clerk of works.

It was announced that the building will open on May 24, and that it is proposed to make Mondays and Saturdays sixpenny days, the admission on other days being one shilling. When the building is opened, return tickets will be issued from all stations on the Metropolitan Railway and on the Metropolitan Extension of the London, Chatham, and Dover Railway, through-trains to the Great Northern line running on both those railways.

Mr. Banister Fletcher will this evening read a paper before the Architectural Association on "Dilapidations."

MYTHOLOGY AND TEMPLES OF INDIA.

AT the evening meeting of the Royal Institution, on the 21st ult., Captain E. D. Lyon exhibited an interesting series of photographs of Indian temples, magnified and illuminated by the electric lamp. In his introductory remarks he stated that although the Hindoos worship a countless number of deities, they still recognise the one supreme God, whom they consider too awful to erect a temple to him; and his triune personifications, Brahma (creation), Shiva (preservation), and Vishnu (destruction). He then exhibited a picture of the most popular of the gods, Ganesa, and related the legend accounting for his having an elephant's head. Commencing with Trichinopoly, Captain Lyon showed the celebrated temple of Seringam, and explained that a Hindoo temple (called *devila*, or "house of God") consists of the *gopurum*, or entrance; the *mundapum*, or porch; the *teppa kolum*, or tank; and the *vimanum*, or sanctuary: an oblong, plain, perfectly dark building, into which no European is allowed to enter, except of royal blood, and he quite alone. A wonderful *mundapum* at Madura, the Rome of India, was next exhibited, and its erection by the last king of the city said to have cost a million sterling, and to have occupied twenty-two years. One of the guardians of the gods placed here, 15ft. high, carved out of a single block of granite, was also shown, followed by five pictures of the car of Juggernaut, the extraordinary monolith at Kaloogoomulla, and of the beautiful temple carved out of it, the Indian Cupid, the sacred temple at Ramisseram, with its magnificent long aisles, all accompanied by explanatory remarks and allusions to the legends connected with them. Captain Lyon then conducted his audience northward, exhibiting representations of the temple of Avadea, Covil, Tanjore, and the seven pagodas near Madras, together with the rocks cut, both inside and out, into marvellous *bassi relievi*, the authors and purpose of which are quite unknown. Some of these works are attributed to the Buddhists, but the only known relics of these religionists are caves. The succeeding views included Tarputri, with its wonderful carvings; the temple described by Southey in his "Curse of Kehama"; remains of the city of Bali, destroyed by the ravages of the sea, and other ruins, with historical comments. The religion, gods, and temples of the Jains were next introduced, followed by views of the exterior and interior of the Taj-Mahal, the gorgeous mausoleum erected by Shah Jehan.

KHIVA AND CENTRAL ASIA.

A COLLECTION of oil paintings and pencil drawings will be exhibited from Saturday next in the private saloons of the picture-gallery at the Crystal Palace. At this moment, when the eyes of Europe are turned towards Central Asia, nothing could be more instructive than this collection. Through the paintings and drawings of M. Basil Vereschagin, a Russian artist of considerable power, we are made acquainted with some striking scenes of the warlike life in these savage parts of Asia. He has faithfully reproduced the architectural and ornamental peculiarities of mosques, tombs, houses, temples, and theatres; as also the ethnographical distinction of the different races dwelling in these regions. The artist introduces us to the Marketplace of Samarkand, adorned with the decapitated heads of Russian prisoners stuck on poles, as was the custom with us in the time of Queen Elizabeth, when the heads of traitors were used as the decorative ornaments of London Bridge. A picture, representing the interior of an Alhambra-like elegant hall, with the tomb of the great conqueror Timur (or Tamerlan), who ordered himself to be placed at the feet of his teacher, Mir Seid Bekr, is excellent in effect. A mound constructed of human skulls, satirically dedicated by the artist to "all conquerors, past, present, and future," must strike us as characteristic, though far from being æsthetic. The ornamental artist has an opportunity of studying the decorative peculiarities of Central Asia in carved pillars, doors, marble balustrades, geometrically-ornamented walls, minarets, tents, dresses and interiors. The Persian element of textile arabesque predominates everywhere. As we purpose giving a more detailed review of the exhibition, we confine ourselves to these few remarks, in order to draw the attention of our readers to this valuable and instructive collection. Z.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

THE VICTORIAN INSTITUTE OF ARCHITECTS.—The annual meeting of the Victorian Institute of Architects was recently held at the Port Philip Club Hotel, Melbourne, the president, Mr. Joseph Reed, in the chair. The hon. secretary brought up a report of the proceedings of the past year, which was received, ordered to be printed, and circulated amongst the members. At the close of the first year of the existence of the institute, the council congratulates the members upon its successful formation. Thirty members were enrolled at the commencement, five members and two associates have been elected during the year, and one member (Mr. D. B. Pritchard) has been removed by death. The number of members is 34; associates, 2; total, 36. At the commencement of the year the rules and bye-laws of professional charges were carefully considered, printed, and distributed to the members. It is believed they will tend to create and preserve a feeling of harmony amongst the members, and remove the unpleasantness caused by the rate of charges not being uniform. A form of diploma has been designed, approved of, is in course of preparation, and will shortly be issued to the members. A sub-committee was appointed to revise the general conditions of contract. They agreed upon and placed their ideas in the hands of Messrs. Malleon, England, and Stewart, to put them in a legal form. It is hoped that they will shortly be in a position to bring them before the institute. Another matter of considerable importance to the profession has been considered, namely, the desirability of having the public works of the colony thrown open to competition. The treasurer's statement was read with satisfaction by the members. The meetings of the past year have been entirely of a routine nature. The steps necessary to be taken to establish the institute have perhaps prevented the reading of papers on subjects relating to the art and science of architecture. It is hoped that during the current year some matters of interest will be brought before the members for discussion.

BEDFORDSHIRE ARCHÆOLOGICAL SOCIETY.—At the last monthly meeting, the Rev. H. Wood exhibited Romano-British relics lately discovered in "South Field," in the parish of Biddenham; three large cinerary urns, of various and elegant forms, and one large poculum or cup of brownish yellow earth—one of them marked with a simple pattern on the surface; all these had been struck by the plough and fractured; but Mr. Wood had restored them so far as the loss of some portions would permit; two nearly uninjured smaller vessels of the same material; two almost perfect pateræ of red Samian ware, one bearing the potter's mark "OF. CALVI," and the other a scarcely legible stamp similar to several found on other specimens of this description; and the foot of a small bowl of the same ware. Near the urns were found vertebræ and other bones, some human, and also a number of flint flakes and a part of a well-worked arrow-head and two scrapers of flint. Flint flakes have been found at or near the same spot on a previous occasion.

MOUSSOULI.—Mr. George Smith, of the British Museum, telegraphs from Moussouli—where he is prosecuting, on behalf of the *Daily Telegraph*, his search for Assyrian records—the welcome intelligence that, having been permitted by the Turkish Government (thanks to the exertions of Sir Henry Elliott, our ambassador at Constantinople) to commence operations, he has already made several discoveries and has written and dispatched some long letters descriptive of them.

CATHEDRAL OF S. MARY, EDINBURGH.—If we are informed rightly, a somewhat awkward difficulty has occurred with reference to the erection of this building. It was the opinion of competent judges that on the site selected for the new cathedral, rock would be found so near the surface as considerably to lessen the expense of the foundation, and therefore it was hoped that Mr. Christian's estimate, "from £6,000 to £7,000," might prove to be above the sum required. From investigations which have now been made, a "fault" occurs just at the spot appointed for the building, and there is a depth of between thirty and forty feet of unsound material superimposed upon the sloping face of the rock at this point. This will probably increase the expense of the foundations to a considerable extent, besides leading to other complications.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE PROPOSED CHURCH OF S. JOHN THE BAPTIST, KENSINGTON, WEST.

This church, of which we give an illustration, is the latest of a series of noteworthy churches which Mr. Brooks has designed for the metropolis. It is, as all his churches are, of striking character, and its towering height will render it a conspicuous landmark in the quarter in which it is intended to be erected.

The church will be built of Kentish rag, and the interior will have a facing of the same material, following the principle which Mr. Brooks has already successfully carried out at Plaistow and Chiselhurst. The dressings of doorways and window arches and similar parts of the structure, which are generally executed in freestone, will on this occasion be of Chalbury stone, a material not hitherto familiar to us, but which we are told is from the neighbourhood of Banbury, and has been selected by the architect for its warm colour, as

cerely hope that Mr. Brooks may have the gratification of seeing his design carried out in its entirety, and his conception successfully realised.

COTTAGES AT OAKLEY, NEAR BISHOP'S STORTFORD.

These cottages were erected in 1871, by Mrs. Chamberlayne, on her estate at Oakley, near Bishop's Stortford, in the place of others dating from the sixteenth century. Tradition asserts that the original ones were formerly the old "White Hart" Inn, with its stabling and out-buildings, but upon becoming too dilapidated for use as such, a fresh inn was built adjoining, the old premises being turned into cottages. The plan of some of the old buildings seems to confirm this statement: one story high, the floors of the bare earth, no windows to open, two rooms only in a cottage—such were some of the leading features of the old buildings; but, on the other hand, a decided picturesqueness must not be denied them.

In arranging the new buildings, an attempt has been made to avoid such discomforts, but at

by Mr. Brass, of Old-street, S. Lukes. The style adopted is the Gothic of Northern Italy, the ornamental portions of the facade being executed in red terra-cotta, supplied by the Watcombs Terra-Cotta Company; all the ornament having been modelled in London under the superintendence of the architect. The building is of three stories above the street, with a frontage of 34ft., to Bridge-street. Wherever terra-cotta has not been used for dressings, the stone employed has been Portland, or red sandstone from Whitehaven. The composition of the ground story is an open central porch between two windows. The columns of the porch are of red Mull polished granite with carved caps; the cornice of terra-cotta, and roof of Portland stone, vaulted underneath with stone ribs and terra-cotta panels. The porch is to be inclosed by wrought-iron gates supported by shafts of serpentine marble, with capitals of stone and terra-cotta. On the first story are three deeply-recessed circular-headed windows with glazed terra-cotta shafts and enrichments, the outer order being *amorini* and clusters of fruit boldly modelled by Mr. Phyllers, the idea being that the children are gathering the fruits of their parents' provision. The second story has three windows, also circular-headed, but of smaller proportions and plainer detail, with a good amount of plain wall space. The whole is surmounted by a cornice composed of terra-cotta, with the corona of red stone. The stacks of chimneys are red brick with projecting heads and detached terra-cotta fluted shafts banded to them.

The site being very irregular, considerable ingenuity has been displayed in planning the internal arrangement. The construction of the floors are fireproof, on the Dennett principle; the ceilings of the general office ground floor, board-room, physician's waiting and luncheon rooms, first floor, below the arches, are panelled in pitch pine, with boldly-moulded beams and ribs. The chimney-pieces in board-room are executed in teak and wainscot by Forsyth, and the wrought-iron work, railing, balusters, &c., by Shrivell, of Castle-street, Long-acre, all from the designs of the architect.

EARLY CHRISTIAN ARCHITECTURE.

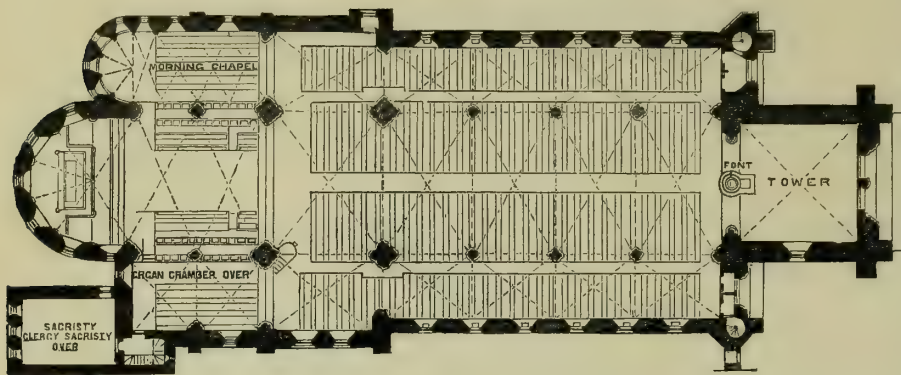
We follow up the illustrations as given last week on "Indian Architecture" with some on "Early Christian Architecture," accompanied by Dr. Zerffi's description in page 386. This series will be a unique and comprehensive one, as it will embrace ancient and modern work, including architecture, sculpture, and painting. It will, in fact, be one of the most interesting records of the progress of art ever published. The illustrations may be seen with advantage under a magnifying glass.

DECORATIONS OF DROMORE CASTLE.

We are enabled, by the courtesy of the architect, Mr. E. W. Godwin, to give this week another sheet of engravings illustrating some of the decorations of Dromore Castle. A fortnight since we gave specimens of painted glass as designed by Mr. Godwin, and we now give some of the decorations of the dining-room, drawing-room, and ante-room.

THE WORST LIGHTED CITY IN EUROPE.—On Tuesday, at a meeting of the City Commission of Sewers, held at Guildhall, Mr. T. Cox called the attention of the Court to the deficiency of gas supplied to the public lamps within the City, and moved that the subject should be investigated by the Streets Committee. The resolution was seconded by Mr. John Paterson. In the course of the discussion upon it, Mr. Clark asserted that London was the worst-lighted city in Europe, and Mr. Bedford remarked that the whole system of lighting in the City was at present a melancholy failure. The Chairman urged that each lamp should be supplied with a meter, and stated that the Commission paid for a supply of 5ft. per hour at each lamp, and only obtained, on an average, 3ft. Mr. Haywood, the engineer, in reply to Mr. Pedler, said the cost of providing meters would be about 4s. or 5s. annually for every lamp, and there were 3,000 lamps, or thereabouts, in the City. The resolution was carried almost unanimously.

Lord Cochrane's statue at Valparaiso was inaugurated on Feb. 12, by the President.



well as its sound and good free-working qualities. The roofs will be covered with sea-green Penmoyle slates, surmounted with a red tile cresting.

The first object that meets the view on approaching the church is the massive tower, which forms the extreme western termination of the edifice, and which is its most conspicuous feature; its dimensions will be imposing, and as it will project some distance beyond the main body of the church, its proportions will have ample opportunity for being displayed. The principal entrance will be beneath this tower, and the doorway by which access will be given is a grand deeply-recessed opening of two bays, with clustered shafts in the widely splayed jambs, and shafts again in the centre, with figure and canopy in the tympanum of the arch. Internally the tower will be vaulted and form a baptistery, the position for the font being beneath the arch which separates it from the nave. The church thus approached is intended to consist of nave with arcade of four bays; north and south aisles, the latter terminating with shallow transepts; chancel with apsidal end; south chancel aisle with similar end, and intended to be used as a morning chapel; and north chancel aisle with choir and clergy vestries beyond. The chancel will be separated from the chancel aisles by arcades of two bays, and on the north side the arcade will consist of two orders, within the upper of which a tribune is proposed to be introduced. This position has been selected for the organ chamber, and arrangements will be made to fill the upper order of arches referred to with the organ pipes in a manner which strikes us as affording a happy mode of treatment of this part of the interior of the church. The chancel, the morning chapel, the crux, and the transepts, will be vaulted with stone, but the remainder of the church will have boarded ceilings. A *flèche* of great height will be constructed at the intersection of the transept roofs with those of the nave and chancel. We must not forget to speak of the altar and reredos, which will be of rich design, set forward some six or eight feet from the east wall and surmounted with a baldachino very effectively conceived. The extreme internal length will be about 181ft., the extreme width between the walls 65ft., and the height from the floor of the nave to the ridge of the roof 77ft., while the height from the ground to the top of tower will be 200ft. These figures will enable our readers to form some idea of the size of this noble church, and we sin-

the same time not to forfeit natural picturesqueness.

Every cottage has an entrance lobby, out of which the staircase opens, a large sitting-room, a kitchen, larder, coal-cellar, w. c., and three bedrooms, except the cottage to the left of the middle block, which has only two bedrooms. All bedrooms have of course separate entrances from the staircase landing. The ground-floor rooms are 8ft. high, and the bedrooms 8ft. 6in. The larders and bedrooms, in addition to the ordinary means of changing the air, are ventilated. A laundry and bakehouse have been provided to be used by all.

The front cottage to the right is also the village shop, and has the addition of a good basement cellar. The shop is 16ft. by 14ft. and 9ft. high.

In the kitchen of every cottage is a sink, placed against the external wall, the pipe from which is taken through the wall, and empties itself on a grating, from which it runs off into the drain; this was done in order that there should be no unpleasant smell in the kitchen, where the family necessarily spend much of their time; brick and slate traps in cement are everywhere used; the sewage is conducted into cemented cesspools, one to each block, with overflow pipes to a fourth cesspool at a little distance, out of which it is intended to be pumped and used on the land.

There is a plentiful supply of good water. The rain-water from the roof is conducted into a tank in the centre of the quadrangle, and a well has been dug adjoining the tank, the two pumps, as seen in the drawing, being within one case.

Local features have been kept to in the design, and the materials which the neighbourhood supplies, red brick and tiles, made use of. The timber of the half-timbered work, and much of the other woodwork, such as doors, porches, &c., is of elm, and was grown on the estate. The upper floors are partly hung with plain tiles, partly plastered between the timbers, the plaster being pargetted, as is general in Essex.

The contract was carried out by Mr. Edward Brown, of Saffron Walden, from the designs of Mr. Alfred W. N. Burder, architect, 47, Manchester-street, Portman-square, W.

ECONOMIC LIFE ASSURANCE SOCIETY'S NEW OFFICES, BRIDGE-STREET, BLACKFRIARS.

These offices, which our double-page illustration represents, have been lately rebuilt from the designs of Ewan Christian, Esq., of 8A, Whitehall-place, (assisted by Henry Christian, Esq.),

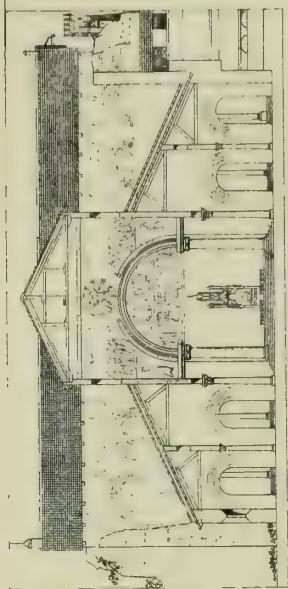


Fig. 1

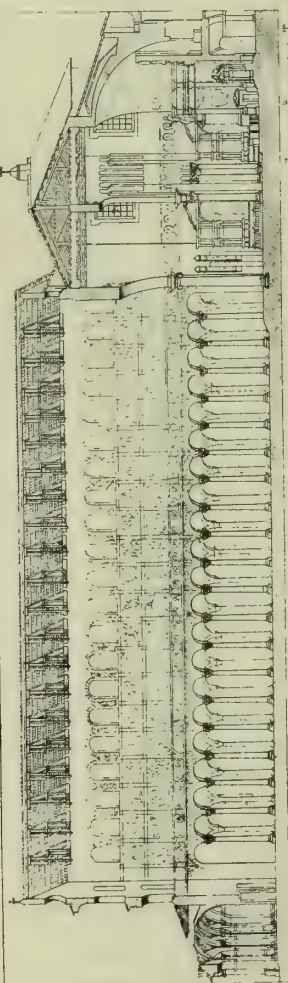


Fig. 2

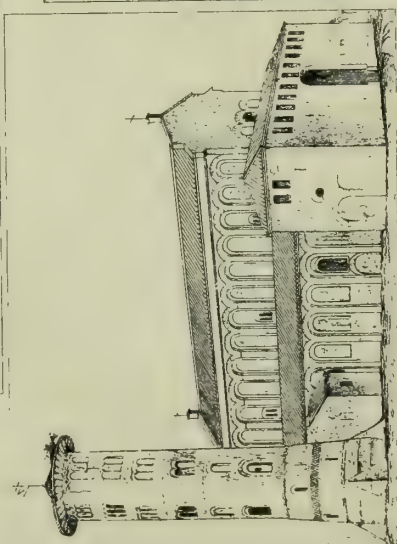


Fig. 3

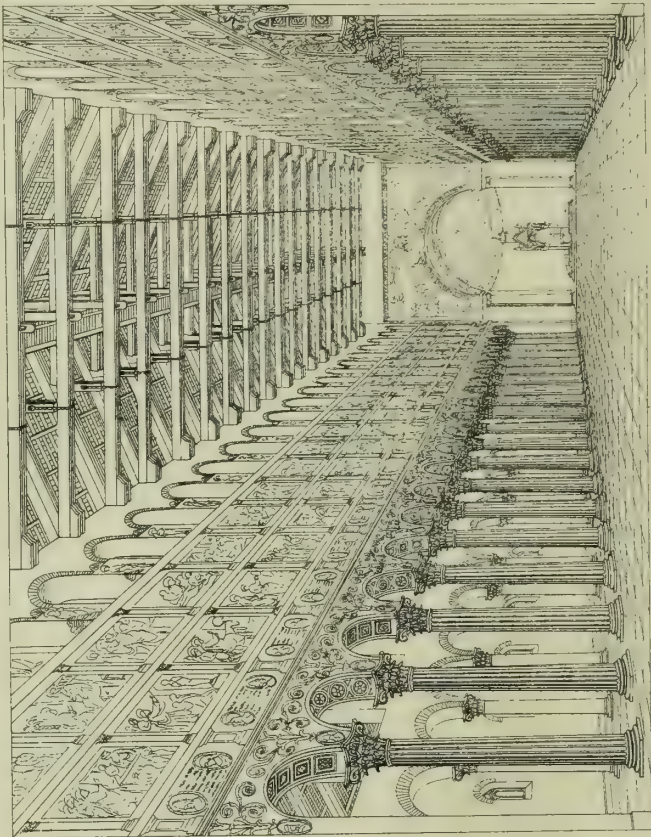


Fig. 4

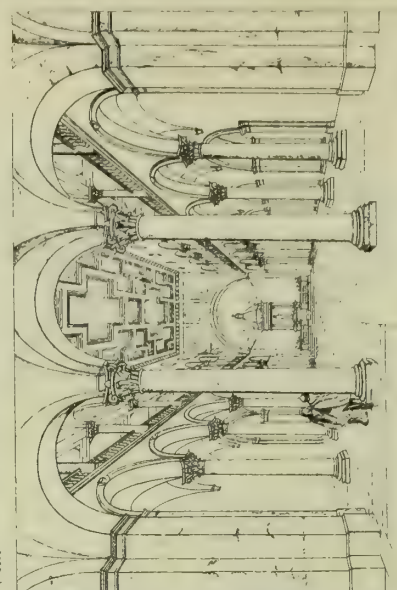


Fig. 5

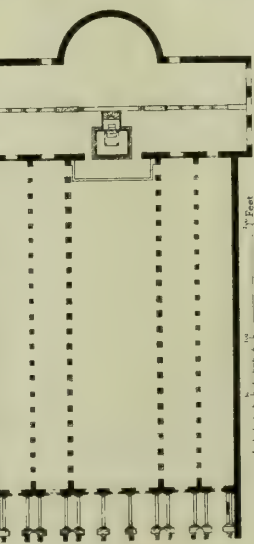


Fig. 6

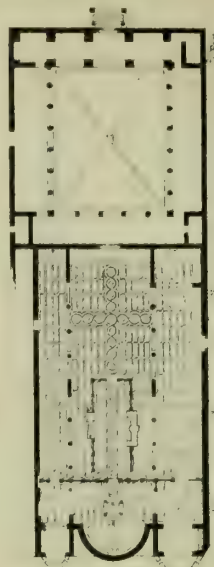


Fig. 7

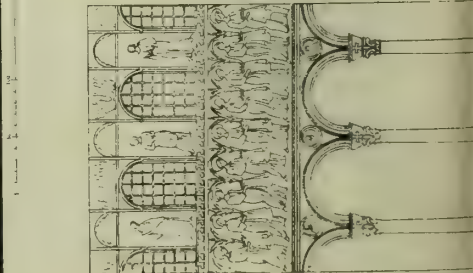
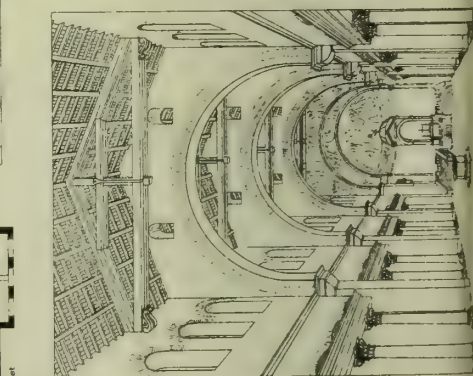
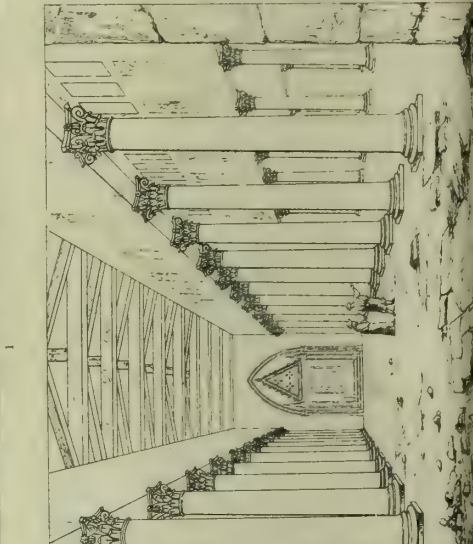
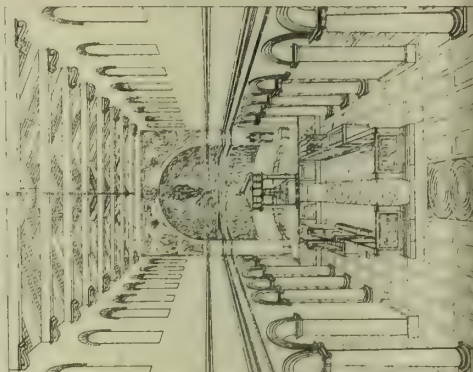


Fig. 8

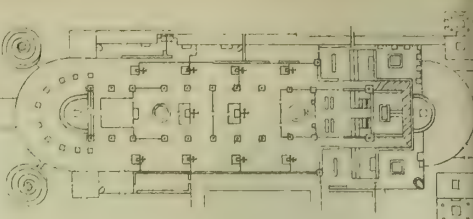
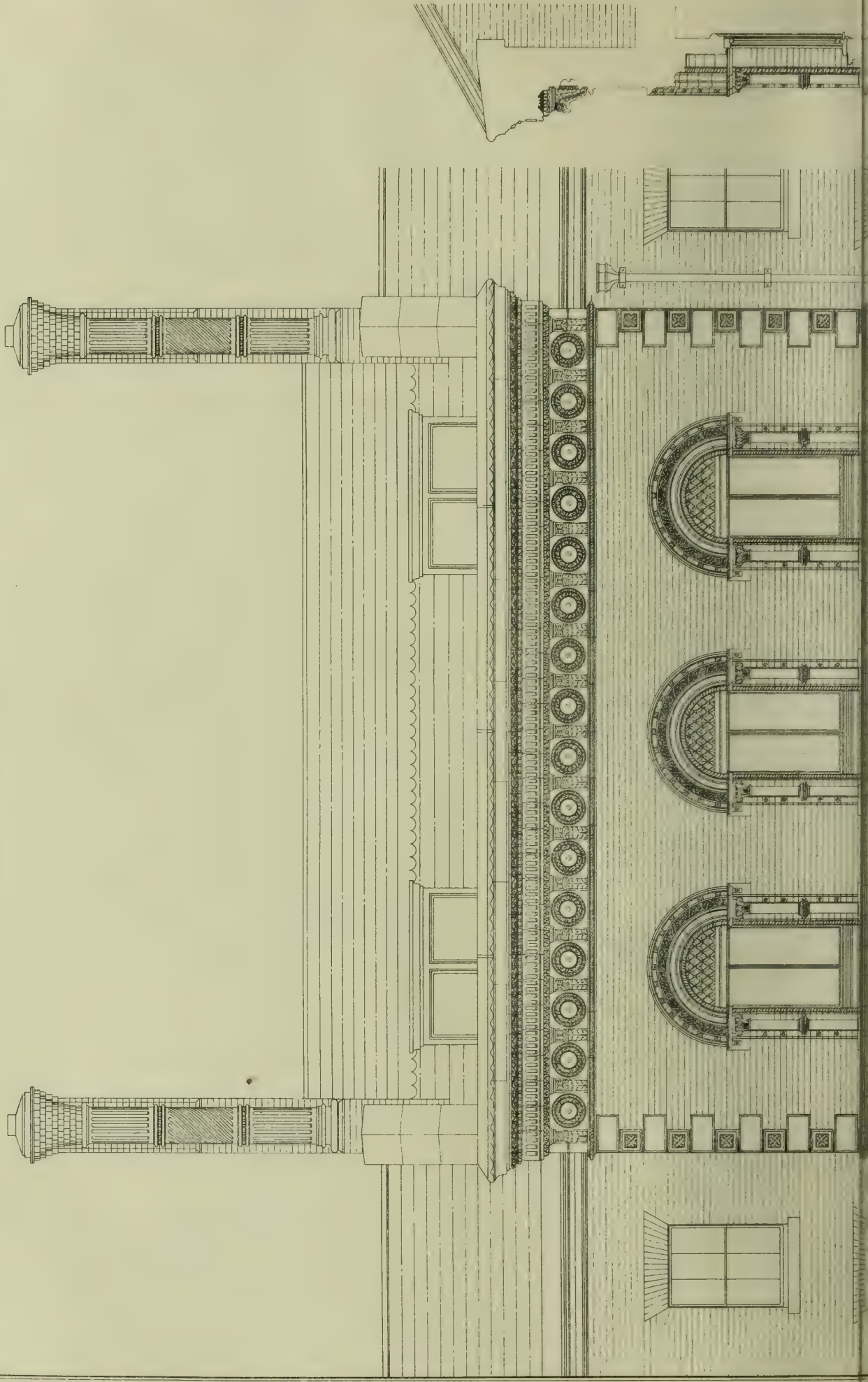
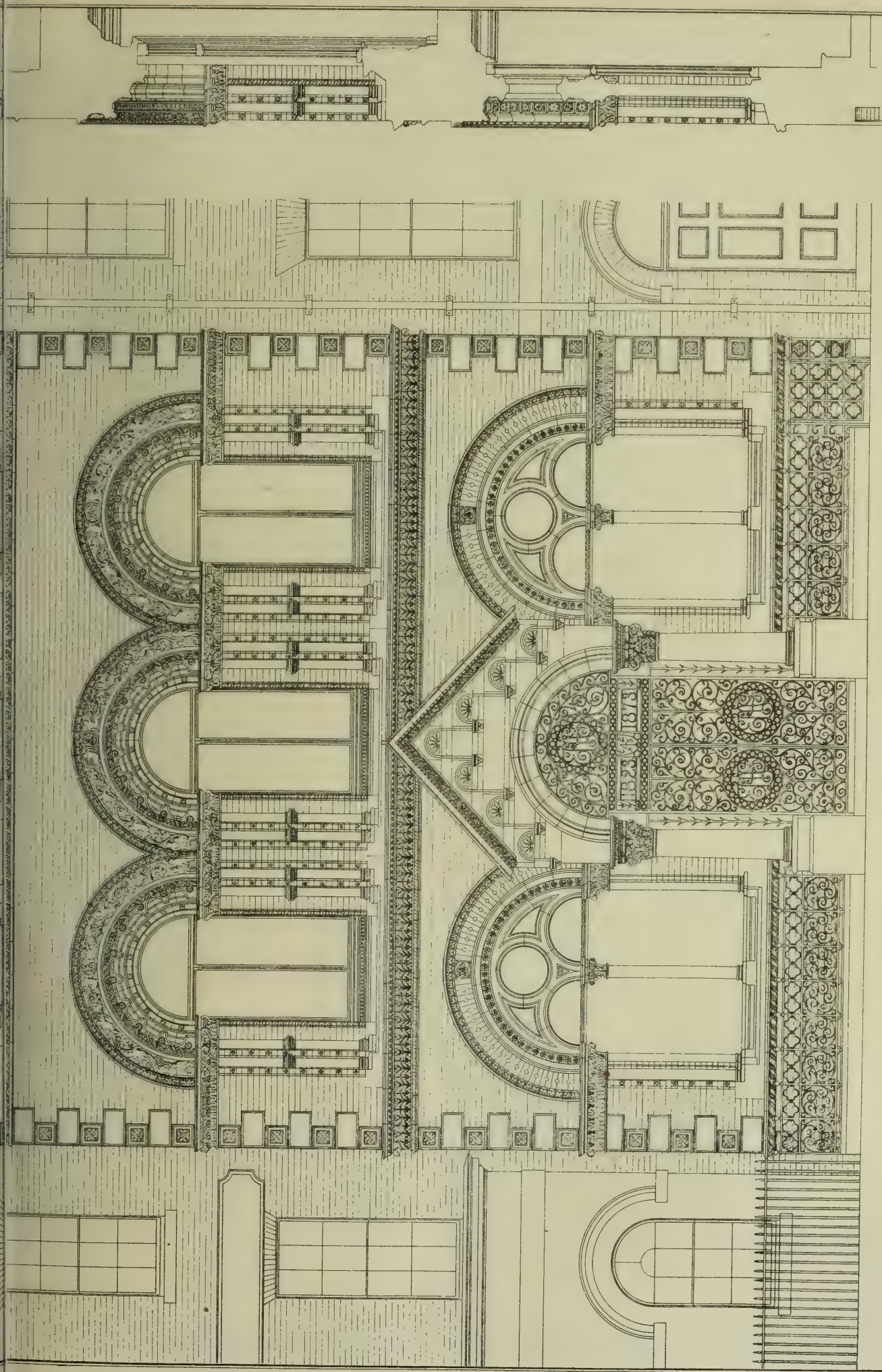


Fig. 9

THE BUILDING NEWS, APR. 4. 1873.

ECONOMIC LIFE ASSURANCE OFFICES
BRIDGE STREET BLACKFRIARS.





EWAN CHRISTIAN ARCHT:

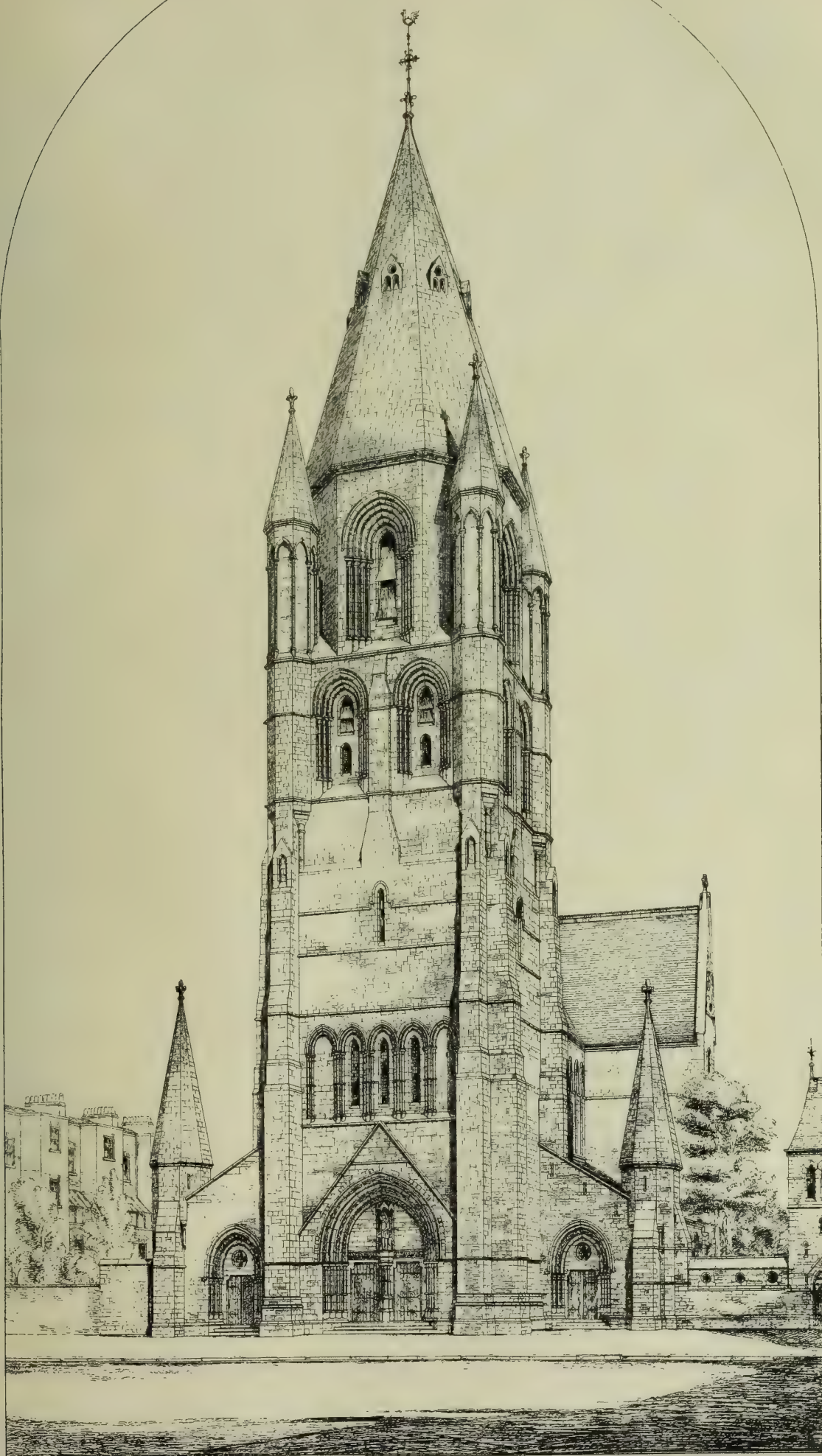
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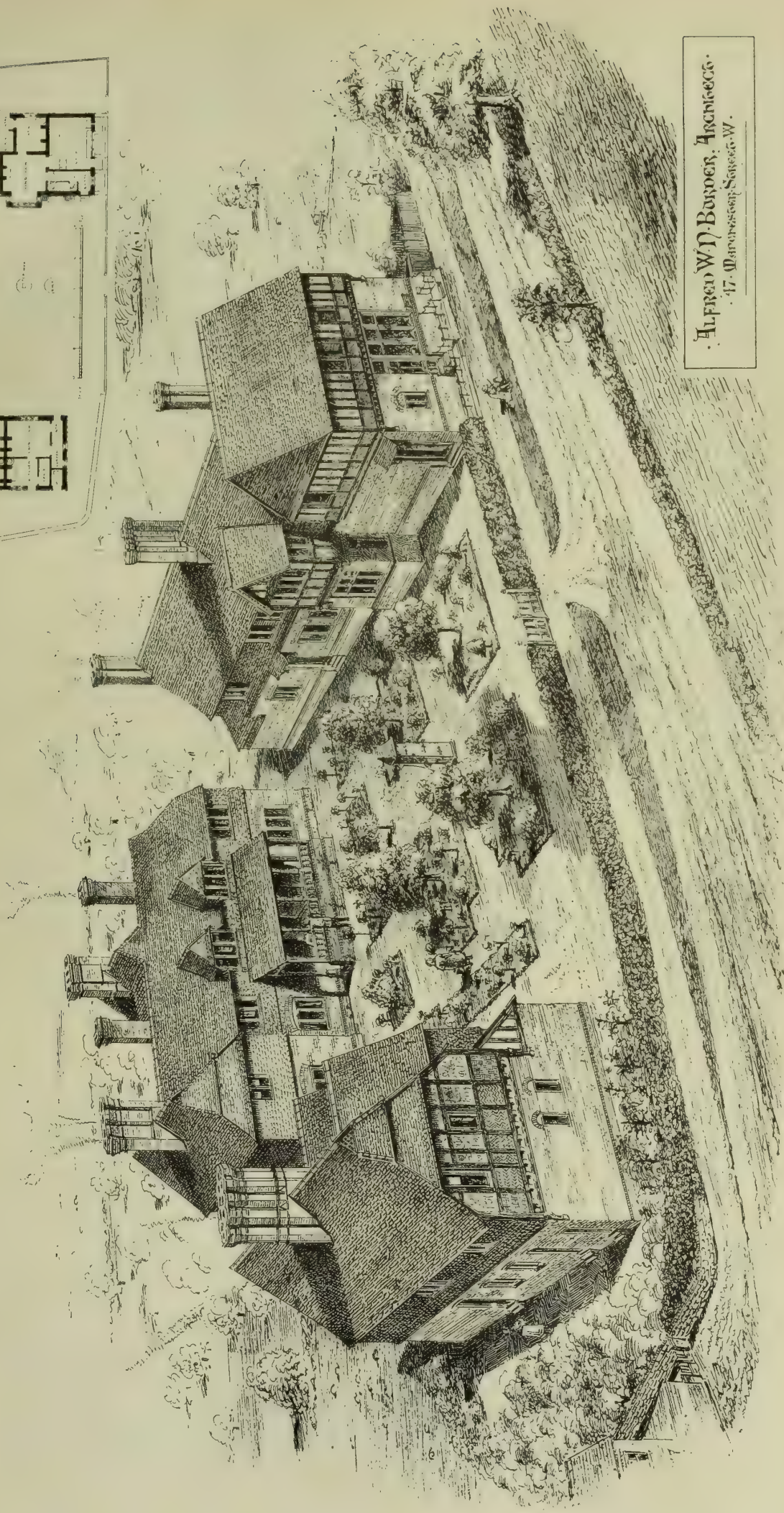
Church of St. John Baptist, Kensington, West. James Brooks, Archt. London 1872.

THE BUILDING DEWS, APR. 4, 1873.

GROUP OF COUGAGES, AC. OAKLEY.
BISHOP'S SERRAGEORD.



GROUND PLAN



ALFRED W. N. BORDEN, ARCHT. & C.
47. WAREHOUSE, ST. GEORGE'S W.

ANNALS AND ANTIQUITIES OF THE COUNTIES AND COUNTY FAMILIES OF WALES, &c.*

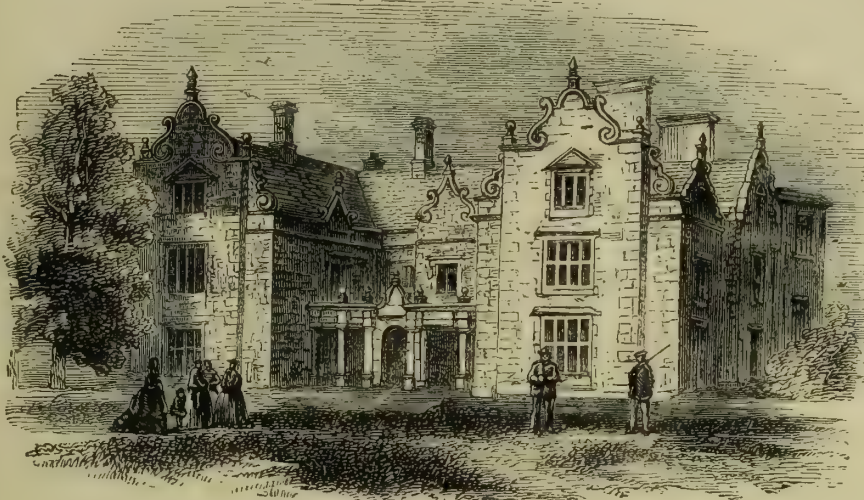
WE are not ourselves specially interested in the annals which occupy the greater portion of this work, admirably though the task of their compilation has been effected by Dr. Nicholas; but the antiquities to which he has also devoted no small amount of attention claim some notice at our hands. The Principality of Wales is, indeed, remarkable, not only for the number and extent of its historical monuments, but even for their artistic and architectural pretensions it need give place to hardly any other district in the Kingdom. Then the remains of the domestic architecture of the middle ages scattered throughout its several counties are considerable and interesting. Of the earlier examples, which in point of construction were not very durable, we yet find constant traces which in a more highly-cultivated part of the country would have been wholly obliterated years ago. Upon the untilled hillsides frequent mounds are to be found, surrounded by ditches, which have been often erroneously supposed by antiquaries to have been military camps, whereas they only mark the site of an ancient residence, which in so turbulent a neighbourhood was necessarily fortified to some extent.

The more substantial stone-built castles of the Feudal period, which were the successors of those slighter constructions, and which carry us back, in imagination at least, to the more than half-fabulous Arthurian age, are, as is well known, plentiful throughout Wales, as well as in the border-land between it and England. We have further the splendid piles which mark the period of its tardy conquest, and which are upon a scale scarcely equalled elsewhere. Then there is no scanty store there of ecclesiastical and monastic remains, which, if simpler in character than the cotemporary work in the more peaceable and settled English counties, have great intrinsic, as well as special merits of their own. Lastly, there is

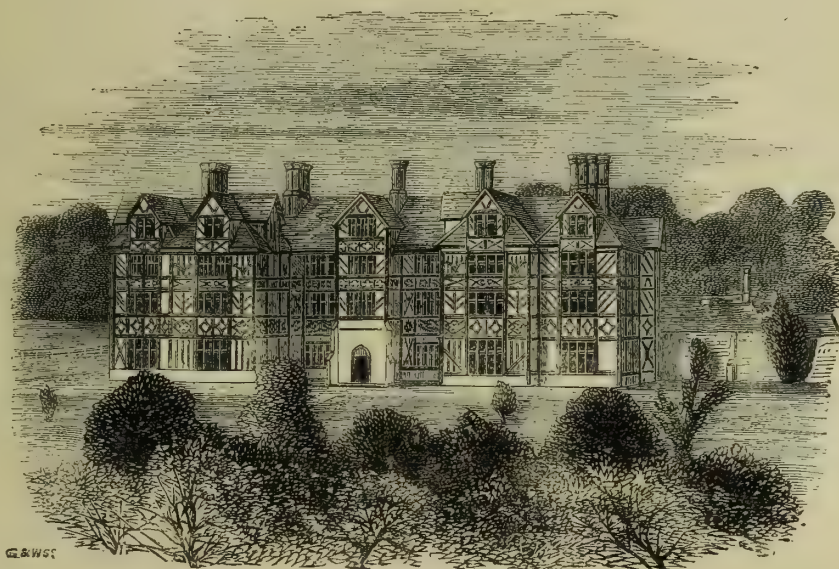
a long list of houses and mansions which in modern times have sprung up in so many of the lovely spots that are embosomed amidst its picturesque mountains and hills. The eclectic character of these buildings embraces every variety of taste, and they are, as may be seen in the profuse illustrations of Dr. Nicholas, a complete study in themselves. The several counties are arranged in his work

in alphabetical order, and separately and carefully described—first, in their relation to physical geography, with notes as to their geology and mineralogy; then their history is briefly recounted, with the antiquities, pre-historic, historic, and ecclesiastical; and, lastly, the annals of the several county families are fully entered into. By the aid of photo-

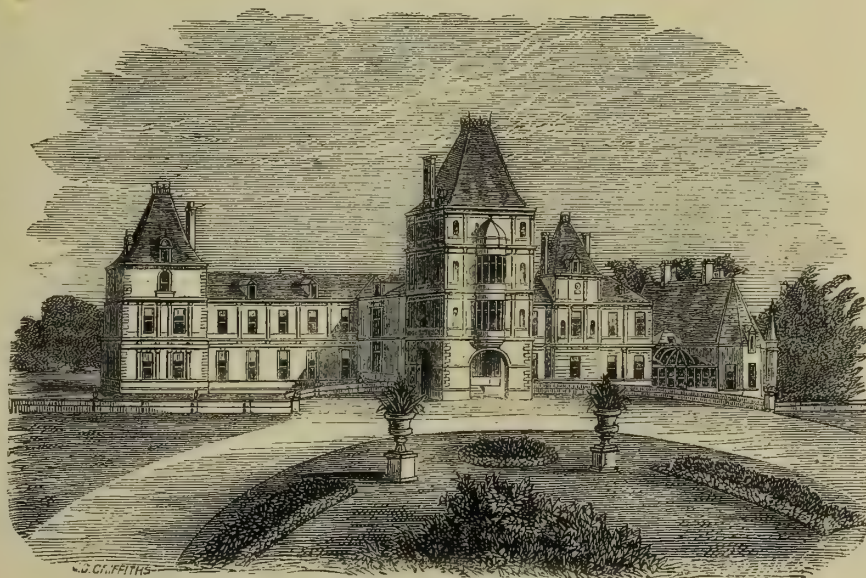
graphy, Dr. Nicholas has been able so fully to illustrate his work as to render it both more exact and interesting than any previous work of its class, and we believe that it cannot fail to take high rank among historical and topographical works generally, and quite the highest in the special department he has chosen. It is not to such a work, however, that the architect would turn for accurate information as to buildings, which must necessarily be very briefly touched upon in its pages, and the student will not find much likely to be of use to him beyond the classification of objects worthy of his search in the several counties. This portion of the work we may perhaps be allowed to say, without being accused of hypercriticism, might have been entrusted with advantage to some one more specially skilled in the subject; and if the comments of criticism were necessarily restricted, it would have been well if those that are to be put in the hands of persons nearly interested should have been thoroughly reliable. Dr. Nicholas' modesty naturally would not have allowed him to speak on such matters, *ex cathedra*, but he might have summoned to his assistance some one who could. A little more information as to the authorship of the designs of the houses shown in the illustrations could not but have been acceptable to others than ourselves; in default of which we are left ignorant, not only of the name of the architect, but also of the date of the erection of many a pile by the view given, of which our curiosity is awakened. Yet many excellent remarks are made and hints given in the pages, which show the author to have very good taste of his own, and to be anxious to spread such, as when he thus lectures the landowners of Anglesey: "One cannot but shrewdly



LLANNERHAIDR HALL.



GREGYNOG, MONTGOMERYSHIRE.



WYNNSTAY (FRONT VIEW).

* "Annals and Antiquities of the Counties and County Families of Wales, &c. By THOMAS NICHOLAS, M.A., Ph.D., F.G.S. London: Longmans, Green, Reader and Co.

think that the landscape of Anglesey might be made fairer and richer if the owners of land more generally had the liberality and taste which some of them have already displayed. No co-extensive tract, admitting in the main of cultivation, offers more tempting spots for plantations of larch and fir without robbing the farmer of a yard of arable soil. On every hand, in some parts, you see promontories and declivities waiting to be covered with the varied green and graceful forms of the pine-tree. There are many thousands of acres in Anglesey which are an eyecore to the intelligent observer and profitless to husbandmen and landlord, which might be covered with the sweetest of verdure and made to minister largely to the wealth of the country."

In truth, we see but little evidence in any of the views in the work of much attention being given to the art of landscape-gardening, probably because the natural beauties are so great that art may be thought to be out of place in any species of competition with nature. This may be so to those looking from the windows; but looking to the mansions, as we are here made to do, there is in most a species of ruggedness in their surroundings which sadly detracts from them. The greater number of the gentlemen's villas are, unfortunately, but boxes in the most literal sense of the term, and are, in themselves, as great an intrusion on the scenery as any of its wildest surface can be close to their windows; but they are rendered more gaunt, solitary, and out of keeping by having been, as it were, dropped into the middle of a park without any apparent preparation made to receive them.

Wales possesses its share of the would-be Classic mansions, with misplaced porticoes stuck, as it were, upon stilts, such as Glynllifon, in Carnarvonshire (p. 315), and far more than its share of mock-modern castles, for which, happily, the day has past, such as Penrhyn Castle, in the same county, and Cyfarthfa Castle, in Glamorganshire. From such we turn with satisfaction to those of the Tudor period which have been preserved, and of which Llanrhaidr Hall, in Denbighshire, is an example; or to Gregynog, in Montgomeryshire, the seat of the Hon. H. Hanbury-Tracy, which, though of recent erection, is a good imitation of the old timber-constructed mansions. Wynnstay, the seat of Sir Watkin Williams Wynn, is no doubt correctly described by the author as a "new mansion, replete with all the appointments of a sumptuous residence, is a costly edifice in the Renaissance style, containing in its external outline some of the features of a French chateau;" but that this should be unaccompanied by a notice as to the fact that Mr. Benjamin Ferrey was the architect of this, in many respects, successful design, is to be regretted, and shows the narrow limits to which information of this class has been confined. Perhaps, of all this Domestic class of work, an old castle on the coast of Glamorganshire may be selected as the most in harmony with its picturesque surroundings, and worthy the study of those who are called upon to build in a similar situation.

The above illustrations are fair examples, out of many scattered profusely through the pages of this work, and which give it considerable interest. A future edition, it is promised, will be still further enriched in the same fashion. We may add that Dr. Nicholas is the originator of the Welsh College, at Aberystwith, which was erected under the architectural superintendence of Mr. Seddon, and illustrations of which have appeared in our pages.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary general meeting of this Institute on Monday evening last, Mr. Alfred Waterhouse, Vice-President, in the chair, Mr. Thomas W. Cutler, of 9, Conduit-street, was elected an Associate, and Mr. George Ledwell Taylor (surviving author of Taylor and Cressy's "Architectural Antiquities of Rome"), who is to read a paper before the Institute on Monday evening next, was, in consideration of his great age and valuable services as an author, unanimously elected an Honorary Fellow.

The Chairman referred to the meeting held at Willis's Rooms on Saturday last, to consider the question of metropolitan improvements and the manner in which they should be carried out in future. Lord Elcho addressed the meeting at considerable length, making the question of the proposed approach from Trafalgar-square to

the Thames Embankment a peg upon which to hang a larger question. His lordship thought it very desirable that there should be some sort of board of control or committee of taste whose duty it should be to consider and advise on all metropolitan improvements or works, whether carried out by the Government, the Metropolitan Board of Works, or by railway or other companies. A memorial to the Premier was unanimously adopted at the meeting, asking him to consider the question; and Lord Elcho had sent a copy of the memorial to the Institute, trusting that as many members as possible would sign it.

After some remarks by Professor Kerr, Mr. Charles Barry, and Mr. Thomas Morris (the latter remarking that of course the Institute would be the proper body to give advice in these matters),—

Mr. COOKE pointed out at some length that, although the intention of Lord Elcho was plain, the memorial was couched in such vague and general terms that if signed by the members it might possibly, on some future occasion, be used against them in the House of Commons. He therefore strongly urged the members not to sign the memorial.

After some further remarks by Mr. Waterhouse, Mr. Thomas Morris, and Mr. Charles Barry, the further consideration of the subject was postponed until after the paper.

Mr. J. B. WARING, Fellow, then read a paper

ON THE LAYING OUT OF CITIES.

The first part of the paper was devoted to an historical and archaeological review of the subject, the author accounting for the narrowness of the ancient cities of Western Europe by remarking that it was the result of Eastern precedent, the Eastern nations making their streets very narrow in order to exclude the heat of the sun. The plan of many such towns is preserved even to our own day, of which Albenga, on the Riviera, is an interesting example—a sort of large prison, intersected by narrow and tortuous passages, tending to keep out sunshine and fresh-air. In the reign of Edward I., who, for one cause or another, founded completely new towns, which were often called in France *Villeneuve* (new towns), or *Villefranches* (free towns), here for the first time, as far as we know in the history of cities in Mediæval Europe, we come to a clear and definite system of arrangement; and it appears probable that this system is due to Englishmen, since Mr. Turner gives an extract from an original document in French, wherein Edward I. (*anno* 1298) wrote from Bordeaux (then the capital of the English provinces in France) to London, "desiring the authorities there to send him out four persons competent to lay out the plans of towns, who best know how to divide, order, and arrange a new town in the manner that will be most beneficial to us and the merchants." Edward founded Sauveterre, Monsegur, La Linde, S. Foix, Libourne, and Montpazier, in France, and Kingston-upon-Hull and Winchelsea, in England—all formed on a general plan, of which Montpazier will serve as a good example. Mr. Hudson Turner says: "These towns are more regular and symmetrical than most modern towns, and are built on an excellent and scientific plan. . . . There are always two parallel streets at a short distance from each other, and connected by short streets at frequent intervals; between these principal streets, and also in parallel lines, are narrow streets or lanes, corresponding to the modern mews, and employed for the same purpose. By this means each plot of ground for building on is of an uniform size and shape—a parallelogram, with one end facing a principal street, and another a lane. . . . The principal streets were 24ft. wide, the lanes 16ft., and the passages only 6ft. . . . Near the centre of the town was a large market-place, at one corner of which was usually the church; and it should be observed that the principal streets do not cross each other in the centre of the market-place, but run in a line with its four sides . . . so that the traffic did not interfere with the central space." In the author's opinion, this plan of rectangular divisions, which is also that adopted in the United States of America, is *not* a good one, although, nevertheless, a great improvement on old customs, and having no doubt some special advantages. The foundation of new towns seems to have ceased shortly after the 13th century, and the principal cities of Europe appear to have been built up from time to time in a haphazard manner, whilst their internal condition was of the worst descrip-

tion. In the 17th century, however, the great fire of London (1666) produced two plans for systematic arrangement of new streets, &c., which present some new and noticeable features. They were designed by Sir C. Wren and John Evelyn, and both are engraved in *Styrie*. Sir C. Wren, in his plan for rebuilding the city, leaving out details, proposed to form three kinds of streets—90ft., 60ft., and 30ft. wide respectively; to form a canal of Fleet Ditch, to be 120ft. wide; a quay along the river-side, 40ft. wide; the principal public buildings to be massed together round the Royal Exchange, on a large area of octagonal form, from which radiated the main streets, and in which, at stated intervals, were to be placed the various churches, whilst all churchyards and "unnecessary vacuities, and all trades that use great fires or yield noisome smells," were to be outside the town. This plan of Wren's is a great advance on the old system, or rather no-system, and indeed, in some respects, could scarcely be improved upon. Neither his nor Evelyn's plan was adopted, much to our loss at this present day. When the great fire took place at Chicago, it occurred to the author that an opportunity presented itself of laying out the new city on an entirely new plan. He had not at that time seen Wren's plan for rebuilding London; but it required only some consideration to be convinced that the rectangular plan common in the States was open to many objections, and that an entirely different principle should be adopted. That principle he found in the spider's web, especially in the web of the "geometrical spider," in which the quickest way of reaching the centre from any given point is clearly obtained. The main plan Mr. Waring proposed to be on concentric circles, or rather semi-circles, divided into sections by radiating streets and sub-divided into wards, to be provided with means against fire, and sanitary arrangements complete in each section respectively, corresponding to our old system of wards or guards. In rebuilding the city advantage might be taken of a combination of squares, crescents, terraces, boulevards, and streets, so as to produce the greatest pictorial effect. The houses might have colonnades on the lower story, as at Bologna, forming comfortable walks in summer or winter, whilst arcades, like those of Milan and Paris, should connect the principal points of interest. All buildings should be constructed as nearly fireproof as possible, and permanent sites for fire escapes be established at stated distances throughout the city. To avoid the monotony which characterises the new portions of Paris, Lyons, and other French cities, in which large blocks of new buildings have been lately erected, and one street so closely resembles another that sometimes you can hardly say in what street you are, Mr. Waring proposed that various styles should be assigned to various blocks of buildings, so that all styles of architecture might be represented—Greek, Italian, Gothic, Lombard, &c.—as might be found consistent with good taste. Moreover, we should thus avoid the unsightliness commonly seen in England, of buildings widely different in style, out of all harmony, and sometimes painfully incongruous, placed in juxtaposition, and mutually destructive of each other's effect. A few good canals, crossed by ornamental swing bridges, as in Holland, might serve to connect the traffic of Lake Michigan with the principal railway-stations and the Illinois canal. Spacious markets should be erected in central positions; those for fish being furnished with troughs to each stall, filled with water, in which fish can be kept alive, as in the "Halles" at Paris. Abattoirs, cattle-markets, and all offensive or dangerous manufactures should be kept outside the city precincts, and finally, not only should a system of sewage be carefully prepared, for the purification of the city, but the sewage matter should be utilised as manure. As regards the figures adaptable for the block plan of a city, with its thoroughfares, it will be seen that the choice lies almost entirely between a square, a parallelogram or a circle; and Mr. Waring's opinion is all in favour of the last-named, both for beauty and convenience. Space, air and trees should enter into all plans for new towns or new quarters, and he proposed that instead of the old system of gardens at the back of town houses, the garden should be in front of the house, then the pavement and road for ordinary traffic, with a double tramway in the centre for the carriage of trains and cattle, not by steam but by horse power; for there seems to be no valid reason why railway trains should not be carried right through a city without changing.

The following objects and principles of design ought to be attended to systematically by men engaged in the practice of architecture; they are arranged here in sequence according to their importance to the general welfare as well as to the occupants:—1. Health; 2. Security; 3. Convenience and utility; 4. Proportion and beauty; 5. Decoration. All these relate to the plan and interior of the building alone; 6. Composition; 7. Proportion; 8. Light and shade; 9. Detail. The first object, "health," demands primary attention to the site of the proposed building, and a well considered system of getting rid of all refuse matter from the building itself, its proper ventilation and the manner of warming it, and a proper supply of pure water for drinking, as well as an ample supply of water for cleansing purposes. The second object, "security," requires that particular attention be given to the best methods of fireproof construction; ample provision for water available in case of fire; staircase attached to the main building, and as nearly separate from it as possible, combined with a solidity of construction intended to resist any accident within the range of ordinary likelihood. "Convenience and utility" depend mainly on the plan of the whole block of building, and include attention to comfort, facility of access to various parts, sound and light. "Proportion and beauty" relate to the scientifically arranged dimensions of rooms, and the application of purely architectural features, such as columns, arches, &c., in the combination of which the art of the architect is best shown. "Decoration" consists in the application of sculpture, or of coloured ornament; the last in every kind of material is most adapted to the purposes of internal decoration, but should never be excessive. "Composition" regards the entire external mass of the building, and must vary according to the subject, but in all large works simplicity of mass and largeness of parts are essential to grandeur of effect. "Proportion and beauty" include not only the due proportion of one part to another, but the proper proportions of each single member, such as a column, &c., the proportion of regularity consistent with a pleasing variety of form; indeed, the application of scientific art in architecture, and the subordination of all mere ornament. The subject of "light and shade" requires a due consideration of the aspect as regards the sun of each external facade of the building, and includes not only the shadows cast by it from the projection and recession of masses, and from particular features, but also the application and effect of sculpture, whether as affected by light from the sun or as receiving and holding the ordinary light of a sunless day. "Detail" demands studied consideration of position, delicacy of outline, capacity for effect by shadow, and the employment of colour, which in Great Britain should be very sparingly employed, but may be used legitimately for the use of ornamental designs. After giving an historical account of the paving and lighting of streets, Mr. Waring concluded by saying that something more than trouble and expense are required to make our cities decent and healthy, and that is legal power on the part of the proper authorities to enforce the observance of their duty on the inhabitants. To his mind, there ought to be a printed list of all that a housekeeper is required to do, in respect to keeping his house and its surroundings in proper order, and this should be given to him by the parish authorities, whose regular inspector ought to be furnished with power to see that those duties are properly carried out, and the neglect of doing so should be subject to penalties. Interfering with the liberty of the subject is, he was aware, a favourite outcry amongst us, but the liberty of the individual is justly curtailed if the object in view is the interest of the public: and it is to be hoped that in course of time a proper and regular system of house-to-house sanitary inspection will be instituted, each inspector being responsible to the parochial authorities for the proper discharge of his duties. Moreover, in future, when opportunities occur for the re-arrangement of new quarters in cities, or for the planning of new towns, as might have been the case at Birkenhead in 1845, we are not without hopes that a wider view of the subject will be taken than has yet been customary, and that space, air and health will be as much regarded as convenience and beauty; and a general plan be laid down combining them all, to which all who propose building will have to conform, and the excellent motto which the Institute has adopted be effectually carried out, "Usui civium, decori urbium."

In the discussion which followed,

Mr. CHARLES BARRY said that the author of the paper had assumed that in the laying out of cities it was essential to have one central point, and that there should be facilities for getting to that point from any other point in a direct line. He (Mr. Barry) was of opinion that in a large city—like London, for instance—it was necessary to have several centres. Mr. Barry concluded by moving a vote of thanks to Mr. Waring for his paper.

Mr. FOWLER, in seconding the motion, remarked that a member of the Institute had received a commission to go to America to lay out a city for clients of his in this country, and it was to be hoped that he would do so successfully, and that the work would remain for ages as a monument of his skill.

Dr. MARNER having made a few remarks,

Mr. PAIN, Associate, referred to the splendid opportunity, gradually being lost, of turning such roads as the Euston-road, City-road, and most of the main suburban roads, north and south of the Thames, into boulevards. These roads were all skirted by private houses, with long gardens in front. As the suburbs have extended, and the traffic along these roads increased, shops had in some places been built over the gardens, and, subsequently, in some instances, the houses had been rebuilt over these shops. He suggested that in such roads as these, the shops should be made in the ground story of the existing houses, which should preserve their old line of frontage, and that the gardens should be cleared away, allowing of good wide pavements being formed, and these should be planted with trees. Such boulevards could be formed in all parts of London, and at a very moderate cost if promptly set about.

Professor KERR was rather inclined to support the view taken by Mr. Waring as to the best form in which to lay out a city.

Mr. SEDDON and Mr. MORRIS having made a few remarks, the motion was carried by acclamation, and Mr. Waring having briefly replied,

After a long discussion, it was decided to refer the subject of memorialising the Premier on the subject of metropolitan improvements to the Council, who were instructed by the meeting to draw up a memorial, which, while embodying all that Lord Elcho could wish, would be free from the objections urged against the memorial adopted at Willis's Rooms.

The meeting then terminated.

SCHOOLS OF ART.

THE LONDON FEMALE SCHOOL OF ART.—The Princess of Wales distributed the prizes to the students of the Female School of Art on Wednesday at Burlington House. The principal prizes were those gained in the national competition, and the chief of these, a national gold medal, was taken by Emily Selous, now Mrs. Fennessy, for an original composition in clay. Mrs. Fennessy also received a National bronze medal for a clay model of Juno, from the Antique, and in addition to this, she had the honour of receiving from the Princess her Royal Highness's own scholarship in sculpture. The subject chosen was the Italian painter Cimabue, and the result an original model in clay, which was exhibited in the theatre. A National silver medal was awarded to Miss Helen Hancock for a study in tempera of a passion-flower, from nature; and another silver medal was gained by Miss Julia Pocock for an original subject, Alcestis, modelled in clay. A National bronze medal was taken by Miss Emily Austin, for a group of primroses and apple-blossoms, from nature. Miss Austin also gained the Queen's Scholarship for watercolour drawings of flowers and still-life. The Queen's gold medal was presented to Miss Alice Blanche Ellis, for the best design for a fan. The competition for this medal is directed in successive years for figure-drawing, modelling, flower-painting, and design, and the award was made this year for a painting on silk. Miss Ellis also received a National bronze medal for applied design, and a Queen's prize for studies of styles of ornament. Queen's prizes were also awarded to Miss Elizabeth Dorrington and Miss Anne Hopkinson, for studies in water-colours. Numerous prizes and certificates were given for designs for articles of utility, including one for a dessert-service.

It is proposed to erect at Stoke Newington a new church, dedicated to All Saints, with "free and open seats," capable of holding 750 persons, and schools for 300 children.

PARLIAMENTARY NOTES.

METROPOLITAN BUILDINGS ACT AMENDMENT BILL.—On Wednesday the second reading of the above Bill was moved by Dr. Brewer, the object of which was to legalise the continuance of private intramural slaughter-houses in the capital, which, under the Act referred to, should cease to exist in the course of next year.—Mr. F. S. Powell opposed the Bill on sanitary grounds, and moved that it be read a second time on that day six months.—Mr. Locke, as a metropolitan member, gave his support to the second reading, which Mr. McCombie declined to do.—Mr. C. S. Read took the same course, and argued in favour of abolishing private slaughter-houses and substituting public abattoirs for them.—The Home Secretary cited the conclusions at which the select committee, on whose suggestions the Metropolitan Buildings Act was founded, had arrived against the measure. Although they reported that slaughter-houses were not in themselves unhealthy, yet in another paragraph they recommended that private slaughter-houses should be got rid of, and public abattoirs substituted; and, further, that powers should be given by a general Act to local authorities to acquire land for the purpose. Whilst, then, he could not vote for the second reading, he thought that the question of meat supply was of great practical importance. The provision for closing private slaughter-houses would not come into force until the end of August next year, and it appeared to him that Parliament might, in the meantime, profitably employ itself in making a thorough inquiry into the matter, and with that view he recommended the withdrawal of the Bill, and was prepared to give the support of the Government to the appointment of a committee of inquiry.—Mr. Torrens having urged that the Government should themselves assume the responsibility of moving the appointment of a committee and conducting the inquiry, the Home Secretary expressed his readiness on behalf of the Government to accede to the suggestion.—Sir C. Adderley approved of the appointment of a committee, but hoped that the reference would be strictly limited to the consideration of the provision in the Act of 1844 for the abolition of private slaughter-houses. The delay of thirty years had been ample concession to vested interests.—Ultimately, on the distinct understanding that Ministers would undertake the inquiry, Dr. Brewer withdrew his Bill.

The technological examinations of the Society of Arts are announced, the subjects being cotton, paper, silk, steel, and carriage-building. The Spectacle Makers' Company have offered prizes for the subject of steel manufacture. Among the contributions to the fund are the Fishmongers' Company, 50 guineas; Mercers' Company, 25 guineas; the Vintners', 10 guineas; and the Salters', 10 guineas (annual).

A NEW PROCESS OF GRAINING OR IMITATING WOOD.—According to a patent recently issued to Mr. John Johnston, of New York, graining, or imitating wood, may be accomplished in the following manner:—A glass plate, preferably a thick, even plate, has wrought upon it with a pencil or brush, with asphaltum, wax, grease, or fatty substances, such figures and configurations as shall form the design seen on the surface of planed wood. The glass is then etched by the use of hydrofluoric acid. When the etching is sufficiently deep, the plate is cleaned with spirits of turpentine, and the whole surface is spread over evenly with oil-graining colour. The plate is then scraped with a scraper of soft wood, which, drawn over the surface of the plate, leaves the colours only on the etched spots. A printer's roller of the proper circumference and width is then passed over the whole surface of the prepared plate, by which the design is transferred to the roller. Then the roller is rolled over the surface of the wood to be grained. It is claimed that the method is equally applicable to metal, paper, or any substance or composition, and that any desired number of impressions can be taken quicker, cheaper, and more readily, even by inexperienced hands, and that, therefore, the skill of the experienced grainer can be expended on a series of plates, without requiring his time or services in copying, thus making the process cheap, rapid, and perfect. In adapting the process to printing on paper, the plates are etched out in the places not desired to be transferred. The plate is then mounted on the wood, and is printed from it in the ordinary manner.

ON THE DOME.*

IN my last lecture, after bringing down our consideration of domical construction to the period of the perfecting by the Byzantine architects of the system of what are known as "Pendentive Domes," I was proceeding to describe a few of its most marked productions, but was stopped short when I had given a rapid sketch of the most wonderful of its creations,—the Church of S. Sophia at Constantinople, of which Fig. 1 shows section.

Among those remaining at Constantinople, that of S. Irene (section shown in Fig. 2) perhaps comes next in date. Its central dome, like that of S. Sophia, is flanked by arcaded isles which, however, do not extend to the vaulting, but simply carry galleries. These wings, therefore, as well as the eastward extension, are covered by barrel vaults, the latter being terminated by a semi-domical apse—while westward is a second dome, like the central one in plan, excepting that, being less in dimension east and west, its base is an

Mother of God, is of much later date. The church proper has but a single dome, though there are several others over the narthex. This dome covers the intersection of two barrel vaults, is supported simply on four columns; and rises high above its pendentives on a drum pierced by windows. The architecture of this church is very elegant, differing in date, it is probable, but little from that at S. Mark's at Venice. Others do not differ sufficiently from these types to make it worth while here to describe them. It may, however, be mentioned here that in the later Greek churches the domes, or some of them, rose often so high as to become rather elegant towers, arcaded externally. This is the case with several of the churches at Athens.

Among the churches of that city we find one type of great elegance, the Church of S. Nicodemus, in which the dome occupies the width of what we should call the nave and its aisles; each side of the square over which it stands being divided into three unequal arches, over which it rises on a lofty drum, and is carried on eight pendentives. This forms a most elegant interior, susceptible of many varieties; and, from the spacious central space which it affords, seems the most valuable type on which to found a domed design for a modern church.

It would, however, be endless to enumerate the varied forms of domed churches in the East, though, with all their varieties, they may usually be reduced to a few elementary types. If you desire to study them, I would recommend to you Salzenberg's "Old Christian Architecture at Constantinople," Couchaud's "Byzantine Churches in Greece," and Texier and Pullan's "Byzantine Architecture."

It is not, however, in the East alone that the Byzantine dome is to be found, even in its earliest days—those of Justinian himself. It established itself equally at Ravenna; indeed, as we have seen in the Baptistery there, as well as in the tomb of Galla Placidia, it, in an early form, preceded those at Constantinople itself. Its great effort, however, there was the Church of San

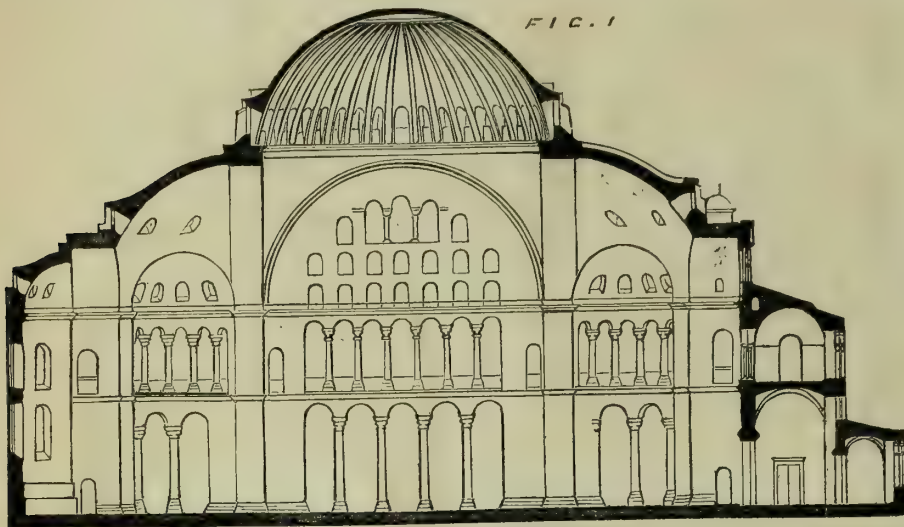


FIG. 1

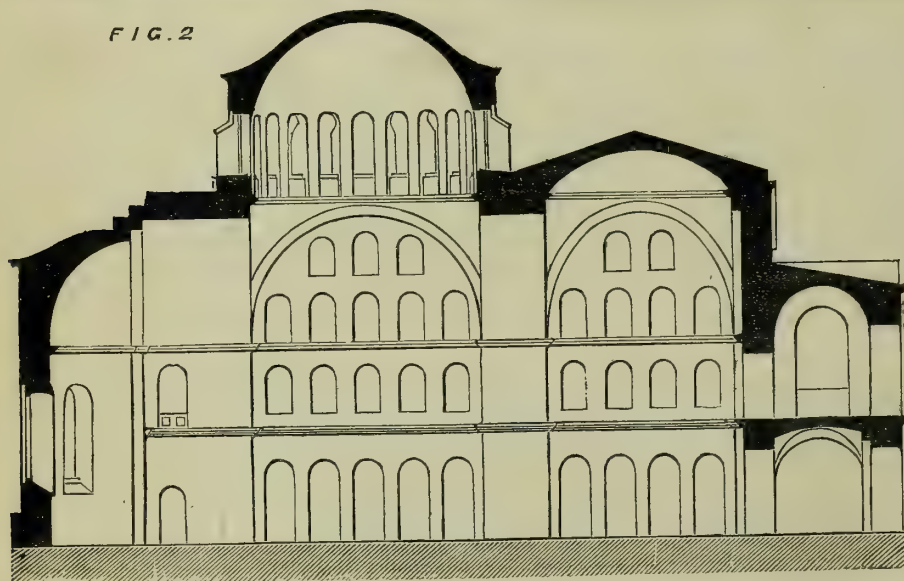


FIG. 2

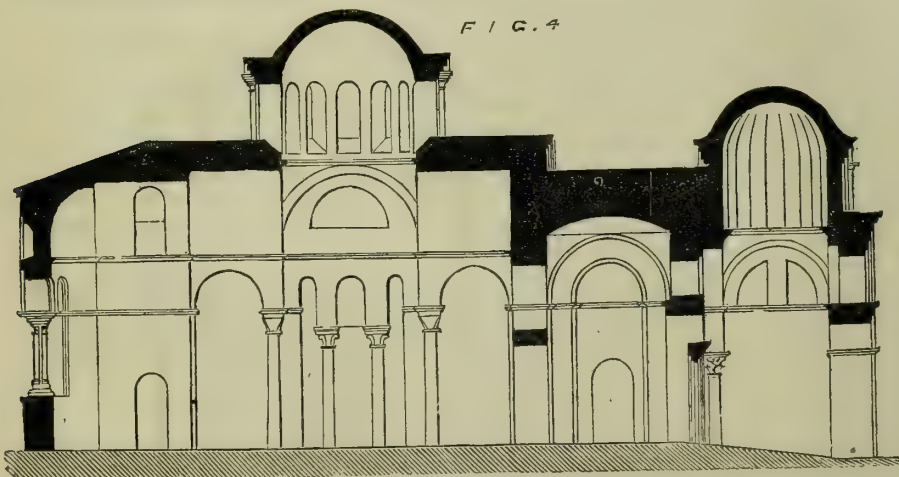


FIG. 4

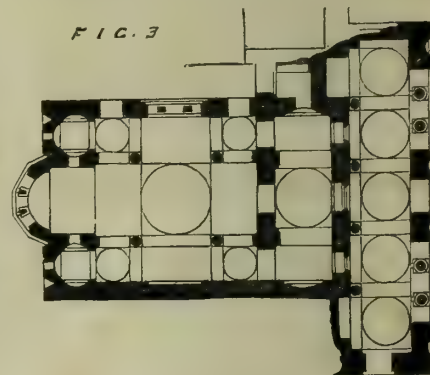


FIG. 3

I will now proceed with my subject. After the Church of the Holy Wisdom, all subsequent domed churches of the Byzantine class seemed to shrink from a hopeless competition, and to content themselves with moderate dimensions.

ellipse instead of a circle. The actual domes, however, differ much more widely; for, while the western one is a flat disc continuing the surface of its pendentives, the central dome is raised above them on a high drum pierced like a clerestory with many windows.

The Church of the Holy Theotokos (plan of which is given in Fig. 3, and section in Fig. 4), or of the

Vitale, erected by Justinian and Theodora. This church was evidently imitated more or less from the Temple of Minerva Medica, though whether directly or through that of S. Sergius at Constantinople can hardly be judged. It is a grand octagon, with a spacious surrounding aisle of double height. Seven of its sides have the same circular niches projecting from them that we find in the temple (as well as in the Church of S. Sergius), only they are arcaded and carried out with purely Byzantine details. The aisles are of two stories, united behind a lofty arcade. This is surmounted by a clerestory, encroaching, to a certain degree, upon the dome. This, however, is not pendentive. It is covered externally by a roof. It has undergone much modernisation, but retains its general form and a good deal of its ancient decorations, which show it to have been treated much as S. Sophia, with which it was contemporary. The church is the more interesting from having been the type followed three centuries later by Charlemagne in his famous church at Aix-la-Chapelle.

The manner in which the dome was introduced and adopted in Italy during these ages was so diverse in its results as to cause it to be very perplexing to chronicle it in any clear consecutive order. There were, in fact, two distinct influences, both occasionally leading to its adoption.

At Rome, and in places under Roman influence, such examples as the Pantheon could not fail to have their effect on the subsequent architecture, and we accordingly find there numerous scions of

*Second lecture delivered at the Royal Academy by Sir GEORGE GILBERT SCOTT, R.A. (See p. 358.)

this primeval family, while, as we have just seen, the purely Byzantine form was simultaneously introduced by way of Ravenna, and later on was planted at Venice.

Through this twofold influence the dome became very frequent throughout Italy. It was carried, as we have seen, by Charles the Great, from Ravenna to Aix-la-Chapelle, and, later on, was carried forward from Lombardy, under the first three Othos, across the Alps, down the valley of the Rhine, and far into the interior of Germany. Only a few years later it was conveyed from Venice into the interior of the south-west of France, whence it spread throughout an extensive district stretching eastward into Auvergne, and even as far as Lyons, and northward to the banks of the Loire, where, to this day, the effigies of our early Plantagenet kings lie beneath a series of pendentive domes almost as perfect as if at Constantinople.

I will not dwell at much length on the domes which were derived from purely Roman traditions, because they, for the most part, suggest no new type or development.

The most magnificent, probably, is that of the Baptistry at Florence, section shown in Fig. 5,

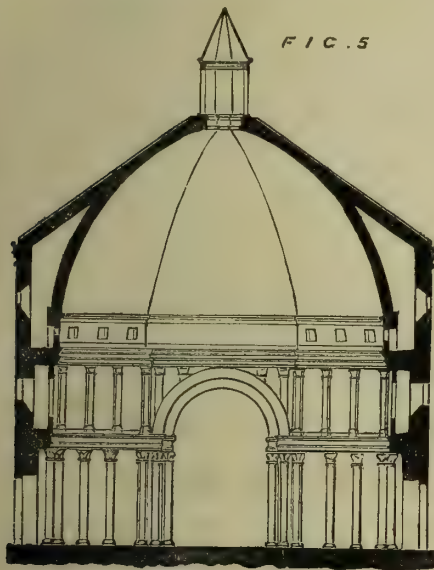


FIG. 5



FIG. 6

and plan in Fig. 6, a noble work of early, though unknown, date. It is clearly founded in a great degree upon the Pantheon, though of octagonal plan, and with a dome of the same form. Its sides are in two stories—the first with deeply recessed colonnades on each side—the upper stage a clere-story. One face, however, is occupied by the arch of the sanctuary.

The dome had formerly an eye, like the Pantheon, but has now a lantern turret. It is encrusted with beautiful mosaic work, with an infinity of figures, the side over the sanctuary having a colossal figure of our Lord in Majesty in a vesica. The architecture is of marble, and the pavement is tessellated work. The whole internal effect is beautiful and impressive in the extreme.

A parallel work is the Baptistry of Parma

(section shown in Fig. 7), a work of the twelfth century. It is polygonal in plan, and greatly inferior to that of Florence. The church of San Tomaso, in Limine, near Bejamo, is simply like an ordinary Templars' church, with a hemi-

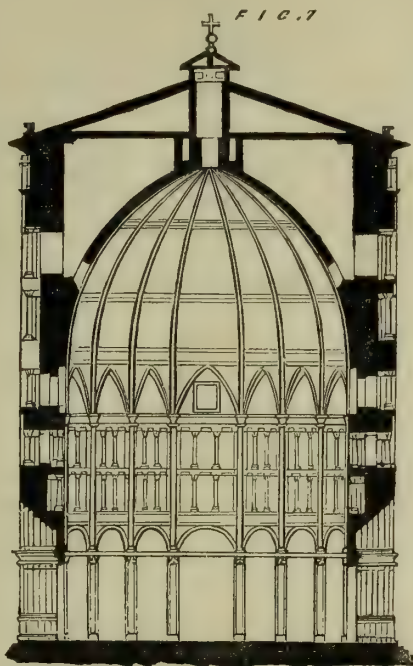


FIG. 7

spherical dome over its clerestory, and a turret rising from its apex. San Stephano, at Bologna, is in some degree on the same type.

The greater part of the Italian domes of these periods, and of this class, simply cover the crossing or the central tower of a cruciform church, and exhibit no important development.

The most original, perhaps, is the dome of the Cathedral at Sienna, which stands upon six piers, forming a hexagon, each side of which is equal in width to the nave and choir. In the next stage, the angles are corbelled out so as to form in the upper story a dodecagon, which form is followed out in the dome.

The merit of this plan is that it unites itself, with little obstructiveness, with the church on all sides of it, and opens out in its centre a space of double the width of the nave. It is also pleasing and elegant in its effect. But it is time that we returned to the Byzantine type, which you will remember that we left at Ravenna to follow out this digression.

We now adjourn from Ravenna to Venice.

The mercantile and perhaps political connections of the old Venetians were mainly *Oriental*. This probably accounts for their architecture, up to the twelfth century, being *Byzantine*.

The church of S. Mark (section shown in Fig. 8, and ground plan in Fig. 9), or the chapel of the Doge's Palace, was founded in the ninth century, in honour and for the reception of the body of S. Mark, which had been procured from Alexandria, when the church in which it had been long deposited was destroyed by the Moslems. This church, however, perished in a popular tumult, late in the tenth century, whereupon the Venetians set about its reconstruction with a determination to render it one of the finest and most sumptuous in existence. All the East, so far as accessible to their ships, was laid under contribution for columns and other architectural embellishments. The design is often spoken of as founded on that of S. Sophia. This was not the case. The Church of the Apostles at Constantinople would rather seem to have furnished its model. It consists of a group of five square spaces, covered each by its pendentive dome. Its peculiarity lies in the breadth of the wagon-vaults which support and separate these domes, which is so great that the vast piers which sustain them are pierced in two stories, and divide each other into four piers, with a vaulted space between them. Each dome is consequently the centre of a cruciform space, the wings of which have wagon-vaults. The only exception is the east end, where an apse is substituted for this space, and out of this apse spring three minor ones, as at S. Sophia. Each dome is about hemispherical above its pendentives, and is pierced with windows, as at S. Sophia.

The domes are now, and have been for many ages, covered over by lofty domical towers, of timber, each surmounted by a sort of turret on its apex. The wings which flanked each domed space, bounded as they were by the perforated

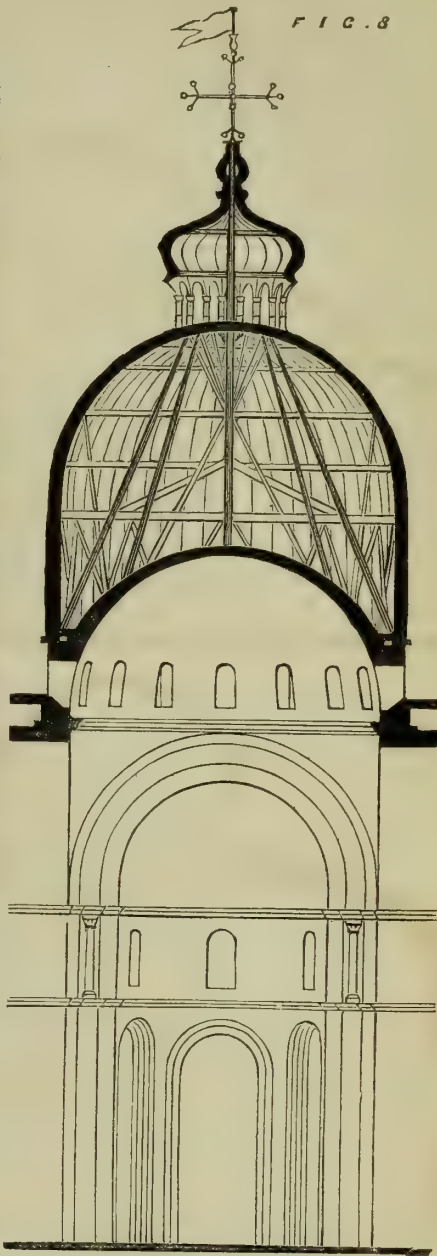
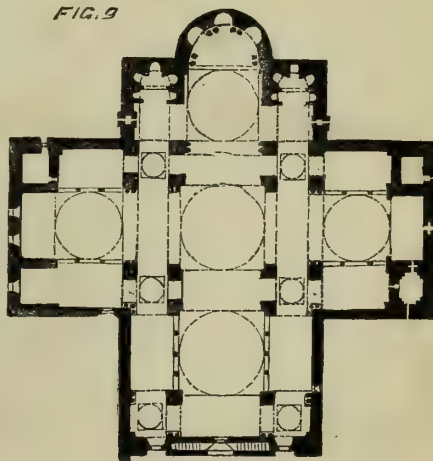


FIG. 8



piers, were so suggestive of side aisles that the builders, familiar, no doubt, with aisled churches, added arcades from pier to pier, both in the nave and transepts. These however, are merely decorative, supporting no galleries, as is frequent in the East, and only serving as narrow communications,

equivalent to triforium passages, between the upper chambers in the great piers.

The entire church is internally encrusted with richly-coloured marbles and gold mosaic, with figures, just as at S. Sophia's; and the floor is of marble and porphyry tessellation, varying in scale from the most vast slabs to the finest mosaic work.

The interior was no doubt a joint imitation of S. Sophia's and the Apostle's Church, rivalling the former in its sumptuous decoration, and imitating the latter in its plan.

To those who have not visited the East, this interior gives a very faithful idea of the splendour of a Byzantine church, and I must say that I have myself seen nothing more impressive.

(To be continued.)

Building Intelligence.

CHURCHES AND CHAPELS.

NEWCASTLE.—The parish church of Newcastle-under-Lyne, dedicated to S. Giles the Abbot, except the fine old tower in the Early English style of architecture, is to be entirely rebuilt. The present nave and chancel, which have become somewhat dilapidated, were built in 1720, and contain several handsome mural monuments, which will have to be disturbed, but which will no doubt be refixed in the new structure. During the progress of the work the services will be conducted in the temporary place of worship erected in the Ironmarket. This structure has done duty for a similar purpose at Kingston-on-Thames, where it was opened in June, 1870. The estimated expense of restoring S. Giles's is about £12,000.

SAXMUNDHAM.—The Church of S. John the Baptist, Saxmundham, was opened on Thursday week, after restoration, from the designs of Mr. R. M. Phipson, by Mr. Grimwood, contractor, of Weybread. The old galleries and pews have been swept away, and the latter replaced by open benches of New Zealand Kauri wood. Space has been saved by the removal of the south porch, and the main entrance to the church is now through the tower, a handsome oak screen separating the tower porch from the nave. A further saving of space has been effected by the removal of the vestry from the west end of the north aisle. A new vestry of Decorated work is now placed on the north side of the chancel. The south chancel aisle has been thrown more open to the chancel by the introduction of two Decorated arches with circular piers, caps, and bases. A new three-light window has been inserted in the west bay of the south aisle. Prior to these alterations the wall was partially of brick, and the buttresses had been repaired with the same material. The clerestory windows had been partially built up, and the stonework of all but one had been removed. These windows have now all been restored in the same style as that which had been left. The walls are faced with wrought flintwork, and the buttresses are all carefully restored. The tower, which is very well proportioned, has also been restored. The windows are all of a late period, and both in the south wall and in the clerestory have elliptical heads with very good tracery. Most of these windows had to be entirely renewed. The chancel had been shockingly defaced by the cheap repairs of the last century. The east wall was of brick, the east window partially bricked up, and the mullions were of wood. A handsome four-light window in the Decorated style has been fixed, and the wall has been refaced in the same manner as that on the south side. The roof, which before was concealed with plaster, has been opened and restored. The chancel is not in line with the church, and the dip is in this case very plainly visible to the south. The precise extent of the deflection is not stated, but to the eye it appears as if the centre of the window was as much as three feet to the south of the centre of the chancel arch. The reredos is not yet finished. It will be from the hand of Mr. Thurlow, sculptor, of Saxmundham. The total cost of the restoration is £1,700.

SPRINGBURN, NEAR GLASGOW.—On Monday afternoon, the foundation-stone of the new U.P. Church, Springburn, was laid, in presence of the Rev. Mr. Johnston, the minister. The new church, which is situated close beside the village, is being built in the Grecian style of architecture. It is 75ft. long by 67ft. broad, and the front elevation will reach a height of 47ft. It is

intended to accommodate about 950 sitters. The architects are Messrs. Clark and Bell, 37, West Nile-street, Glasgow.

BUILDINGS.

BRISTOL.—The Talbot Hotel, Victoria-street, Bristol, is being rebuilt. The style of the new building is Italian, and the design is by Mr. John Bevan, architect. The *façade* is almost entirely of brick, bands and arches of white brick relieving the general mass, which is finished off with a light parapet. Messrs. Church and Phillips are the builders.

SHEFFIELD.—The plans for the new Corn Exchange buildings have been approved by the Duke of Norfolk. Messrs. E. Hadfield and Son, of Sheffield, are the architects. The type selected for the design is Gothic, of the fifteenth century. The materials will be brick and stone. The tenders for the work are to be procured forthwith; and the erection of the buildings will be commenced very shortly. The expense is expected to be about £30,000.

WARWICK CASTLE.—The work of restoration at Warwick Castle is progressing rapidly. The apartments east of the Great Hall are covered in, and the walls have received their first coat of plaster. The floors are now formed of iron girders and concrete. The iron girders for the rooms above the dining-room are being fixed; the great hall shows already signs of a purer taste than the old well-known structure; the south windows have been filled with stone mullions and traceried heads of early fourteenth century work; the interior is being lined with ashlar work, except a few brick panels, some 8ft. high, which are designed to hold the oak wainscoting on which the arms and armour will be fixed. The two arches on the east disclosed by the fire will not again be hidden, but will form, if the present intention is carried out, recesses. The doorway in the window is renewed, but the old windows on the north will soon be hidden again by the new masonry. The gallery, or passage in the wall, above the south windows will be open up into the hall, by the ancient openings being fitted with open metal work. The remains of an old fireplace have been traced in the west wall, near the entrance to the red drawing-room.

SCHOOLS.

LOWER BROUGHTON.—The corner-stones of new day and Sunday schools in connection with the Wesleyan Methodist Chapel in Sussex-street, Lower Broughton, Manchester, were laid on Saturday afternoon. The new schools will be two stories high and built of brick, with stone facings. In the centre of the buildings there will be a general schoolroom on the first floor, 70ft. long by 37ft. wide, and an infants' schoolroom of nearly similar dimensions on the ground floor. At each end there will be classrooms amounting altogether to about fifteen in number. The design also includes a chapel-keeper's house, &c. The schools will accommodate about 1,000 children. The total cost will be £3,500. The architect is Mr. Thompson Raw, John Dalton-street; and the builder Mr. James McFarlane, Rochdale-road, Manchester.

ART AND SCIENCE AT CHESTER.—The Marquis of Westminster, K.G., presided at a meeting at Chester, on Saturday, in furtherance of a scheme for uniting under one roof the City Library and Reading-room, the Society of Arts, the Architectural and Archaeological Society, the Natural Science Society, and also for establishing a local museum, the nucleus of which is already secured to the city by a valuable and extensive collection of geological specimens presented by the Marquis. A joint committee was appointed from the different societies already named, with full power to treat for the rental of premises lately occupied by Mr. C. Potts, with the option of purchase.

DISCOVERY OF A SKETCH BY RUBENS.—The discovery has just been made at Cologne of a fine sketch of one of the most celebrated paintings by Rubens, belonging to the Church of S. Martin d'Alost, and of which a magnificent engraving by Paul Pontius, now rare, is well known. This work represents persons struck by the plague invoking S. Roch, and exhibits a greater number of figures than the large picture, which measures 16ft. in height. In the upper part of this canvas the saint is receiving from Jesus Christ the mission to relieve the sufferings of the infected, who hold out to him their suppliant hands.

GOOD FRIDAY.

THE next number of the BUILDING NEWS will be published on Thursday, the 10th instant, the following day being GOOD FRIDAY. Advertisers and others are requested to send all communications to the office by 5 p.m. on Wednesday next.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.
Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

TERMS OF SUBSCRIPTION.

(Payable in advance.)

Nineteen shillings per annum (post free) to any part of the United Kingdom. To the United States £1. 6s. (or 64 dols. *gold*). To France or Belgium, £1. 6s. (or 32 francs). To India (*via* Southampton), £1. 14s. 10d. To any of the Australian Colonies, New Zealand, the Cape, the West Indies, Canada, Nova Scotia, or Natal £1. 6s.

N.B.—American and Belgian subscribers are requested, to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance.

Subscribers receiving their copies direct from the office are requested to observe that the last number of the term for which their Subscription is paid, will be forwarded to them in a *coloured wrapper*, as an intimation that a fresh remittance is necessary, if it be desired to continue the Subscription.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED—W. E.—C. B. M.—Th. B.—J. G. and Co.—M. E. and Co.—J. H. O.—H. W. R.—J. J. L. and Co.—J. W. E.—S. T.—Rev. Dr. H. E.—T. H.—J. A. B.—M. A.—S. and Co.—Student.—E. F. S.—E. W. G.—E. A. F.—N. N.—Inquirer.
T. R.—The work has not been translated into English.
E. H. G.—The drawing came to hand.
M. CARPENTIER.—We have sent the missing plates. The other subscription must now remain as it is. We cannot receive back the numbers, or alter our books.

Correspondence.

THE "BUILDING NEWS."

To the Editor of the BUILDING NEWS.

SIR,—I am sure you must have received an almost endless number of testimonies in favour of your important development of the BUILDING NEWS this year. You are admirably fulfilling your promise by giving as many illustrations as the three high-priced professional journals gave last year, and you are now giving on an average two pages of illustrations more than the other two professional journals put together, and each of which is published at the same price as your own. The wonder to many of us is that you can give so many illustrations and so much matter weekly for so comparatively small a sum. Young architects in the country frequently sigh for the architectural conveniences and facilities of the metropolis. You frequently hear an ambitious aspirant say, "Oh! how I should like to be in London to attend the meetings and classes of the Institute and Architectural Association." You have, however, diminished his desire to go to London, by bringing so much of the best of London to the country artist. The BUILDING NEWS is, in fact, the country architect's Royal Institute of Architects and Architectural Association combined, and particularly since you have *illustrated* as well as reported the papers delivered before these and other kindred societies. Your illustrated reports of papers given by Mr. Seddon, Mr. Statton, Mr. Robins, Mr. Redfern, Mr. Tarver, and others, have been, I assure you, appreciated. I see the two other professional publications have reported Sir Gilbert Scott's lecture before the Academy on "The Dome;" but you do more, you report and illustrate these lectures, and of course make them doubly valuable. In fact, a report merely of an illustrated paper, however valuable, fails to convey an adequate idea of the author's teaching. Hence many of these reports are almost valueless. You, by giving drawings as well as the words of the author, do a most useful work indeed, and you are, therefore, for this feature of the BUILDING NEWS in particular, entitled to a vote of thanks from your readers. Pray accept mine.

A MANCHESTER ARCHITECT.

"THE ART-WORKMAN" AT RIEVAULX.

SIR,—In your review this week of Mr. Sharpe's "Gothic Mouldings," you touch upon the Abbey at Rievaulx, and it may not be without interest to mention a rather unusual accident that occurs there in connection with the mouldings of the great choir-arch, and which is, I believe, not always noticed. On that side of the arch, which in ordinary cases would be the east side, the middle of the three orders of mouldings has an entirely different section springing from the two opposite piers, resulting of course at the crown, where they meet in a notch. An attempt has been made to overcome this with a small boss of carving, and which now being almost destroyed, discovers what before was more generally concealed.

This unusual feature has been attributed by some Gothic passionists, I understand, to a very rapid transition in the style. For my part, I am inclined to attribute it rather to the presence of "The Art-Workman," and very favourably to the argument you cite from the "Quarterly Review," "where every workman did as he listed," though in this case not with precisely the result anticipated by the reviewer in question.

The same sort of thing occurs also at Beverley Minster, where the arcading joins the earlier and the later work, but here, of course, it is explainable.—I am, Sir, &c.,

March 31, 1873.

R. MORRISON MARNOCK.

Intercommunication.**QUESTIONS.**

[2818].—**Ionian Capitals.**—In the new edition of "Weale's Dictionary of Terms," it is stated that "We cannot generate the curve of the volute of an Ionic capital but by approximation, but the inventors of the order must have known how to generate this and other curves in Greek architecture on fixed principles. Mr. Jopling is said to have discovered the true generic curve." Can any one give me any more information about Mr. Jopling and his discovery?—TANNO-GALLATE.

[2819].—**Concrete Walls.**—In building low concrete walls about 4ft. high, is it necessary to sift all the sand out of the gravel used? Can ground lime be used instead of Portland cement, and in what proportion? The minimum proportion of Portland cement? And can lime and cement be used mixed, with economy or advantage?—J. GRAINGER.

[2820].—**Agreements, &c.**—Is a stamp necessary on an agreement between a builder and an artificer—say, bricklayer or plasterer—for work to be done and paid for by measure (labour only)? Is an adhesive stamp sufficient in all cases, or ought the agreement to be sent to the Stamp Office as a deed is sent for stamping? Can a builder make an estimate for dilapidations, and charge for the same, without paying for appraiser's license? Supposing the estimate to be for the information of one party only, is a stamp necessary? Within what time must an agreement be stamped? I think six weeks is the limit. Am I right?—ANON.

[2821].—**Limestone.**—Where is the finest limestone to be found? If in England, name the county.—WM. KELLY.

REPLIES.

[2797].—**Durability of Stone.**—As "J. V.," of Exeter, is angry with me for maintaining that granite is durable, I give the following examples. The monuments in the British Museum are a few thousand years old. St. Mary's Church, Truro, is of the fifteenth century. The Eddystone lighthouse, near Plymouth, has its base of granite, and has withstood the storms of nearly one hundred years without damage. The three London bridges built of Cornish granite are in perfect repair, as is also the Duke of York's Column (of Scotch granite). I dare say the vicar alluded to, being possessed of the logical faculty, ventured to draw an inference from a fact, concluding, it seems too boldly, that an exposed block of granite that has lasted without scratch or blemish for twenty years will also last one hundred. The fire at Chicago destroyed both limestones and sandstones. Granite will stand fire as well as limestone, but no better; and, as "J. V." refers to the fact of the fire at Boston, I may remind him that they are, nevertheless, building the ground story of the new Museum there with this material; that at New York, the new Museum of Fine Arts—a building larger than Somerset House—and at Aberdeen, the new Post-office, are to be of granite. These last examples, at least, show confidence in the material, for which there must be some reason. As I said before, it requires proper selection, like any other materials, limestone included. Would the Plymouth stone stand our London atmosphere? In my opinion, neither it nor any other limestone will.—H. T.

[2817].—**Discoloured Mortar.**—In answer to "An Old Subscriber," I beg to state that, from my experience, there is no cure for his annoyance but time. The better the work, the more the efflorescence of which he complains will come out. If he will go to St. Stephen's Church, Haggerston, he will find that the outside, which is in grey stocks, is getting a good colour—that is, as far as the dirt and smoke of that neighbourhood will allow it—whereas the inside, which is faced with malms and pointed, is not nearly free from efflorescence, but what little is free from it looks very well, I think; but it must have time and a reasonable amount of dry weather. It is caused, I believe, by the sand, which is mixed with the clay of which the bricks are made, because I once tasted the raw bricks at a field, and it was quite like the efflorescence or salts emitted from some work I was doing at that time, and I was induced to go and see the field for myself. I built some houses at Lewisham, in Kent, and the bricks I used were second malms for fronts, and stocks for backs, &c., and I never saw any salts or efflorescence come from them, and there was none to be tasted in the raw material. So I should advise "An Old Subscriber" to brush it off well, and leave it to that end of us all—Time.—A PLAIN-DRAWING CARPENTER

Our Office Table.

LEEDS SCHOOL BOARD.—At a recent meeting of this Board, Mr. Adams, of the firm of Adams & Kelly, was elected architect to the Board. The Board also adopted the recommendation of the Sites and Buildings Committee, that the designs of Messrs. Adams & Kelly be accepted for the Jack-lane Schools. Quantities and satisfactory tenders for the work had been obtained, the amount of the tenders being £4,801. One of the members demurred to the full architect's commission being paid in this case, as Mr. Adams had just been appointed architect to the Board at a large salary; but this objection was not pressed upon its being explained that, previous to the appointment, the successful plans were selected in competition, and were those of the firm of Messrs. Adams & Kelly, not of Mr. Adams individually.

MODEL-HOUSES ASSOCIATION.—A deputation appointed by this association, which is a charitable society organised for the purpose of improving the dwellings of the industrial classes, and for the building and maintenance of better homes for them, waited upon Mr. Stansfeld, at the Local Government Board Offices, Whitehall, on Monday, to urge upon him the necessity of some alteration in the Artisans' and Labourers' Dwellings Act, 1868, and with reference to other matters affecting the industrial classes. The deputation pointed out that the Act of 1868, which was passed by the House of Commons to prevent the occupation of houses unfit for habitation, did more injury than good to the working-classes by diminishing the number of houses available for them, and so necessitating greater overcrowding. It was desirable, therefore, that as the Government would not be able to introduce any general measure this session for the improvement of the Sanitary Acts, a short Bill should be passed at once to enlarge the scope and render the working of the Act of 1868 practicable. The deputation also pointed out the necessity of societies like theirs having powers for the compulsory purchase of land, and for obtaining money for the adaptation of buildings; and that the association was an adaptation society, and sought to adapt old buildings to new wants, rather than to pull those buildings down. Mr. Stansfeld, in reply, stated that as far as practical operations were concerned, they must be content to discuss the minor propositions, because he did not think public opinion was at all advanced towards the reception of discussions on the subject. The deputation must agree with him that it would be a very large proposal to bring before the public. He did not see any legal difficulty in the way of borrowing money for the adaptation of buildings, as well as for their erection, and until that legal difficulty was pointed out he must abide by the Act.

TESTIMONIAL TO MR. G. SMITH, F.S.A.—On Saturday a meeting was held in the large room of the Social Science Association, Adam-street, Adelphi, for the purpose of presenting a testimonial to Mr. George Smith, of Coalville, Leicestershire, in recognition of his exertions on behalf of the brickfield children of England. The meeting was presided over by the Earl of Shaftesbury.—The hon. sec., Mr. E. Walford, gave a brief sketch of the many years' exertions of Mr. Smith for the amelioration of the condition of the children and young persons employed in the brickfields of this country.

THE STATIONERS' COMPANY AND TECHNICAL EDUCATION.—Following the example of other of the City companies, the Stationers' Company, with the view of promoting the technical education of the workmen and apprentices in the different branches of the trades connected with engraving and printing, have arranged for the delivery of a course of six lectures on printing, its history and progress, from the earliest period to the present day, including, also, engraving on wood and metal and lithography, by Mr. E. A. Davidson. The admission to these lectures is by tickets, which may be obtained gratis at Stationers' Hall. The first of these lectures was given on Monday evening last, and the remainder of the series will be given on the following Monday evenings:—April 7, 21, 28, and May 5 and 12.

The memorial stone of a new church at Bruntingthorpe, Leicester, now being erected by Mr. F. H. Allen, builder, of Leicester, from designs by Mr. W. Smith, of London, was laid on the Feast of the Annunciation of our Lady.

CHIPS.

A new Wesleyan chapel at Northampton was opened on Sunday week. The cost of the building has been £750, and it accommodates 300 persons.

Naples has just celebrated the 200th anniversary of the death of Salvatore Rosa. The Neapolitan artists were all present in the Church of Santa Maria degl' Angeli, at a religious service performed in honour of the illustrious master.

The Church of S. Madoc, Llanbadock, was reopened on Lady-day, after restoration, by Mr. J. Prichard, of Llandaff. Mr. J. M. Lucas, of Leamington, was the contractor. The cost of the restoration was £800.

The Epping Forest Commissioners have concluded their inquiry into the inclosures on the manor of Chingford S. Paul's, and are now proceeding with the manor of Chigwell.

Mr. Partridge, President of the Royal College of Surgeons, and Professor of Anatomy at the Royal Academy, died on Tuesday week, in his seventy-second year.

The collection of modern pictures of Mr. Edwin Dixon, of Merrivale-grove, near Wolverhampton, was on Friday week disposed of at the rooms of Messrs. Christie, Manson, and Woods, and realised £16,500.

It has been resolved, at a meeting held in the Senate House, Cambridge, to erect a memorial to the late Professor Sedgwick. It will take the form of a geological museum.

It will be remembered that Mr. Gibbs, of Tyntesfield, promised last summer to build the chapel of Keble College, which it was expected would cost nearly £30,000, entirely at his own expense. The plans are now finished, and Mr. Gibbs has consented to lay the first stone on S. Mark's day, April 25, on which, in 1792, Mr. Keble was born.

Trade News.**WAGES MOVEMENT.**

AYR.—The joiners' strike in Ayr is now at an end, the men having resumed work on their own terms—viz., an advance of 3d. per hour, and the reduction of the hours of labour from 54 to 51 per week.

BARNESLEY.—The Barnsley operative joiners have received 2s. per week advance from the 1st April.

GALASHIELS.—The working carpenters of Galashiels have refused to request a rise of 3d. per hour.

GLASGOW.—At a meeting of Glasgow joiners held on Saturday night, it was reported that 86 employers had consented to accede to the demands of men for an advance of 3d. per hour; 20 promised to pay the advance if the trade generally did so; nine had refused, and four had not yet given any decided answer. As the nine masters who decline to give the advance employ very few hands, the threatened strike will be averted.

LEAMINGTON.—About 500 operatives in the building trade in Leamington refused yesterday to go to work on the new regulations which came into force on Monday. The regulations reduce the wages 3s. in winter. Both sides continue very firm.

LIVERPOOL.—The building trades of Liverpool have recently been in an unsettled state in consequence of the disputes with the house-carpenters and joiners of Liverpool and Birkenhead. The men claim an increase of wages and a reduction in the hours of labour, which practically involve an increase of pay amounting to 2s. 4d. per week, with five hours less work. No positive change, however, can take place until the 1st of May, as both parties on the 1st November last bound themselves to give six months' notice of any change. The men have already rejected a proposal of the masters to increase the wages by one halfpenny per hour without reducing the hours. The men proposed to refer the matter to arbitration, which the masters declined. The masters held another meeting on Tuesday afternoon, when it was unanimously and emphatically resolved not to accede to the proposal of arbitration made by the men. The latter have still a month to consider their final decision.

LONDON.—At a meeting of the General Committee of the Carpenters' Advance of Wages Movement held on Monday at the "Brown Bear," Bloomsbury, the secretary read the following letter from the Secretary of the Master Builders' Association, in reply to the memorial sent in by the carpenters for an advance of 3d. per hour in their wages, or from 8 1/2d. to 9d. per hour:—"The Committee of the Central Association of Master Builders of London has received with surprise a request from the carpenters and joiners to disturb the arrangement made so recently as to the rate of wages and hours of work. In regard to the alleged present necessity of an increase of the weekly earnings, the committee is of opinion that it should be met by working longer hours during the summer months, an arrangement the Committee is prepared to consider." The committee expressed an opinion that the Committee of Masters need not have felt any surprise at receiving the memorial, inasmuch as it was generally understood that the arrangement of last year was only a compromise of the then existing dispute. The committee will not take any action upon the above letter until the opinion of the trade has been expressed through its delegates.

ROTHERHAM.—The operative masons and joiners of Rotherham have received an advance of $\frac{1}{2}$ d. per hour in their wages.

S. HELEN'S.—The bricklayers of S. Helen's have determined to seek an advance of wages, not having had any during the recent wages agitations. Their present payment is 33s. per week, and they demand 36s., in consideration of the increased cost of living. It is intended to make a formal demand and allow the employers a month to consider it.

ASHTON & GREEN.

Slates, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portmadoc and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.

24 by 12	22 by 12	20 by 10	18 by 10	18 by 9
420s.	370s.	285s.	215s.	222s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8
222s. 6d.	170s.	212s. 6d.	130s.	77s. 6d.

Per m of 1,200 Slates, subject to a discount. Marble and Enamelled Slates Chimney Pipes, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Ridges Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BRISTOL.—For warehouses in Victoria-street, for Mr. T. C. Stock. Mr. J. Bevan, architect.

Coates	£3,492 0 0
Davis and Son	3,475 0 0
Diment	3,079 0 0
Eastbrook and Sons	2,850 0 0
Church and Phillips	2,750 0 0
Wilkins and Sons (accepted)	2,677 0 0

BRISTOL.—For warehouses in Victoria-street, for the Rev. A. Popham. Mr. J. Bevan, architect.

Davis and Son	£2,363 0 0
Eastbrook and Sons	2,300 0 0
Diment	2,263 0 0
Wilkins and Sons	2,100 0 0
Church and Phillips (accepted)	1,994 0 0

ECKINGTON.—For the erection of new schools and master's residences at Eckington, Derbyshire, for the Local School Board. Messrs Stevenson and Robinson, architects, London. Quantities by Mr. G. D. Taaffe.

Mariotti	£15,177 0 0
Beresford	12,930 0 0
Chambers	12,445 0 0
Chapman	11,747 0 0
Ridal	11,294 0 0

ERITH.—For cottage hospital at Erith, Kent, containing six wards for nine beds, convalescent ward, committee, nurses', operating, and bath rooms, also offices and mortuary. Mr. Herbert Ford, architect. Quantities not supplied.

Tongue	£1,140 0 0
Catchpole	981 0 0
Willis	975 15 0
Wilkins and Sons	950 2 6
Hills	874 7 0

GLOUCESTER.—For erecting a warehouse and offices at the Docks, Gloucester, for Messrs. Wait, James, and Co. Mr. Capel M. Tripp, architect. Quantities by Mr. Henry Carrington.

King and Godwin	£8,230 0 0
Meredith	7,933 0 0
Collins and Cullis	7,914 0 0
Clutterbuck	7,850 0 0
Ashbee and Son	7,630 0 0
Estcourt and Co. (accepted)	7,545 0 0

HAMPSTEAD.—For completion of Nos. 52 and 53, Gayton-road, Hampstead. Mr. Frederick Sparrow, surveyor. Quantities not supplied.

Child	£565 0 0
Heslop and Pollard (too late)	400 0 0
Bridgman, Nuthall, and West	389 0 0
Temple and Forster	385 0 0
Brown (too late)	377 0 0
Stephens	369 0 0
Edgar	337 0 0
Title	273 10 0

IRELAND.—For the erection of three cottages at Warrentown, County Down, for Mr. Crossen. Mr. W. James Watson, C.E., architect.

Rantin	£317 0 0
Wheelan	315 0 0
McShane and Lavery	303 0 0

IRELAND.—For the erection of new flour-mills at Newry, County Down, for Messrs. Sinclair and Son. Mr. W. James Watson, C.E., architect.

McLaughlin and Harvey	£5,700 0 0
Wheelan	4,600 0 0
McShane and Lavery	4,483 18 0
Rantin	4,480 0 0
Collen Bros.	4,249 0 0
O'Hare	3,365 0 0

IRELAND.—For alterations and additions to spinning-mills at Newry, County Down, for Mr. Abraham Wilson. Mr. W. James Watson, C.E., architect.

O'Hare	£5,250 0 0
McShane and Lavery	4,463 0 0
Rantin	4,250 0 0
Wheelan	3,900 0 0
Collen Bros.	2,800 0 0

IRON COLUMNS AND GIRDERS.

Lucas and Son	£895 10 0
The Newry Foundry Co. (Limited)	885 0 0

LONDON SCHOOL BOARD.—For the erection of school buildings at Walworth Common, Surrey, for the School Board for London. Messrs. Henry Jarvis and Son, architects.

Shepherd	£11,000 0 0
Downs and Co.	10,796 0 0
Scrivenor and White	10,650 0 0
Higgs	10,345 0 0
Wells, jun.	10,250 0 0
J. and F. Coleman	10,175 0 0
Cooke and Green	9,995 0 0
Wicks, Bangs, and Co.	9,987 0 0
Marshall and Sons	9,955 0 0
Tarrant	9,876 0 0
Cook	9,770 0 0
Sheffield	9,683 0 0
Henshaw and Co.	9,675 0 0

NEWINGTON.—For alterations and new buildings at the Sessions House, Newington. Mr. C. H. Howell, architect. Quantities by Mr. Roberts and Messrs. Widnell and Trollope.

Browne and Robinson	£18,935 0 0
Holland and Hannen	18,662 0 0
Macey	18,562 0 0
Brass	18,350 0 0
Trollope	18,175 0 0
Lucas	18,140 0 0
Higgs	17,864 0 0
Rider	17,459 0 0
Perry	17,340 0 0

PECKHAM.—For the erection of Wesleyan Chapel, in Barry-road. Mr. C. Bell, architect. Quantities by Mr. H. Lovegrove.

Stephenson	£7,219 0 0
Cullum	6,980 0 0
Downs and Co.	6,750 0 0
Thompson	6,758 0 0
Higgs	6,744 0 0
Scrivenor and White	6,640 0 0
Batley	6,580 0 0
Shepherd	6,450 0 0
Henshaw	6,400 0 0
Nutt and Co.	6,045 0 0

SOUTHWARK.—For additions to Trinity National Schools, Swan-street. Messrs. Henry Jarvis and Son, architects.

Shepherd	£350 0 0
Marshall and Sons	550 0 0
Kent	557 0 0

VENTNOR.—For the masonry required in laying out some ornamental grounds at Bath-road, Ventnor, for the Ventnor Local Board, according to the design of Mr. Jno. G. Livesay, A.I.C.E., Town Surveyor.

Lale	£350 0 0
Beavis	252 0 0
Jackman	238 10 0
Bull (accepted)	229 0 0

WALMER.—For building an infant school and residence, Upper Walmer, Kent. Mr. William Scorer, 12, York-buildings, Adelphi, London, architect. Quantities not supplied.

Woodcock	£610 0 0
Chamberlain	609 0 0
Trollope	605 0 0
Cotten	549 0 0
Gibbons	541 0 0
W. and G. Deane (accepted)	540 0 0

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—ROYAL INSTITUTE OF BRITISH ARCHITECTS.—

"On Classic Architecture, as Principally Exemplified in the Buildings of Rome." By Mr. George Ledwell Taylor, surviving author of 'Taylor and Cresy's' 'Architectural Antiquities of Rome' 8 p.m.

SOCIETY OF ENGINEERS.—"On Horse Rail ways and Tramways." By Mr. Henry Gore. 7.30 p.m.

COMPETITIONS OPEN.

CREWKERNE BURIAL BOARD, April 14.—For designs for the erection of two chapels, lodge, and other necessary buildings for a new cemetery. E. Budge, Clerk to the Board, Crewkerne, Somerset.

BOND-STREET.—For the erection of a building on the site of the Clarendon Hotel, to comprise shops on the ground-floor, with suite of rooms or chambers over. Premiums of £50 for the best, and £10 for the second best designs. Mr. Goddard, 1, Great Portland-street, Oxford-street.

YEOVIL SCHOOL BOARD, April 14.—For plans for the erection of school buildings in Rickleford to accommodate 300 children. G. W. Custard, Clerk to the School Board, Yeovil.

LEICESTER, May 14.—For designs for municipal buildings, to comprise all public offices, assize court, and police buildings. Premiums of £200 for the best, £100 for the second best, £50 for the third best designs. T. Standbridge, Town Clerk, Leicester.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, 'Mechanics' Magazine, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY, WHITEHALL, S.W., April 15.—For supplying 1,800 cwt. of snuffless dip candles. F. W. Rowsell, Superintendent of Contracts.

ADMIRALTY, WHITEHALL, S.W., April 17.—For supplying 140,600 lb. of cotton wasts. F. W. Rowsell, Superintendent of Contracts.

BRIGHTON, May 6.—Tenders for the supply of 130 fathoms of the best Baltic yellow deal ends for firewood. A. Morris, Clerk to the Guardians, Parochial Offices, Brighton.

CHATHAM LOCAL BOARD OF HEALTH, April 10.—For the supply of 400 to 500 tons best broken Guernsey granite. T. Hills, Clerk to the Board, Chatham.

COVENTRY SEWAGE WORKS, April 16.—For the construction of sewage works at Whitley. C. B. Gibb, Secretary, General Sewage and Manure Company, 1, Crown-buildings, Queen Victoria-street, E.C.

HORSFORTH LOCAL BOARD, April 7.—For rebuilding about 400 yds. of dry walling in Brownberries-lane. Mr. J. Kaye, Clerk to the Board.

INNY DRAINAGE BOARD, April 19.—For the erection of river bridges and other masonry. Wm. Mooney, Solicitor, 16, Fleet-street, Dublin.

ISLE OF WIGHT, April 16.—For repairing the roads and highways. A. H. Estcourt, Clerk to the Commissioners, Guildhall, Newport.

LANCASHIRE, April 22.—For the erection of a new residence at Witherslack, near Grange-over-Sands. Messrs. Paley and Austin, Architects, Lancaster.

LEEDS, April 9.—For the erection of a new Wesleyan Chapel in Beckett-street. Messrs. Hill and Swann, architects, Leeds.

LEEDS, April 21.—For additions to malting premises in Garden-street. D. Dodgson, Architect, 18, Park-row, Leeds.

LEEDS, April 8.—For the supply of flags, kerbs, setts, paviers, pitch, tar, coals, and lime; iron castings, at per cwt.; masons' and paviers' work, and horse hire. C. A. Curwood, Town-hall, Leeds.

LEEDS, April 9.—For the erection of wholesale and retail shops and premises in Market-street. Messrs. Wilson and Bailey, architects, Central Market-buildings, Leeds.

LEEDS CORPORATION WATERWORKS, April 8.—For the erection of a covered service reservoir at Beeston. C. A. Curwood, Town Clerk, Leeds.

MIDLAND RAILWAY, April 14.—For the erection of a goods warehouse at Leicester. J. Williams, Secretary, Derby.

OXFORD, April 7.—For the construction of about 3,450 yards of brick sewers, and about 8,100 yards of stone-ware pipe sewers, with bell-mouths, manholes, ventilators, &c. Frederick J. Morrell, Clerk to the Board, 1a, S. Giles's, Oxford.

SAVILE ESTATE WATER SUPPLY, April 11.—For constructing and fixing a lattice girder pipe aqueduct with abutment across the River Calder. Mr. E. Filiter, 16, East-parade, Leeds.

TRINITY HOUSE, E.C., April 17.—For the supply of 24,000 gallons of pure refined paraffine or petroleum oil. R. Allen, Secretary.

WELLAND, WORCESTER, April 10.—For the erection of a new church. Apply to Mr. F. Rogers, 9, Serle-street, Lincoln's-inn, W.C.

THE BUILDING NEWS.

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THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 11, 1873.

A EUPHRATES RAILWAY.

IT is not in these columns that the questions of policy and finance connected with the proposal of a new route to India, by way of the Euphrates or the Dead Sea, need be discussed. The only fact relating to these questions which ought to be premised are that the Suez Canal is entirely beyond our control, could at any crisis be closed against us, and is made the means of laying exorbitant taxes upon our communications and commerce. These circumstances stated, the physical problems alone remain. To no purpose do we deprecate the passion for rapidity now prevalent; it is a characteristic of the age, and every nation outside the torpid circles of Asia must take part in the race; even China and Japan are awakening to the necessity of steam. Whatever is to be done must be done quickly; it is a matter of miles and hours; time is power in our swiftly-whirling days—in trade, in war, in the spread of news, in society itself. We can no more put up with the heavy wading of Dutch keels through the seas, or the creaking waggons of a century ago, than with pack-saddles, bridle-paths, and voyages round the Cape. Railways, ship-canal, continents to be channelled across, the globe to be bound in bands of electric wire, the body of the sea itself to be tunneled—such are the aspirations and tendencies of our age. But England has a peculiar interest in the subject. One half of her empire—and the most important half—lies east of the Isthmus of Suez, and the other west. A water-way has been opened; but it is not English property. Rival projects, therefore, have been for many years on foot, and the principal is that of a Euphrates railway through Syria and Mesopotamia to the Persian Gulf. Strictly speaking, those which we call overland routes are misdescribed, there being no such possibility until the British Channel is either bridged or tunneled, and until the breadth of waves still separating Europe from Asia has been spanned. Yet an immense space might nevertheless be covered by a railway, whether its starting point be at Alexandretta, in the Mediterranean, which has a good anchorage, though a bad climate, and opens upon an impracticable mountain country, or Suedia, at the outlet of the Orontes, leading into an almost level valley through the Lebanon, into the very heart of the region, and presenting no mechanical difficulties; but it may as well at once be stated that, however easily the Euphrates may be reached, the river itself promises few facilities to modern navigation. It is devious, of unequal width and depth, crowded with natural dangers, liable to sudden and irregular winds, and obstructed at once by rapids, leaping over ledges of rock, and by massive stone dams, of ancient build, which alone keep the current on its course. That it can be navigated from the town of Bir to the sea has been demonstrated; but that its navigation would answer any useful purpose as a connection between England and her Indian dominions may be more than doubted. Small war-steamers, light gunboats, and native craft of immemorial fashion, can travel up and down, though at a slow pace; but even for these the two great streams of Mesopotamia have, in wet seasons, a habit of flooding their banks, and recreating those great Chaldean swamps celebrated in history. Let us, however, glance at the plans as severally laid down. The distance from London to Kurrachee, in India, by the shortest available route, must be taken at nearly 5,000 miles, and the briefest possible time for

accomplishing the journey at not far from twenty days, unless we imagine many facilities to have been created which hitherto have not even been projected—as, for example, a railway direct through Central Europe to Vienna, with a prolongation to Constantinople or a port in the Archipelago; works insuring an equable flow of the river at all times of the year; navigation without change of vessels, and so forth; but, at the least, we should gain thirteen days upon the Suez route—a matter of great importance to both divisions of the Empire. With reference to the objection that the territories thus traversed are among the poorest in the world, it is founded upon an entire misconception: the people may not be industrious, but the natural riches of those valleys, if developed, might again support the magnificence of Nineveh and Babylon. Nor is it less incorrect to affirm that the inhabitants, miscalled Bedouins, normally live by plunder. They are perpetually fighting, it is true; still, they carry on an extensive commerce; and the migratory hordes are the most profitable customers of the sedentary tribes, which cultivate the soil, trade at the stores of foreign merchants, employ themselves in the manufacture of cotton and wool, and would doubtless be only too glad to become protectors, rather than destroyers, of a railway, if ever constructed. It will be seen that we are suggesting the arguments on either side, without any deliberate judgment on their cogency. However, if practicable, there can be no question of the superiority of this route: it traverses the peninsular triangle of Arabia across its base, from water to water, instead of passing along its two sides. No difficulty now attaches to the overcoming the monsoons, as was the case in the days of canvas power: it leads, instead of the barren sea, through lands capable of producing, and which have produced, cotton, sugar, silk, and tobacco—the finest in the world—in endless abundance. There could be no limit, except in point of demand, to its yield of corn, or of wool, or of valuable dyes. Still, all these considerations must give way unless it be proved either that the Euphrates is sufficiently navigable to support a great commerce between Europe and Asia, or that a railway can be substituted for the water-carriage, parallel with its flow. The most daring plan is that of a line commencing at Calais, continued to Vienna, carried on to the verge of Eastern Europe, then over the Bosphorus, prolonged by way of Trebizond to the Persian Gulf, following its shores, lengthening over the lowlands of the Beloochistan coast, pursuing its course to Kurrachee, and ultimately traversing the peninsula of Gujerat to Bombay. Any geographer could point out, and any engineer well understand, the stupendous engineering difficulties to be surmounted, although all down the Valley of the Euphrates the work might be as smooth as is conceivable; for, on the approach to India, the character of the country changes—the rivers are broad, deep, and changeable—cuttings and tunnels of formidable proportions would become necessary, and the sides of prodigious rocky hills overhanging the sea would have to be scarped for miles. It is to be feared that the estimates drawn up by the authors of these schemes often resemble the calculations of the enthusiasts who are so apt to convince themselves that it would be the easiest thing conceivable to pay off the National Debt. Another idea is that of opening a communication between the Mediterranean and the Dead Sea by means of a canal. Nature having already performed an important part of the work in a stupendous cutting, more than two hundred miles in length, and separated from a sea at either end by a barrier apparently slight at the north, namely, the alluvial plain of Esdraelon, furrowed deeply by the brook Kishon, which might be cut through at a moderate expense, the excavation necessary being no more than twenty-five miles in length, through comparatively soft

ground. At the other extremity the distance would not be greater, while the work would be as easy, provided that a certain hypothesis of modern geographers, by no means as yet established, be confirmed, of a dried-up strait. However, assuming all that the projectors fondly hope to be facts, it is forgotten, perhaps, that two thousand miles of Turkish territory would be submerged—though it is of no great value; and that the City of Tiberias must be drowned, though this is little better than a group of filthy mud-huts, or temporary tents upon which not much sentimentality need be expended. The one truth which seems to stand out strongly amidst these varying suggestions is that, sooner or later, a second avenue of approach to our Indian Empire will become essential and will be constructed; the questions being whether it shall be a composite line of canal, rail, river, and sea; or whether, fearlessly grappling with all the obstacles, our capitalists and engineers will undertake to open the entire route by land, from the shores of the British Channel to the frontiers of Sindh. As to the possibility of the latter project, it is not a question in doubt; the simple problem is how to compass the one supreme difficulty of all modern enterprise, resting on Imperial guarantees and joint-stock speculation,—the cost; but even here exaggerated apprehensions might arise. True, the inhabitants of that region can no longer be compelled to labour for the merest pittance of corn and salt, though M. de Lesseps found the task of persuasion somewhat facile; but labour, in those territories, notwithstanding whatever may be said concerning the sparsity of their population, is marvellously cheap; such labour, we mean, of course, as digging and barrowing away the rubbish. At all events, we are not bound to renounce the scheme as utterly impracticable until a larger knowledge of facts appears to render imperative that which, at present, might be an unjustifiable conclusion.

SCHOOLS.—No. I.

LEEDS AND HUDDERSFIELD.

THE School Boards of Leeds and Huddersfield were the first to obtain the consent of the Committee of Council on Education to a deviation from the rule of their Department prescribing the width of school-rooms. Both of these Boards considered that the principal room in their schools should be 30ft. or 32ft. in width, with side-walls unbroken by doors or fireplaces, so as to admit of classes being worked on both sides of the rooms. Their plans, prepared upon this principle, were returned, in the first instance, with official objections. A correspondence between the Boards and the Department ensued, in which the additional width was allowed, upon condition that the length of such wide rooms should not be less than sixty feet. The practical objections to this arrangement, as well as the general question of width, were urged upon the Department by a powerful deputation from the Leeds Board, in December last. The deputation succeeded in obtaining an expression of opinion from Mr. Forster to the effect that the conditions affecting the erection of schools were so entirely changed since the passing of the Education Act, that the leading arrangements of schools at the present time might with more consistency be left to the discretion of the local School Boards and their advisers. Finally, in January of the present year, the Huddersfield School Board received the official approval of their plans for wide rooms, and subsequently a like concession was made to the wishes of the Leeds Board.

While the present conflict between Departmental and Local Government is going on, the fact of this concession to local views acquires additional importance. On another point of detail, the Huddersfield Board has broken through the routine principles of the Education Department. One of the rules of the Committee of Council states that 18 inches

should be allowed for the junior, and 22 inches for the senior children, in seating. But the practice of the Department, with a view to curtail expenditure, has been to assume that a certain proportion of the nominal number of scholars will be non-attendants, and therefore provision for the maximum, or nominal number, need not be provided. The Huddersfield Board assume that theirs will be the popular schools, with the best teachers, worked at the least cost to the parents of the children, and therefore always full; consequently, they have made provision, with the consent of the Department, for the full number of scholars, at 18 inches and 22 inches respectively, in the seating.

The marked resemblance in the principles adopted by these Boards may, in some measure, arise from the fact that Mr. W. Lee, the Clerk to the Leeds Board, and Mr. Otho C. Abbott, the Clerk to the Huddersfield Board, are practically conversant with school work, and therefore enabled to add their professional experience to the counsels which have prevailed in each Board. In both instances the Boards determined that all their schools should be situated upon the ground floor. For each department of a school they provide three class-rooms, of varied size, capable of receiving one half of the children. Two of these class-rooms in the Leeds schools are fitted with galleries, and capable of being converted into one room by means of a moveable sound-proof partition. The third class-room in the senior departments is lighted from the roof and fitted with raised parallel desks to form a class-room for Drawing. The same arrangements are made in the Huddersfield schools as to moveable sound-proof partitions, and fittings for Drawing-classes, but there are no galleries in the class-rooms. The proportionate accommodation in the three class-rooms for every 100 children, gives to the single room 40 children, and to the two rooms, capable of being thrown into one, 30 children and 25 children respectively. Nine superficial feet of floor-space are provided for each scholar in the class-rooms of the senior departments, and eight feet in the infants' departments. The average floor space throughout the school and class-rooms is ten superficial feet for the seniors' and nine superficial feet for the infants'. This gives eleven superficial feet in the larger rooms for the seniors, and ten superficial feet in the larger rooms for infants.

The principal rooms, of 30ft. or 32ft. in width, are lighted, and fitted with desks, on each side. On one side the desks are in tiers, upon raised platforms of 4in. each. The walls throughout are 16ft. in height to the plates, and the rooms are open to the top collar of the roofs. In the Huddersfield schools the heating is obtained by the combined use of hot-water pipes with open fire-places. The ventilation is not upon any uniform system. The Huddersfield schools are built with stone; the Leeds in brick, with stone dressings. The cost of the Leeds schools, at present ascertained, ranges from £8. 8s. to £10. 10s. per head, including fittings and furnishing, architect's commission, and payment of clerk of works.

The general plan of these schools forms a range of buildings on three sides of a quadrangular space. The central portion is appropriated to the infants, and the right and left blocks to boys and girls, severally. The choice of sides for the two latter varies with the locality. Each department has a vestibule serving the three purposes of an entrance, a cloak-room, and lavatory. Adjoining this vestibule is a teacher's room. The vestibule leads direct into the principal room, at the extreme end of which the three class-rooms are placed. In the infants' departments the school-room has a gallery capable of holding two-thirds of the total number of scholars, and one room specially fitted as a "Babies' class-room," with two other class-rooms. The closets are placed at the back, in most cases, accessible from covered play-grounds.

These are the outlines, with slight modifica-

tions, of the plan prepared by Messrs. Adams and Kelly, architects, of Leeds, for a Board School in Jack-lane, Hunslet, Leeds, to accommodate 600 children; and also of the plan prepared by Mr. Charles Fowler, architect, of Leeds and Huddersfield, for a Board School at Lockwood, Huddersfield, to accommodate 1,000 children. Messrs. Adams and Kelly's design is Gothic in style, simple and unobtrusive, yet distinctive, in character. They have ingeniously overcome the unsightliness of wide roofs upon comparatively low walls. The windows are fitted with square-headed sashes, worked by Cousins' patent gearing for superseding sash-lines and weights. Above the transoms are casements, opening inside, to admit air over the heads of the children without creating a down-draught. The open fireplaces are to be fitted with Shillito and Shorland's "Manchester school grate." The furniture will be Richardson's "Improved patent premier school desks." The closets will be on the dry-earth principle. This design was selected in a competition limited to twelve local architects. Mr. Adams has since been appointed architect to the Board. The number of children for whom school accommodation will have to be provided is about 12,000.

A Board School upon the same general principles as Messrs. Adams & Kelly's is being carried out at Green-lane, New Wortley, Leeds, from the designs of Mr. George Corson, architect, of Leeds. This contains four departments—a senior boys', senior girls', a junior (mixed), and an infants'—each accommodating 250 children. At Beeston, a smaller Board School is being carried out, from the designs of Mr. E. Backhouse, architect, of Leeds. This contains a mixed department for 200 boys and girls over seven years of age, and an infants' department for 200 scholars. The designs for these schools were selected at the same time as Messrs. Adams & Kelly's in the limited competition before referred to. The terms of the competition specially directed the attention of architects to economy in their designs. They were instructed that the buildings must be plain, strong, and substantial; and while due consideration would be given to the character and suitability of the designs for Board Schools, no building of a costly nature would be approved.

The design by Mr. Charles Fowler for the Lockwood Schools, Huddersfield, is also Gothic in style, with a feeling for symmetrical disposition of the principal parts and details. The site rises from the front to the back of the building sufficiently high to admit of covered playgrounds being formed under the floors of the front portions of the building. The width of the principal roofs is concealed transversely by roofs of the same height over the class-rooms at one end, by the roofs of the lavatories, of less height, at the other end, and longitudinally, by gables over three-light windows. The accommodation is for 1,000 children. The principal rooms are 32ft. in width, 54ft. long, and about 30ft. in height up to the collar forming the ceiling line. The walls, 16ft. in height, are to be built with stone, faced with Elland edge pitch-faced range-work, and Crossland Hill dressings. Open fireplaces are provided in the teachers' rooms only. All the remainder of the building will be heated by Tennant's hot-water system. The windows have fixed casements with pivot-hung portions above the transoms, 12ft. in height from the floors. The ventilation is provided for by means of trunks placed above the ceilings, connected, externally, with Watson's double-current syphon ventilators, manufactured by a firm in Halifax. They form a series of small gablets just below the line of the ridge. The closet arrangements appear well adapted for school purposes in an open locality. An open earthenware gutter, with a good fall, is constructed under the seats. This gutter is flushed at regular intervals by means of a self-acting flushing cistern patented by Adamson, of Leeds, and called a "tumbler cistern."

It consists of an iron vessel balanced upon a pivot with a syphon at one end. The water flows into it in a volume, which may be regulated, until it reaches a certain height, when the cistern tips, discharges its flush of water, and adjusts itself again to receive another quantity. The lavatories will be fitted with Macfarlane's No. 1 wash-hand-basin range. The school and class-rooms will be furnished with Abbot's patent desks, with convertible tops and reversible seats. Desks will be provided for the galleries. The cost of the works will be about £10,000. The design for this school obtained the first premium in an open competition.

The second premium in the Huddersfield open competition was awarded to Messrs. Walford and Pollard, architects, of London and Bradford, whose design for a Board school at Stile Common is about to be carried out. In this plan the rooms are only 22ft. in width, giving a marked advantage in æsthetic treatment over the greater width, both externally and internally. The site is very irregular, being depressed in the centre, and rising considerably from the front to the back. The architects have placed their infants' department in the centre, upon the low level. To the right of it, upon a higher level, stands the girls' department—a range comprising the length of the principal room with class-rooms at each end, and a teachers' room projecting from the face line of the main block. The boys' department occupies a corresponding position to the left of the infants' block. In the centre, at the junction of the three departments, rises a tall clock-tower and ventilating-shaft, with spirelet termination. The ends of the main block, and the projecting teachers' rooms are semi-octagonal on plan; the windows rise into the roofs under dormers; the details are full of character; and the whole composition is charmingly picturesque. The style is Gothic. The roofs are open to the collar. The ventilation is sustained by means of trunks placed over the ceilings and carried to a hot-air chamber in the ventilating shaft. The heating is partly by open fireplaces and partly by Perkins's high-pressure hot-water system. In the cloak rooms there are open fireplaces with skeleton horses arranged in compartments for drying the clothes of the children in wet weather, as well as being more convenient than pegs and hooks upon walls. The moveable partitions dividing the class-rooms are the "Patent London School Partitions for excluding sound," revolving from above, manufactured by Stones, of Ulverston. These partitions are expeditiously wound up with a pull-cord, like a roller blind. They have an inner curtain of hair-felt which effectually excludes sound. The ingenious method of moving them by means of a self-adjusting balance weight is so extremely simple, that they cannot fail or get out of order.

The Huddersfield School Board has altogether thirteen schools in progress, to accommodate 5,882 children. In addition to the architects named—Mr. Fowler (who has two schools in hand) and Messrs. Walford and Pollard—the Board has retained the services of Mr. Hughes, Mr. Cocking, Mr. Stocks, and Mr. Lofthouse, architects, of Huddersfield; Messrs. Henman and Harrison, and Mr. Edward Low, architects, of London; and Mr. George Mallinson, architect, of Leeds. The cost of the works in the hands of these gentlemen will be about £70,000.

The whole of the Huddersfield schools will be furnished with Abbot's patent convertible desks, with reversible seats. In many respects this is the most comprehensive of the many school-desks. It has standards resembling the letter A. The top leaf, forming a desk, table, or back of a seat, is hung upon a pin at the apex of the standard. Upon this axis it can be turned in every direction, and be held in any required position by means of an attached bolt, which shuts into holes in the standard. The seat is attached to a bracket hinged in the centre of the standard, and can

be thrown over to form, in combination with the top leaf, a seat with a back, facing either way, without changing the position of the desk. No other convertible desk has this advantage. The seat is formed with two boards placed over each other, about three inches apart. The intermediate space is divided into pigeon-holes for receiving slates and books. The seat has, when turned on either side, an inclination towards the centre, which allows it to be turned over without throwing out the contents of the pigeon-holes.

QUALITY AND STRENGTH OF TIMBER.

NUMBERLESS experiments have been made to ascertain the strength of timber. Hodgkinson, Barlow, Hatfield, &c., and more lately, Captain Fowke, R.E., have all paid attention to the subject, and written more or less voluminously on the matter, and it requires long and patient study of the different conditions under which their experiments were made, to arrive at anything like correct conclusions. Timber is so much affected by external or internal conditions, that it is difficult to find two pieces giving the same result, but all experiments have been made on wood which to all appearance was good and sound,—a difficult matter always to ascertain. For instance, a plank wholly or in part formed from sapwood would break under strain much sooner than one taken from the heart, because the sapwood is imperfectly formed timber, which requires time to develop. Then again, the heartwood is the best only when the tree is young. At maturity, the timber is equally good in every place, and when in age, the heartwood is the first to decay, so that in the latter case, the wood just inside the bark, where sapwood is found in its youth, is the best part of the tree. Of late years, the cargoes from European timber ports have contained so much sapwood that it was evident there had been reckless felling. Carriage to the sea had become so very expensive in some places, that the question seems to have been how to get a shipload as near as possible to the port, and young trees have been felled which ought to have been left standing for many years longer. The American wood has been comparatively free from sap, the vast extent of her gigantic forests giving greater facilities for the wood to mature. Mr. John Anderson, C.E., a very good authority, says "The strength of many woods is nearly doubled by the process of seasoning; hence it is very thoughtless to use timber in a green state, as it is not only weak, but is exposed to continual change of bulk, form, and stability. After timber is cut, and before it is properly seasoned, the outside is found to crack and to split more than the inside of the mass, because it is more exposed to the desiccating effect of the surrounding atmosphere; but as the outside dries, the air gradually finds its way to the interior. If timber is cut up by the saw when green, and allowed to season or dry in a gradual manner, it is found to be the most durable. Unfortunately, however, it is to be feared that most of the green wood imported into England is used, so far as the cheaper kinds are concerned, almost at once, or at any rate before it is properly seasoned. Such wood is bought for its cheapness, and to keep it a long time would be materially to add to its cost, and if people will insist on taking the lowest tender for their work—and we all know what a monstrous difference there often is between the highest and the lowest—they must expect to have warped joists and shrunken flooring in their houses. In the arts, artificial drying is often resorted to, as in the case of gun-stocks. These are put into a desiccating chamber, where a current of air at 90 or 100 degrees is passed over them at such a rate as to change the whole volume of air every three minutes, and it is found that a year of seasoning may thus be saved. The walnut-wood is as good after this process as if the seasoning had been accomplished by time and exposure, and works

more smoothly under the cutting instrument of the stock machinery. It cannot be too widely known that a plank cut from the sap or imperfect wood for years will shrink in the breadth, and if cut from heartwood it will shrink in thickness, keeping the full dimension in the middle and tapering to the edges. By observing from which part of a tree the wood has been cut, which may be ascertained by examining the end, the future behaviour of a deal may be safely predicted, and the evils of shrinking, in a great measure, prevented; for, although there is a modification of this law in the case of spruce, yellow pine, and other soft woods, such as are used for building purposes, still for all practical purposes the same rule applies.

The ultimate cohesion or tensile strength of the ordinary descriptions of timber in use is given by Barlow, Bevan, & Muschenbroek as follows, the ultimate tenacity being given in pounds per square inch of section:—

Ash	from 19,600 to 15,784
Beech	22,200 " 11,500
Elm	14,400 " 13,489
Flr	18,100 " 7,000
Do. American	12,000
Do. Memel	11,000
Do. Riga	12,600
Oak	from 19,800 to 9,000
Do. English	15,000
Do. African	14,400
Do. Canadian	12,000
Do. Dantzig	14,500
Teak	from 15,000 to 8,200

Mr. Anderson gives a most useful table. He takes the experiments of Tredgold, Barlow, Ebbels, and others as a basis, and shows what the calculated breaking weight in pounds of a beam 1ft. long and 1in. square is of the following descriptions of wood:—Ash, 595lb. to 810lb.; beech, 518lb. to 704lb.; elm, 337lb. to 540lb.; American fir, 483lb. to 570lb.; Christiania fir, 489lb. to 686lb.; Memel fir, 545lb. to 577lb.; Riga fir, 382lb. to 530lb.; Canadian oak, 572lb. to 589lb.; Dantzig oak, 392lb. to 659lb.; English oak, 420lb. to 964lb.; and Teak, 642lb. to 1,075lb. These beams are supposed to be supported at each end and loaded in the centre. There is much difference in all such tables, arising partly from the different nature of wood, even when brought over in the same ship, and also from the different manner in which experiments are carried out; but as they stand, they are very useful to all interested in the building trade.

Good Riga, Memel, or Dantzig timber has always been preferred for beams, and when the piles employed at the Thames Embankment were drawn and put up to auction, there was some brisk competition amongst builders for them, as they had been well selected, and were little the worse for being used. They were Dantzig, for the most part, and some of these very piles were worked up, a week or two afterwards, into some large houses on the Westminster estate, and no doubt will last all the longer for their being immersed for such a time in water. Red pine used to be employed very largely for beams, &c., but hardly any comes to this market now, and Swedish timber, which resembles it, is hardly safe for heavy weights.

Although iron is extensively used for purposes where strength is of great importance, still the import of timber goes on increasing year by year, so that there is no fear but that all the information we can get respecting it is still needed. There are many curious laws affecting the stability of beams. For instance, their resistance to a sudden weight falling on them follows a very different law from that which regulates their strength. The experiments of the Railway Commissioners show that a beam 12ft. long will only support half of the steady load that a beam 6ft. long of the same square will support; but that it will bear double the weight suddenly applied; or, if the same weights are used, the longer beam will not break by the weight falling upon it, unless it falls through twice the distance required to fracture the shorter beam. This supposes that the timber is of precisely the same nature,

for it is by the longer beam bending that it supports the fallen weight without fracture. To conclude, the relative strength of a girder or beam, so far as it depends on the manner in which it is loaded and supported, is very simply expressed by Mr. Anderson, C.E. Taking a girder of a given span, the load may vary in the ratio of 1 to 8, according to the different ways in which the girder is supported and the load distributed*:

Position of support and load.	Relative Strength.
When supported at one end and loaded at the other	1
When supported at one end, and load distributed	2
When supported at both ends, and loaded at centre	4
And when supported at both ends and load distributed	8

ON THE DOME.*

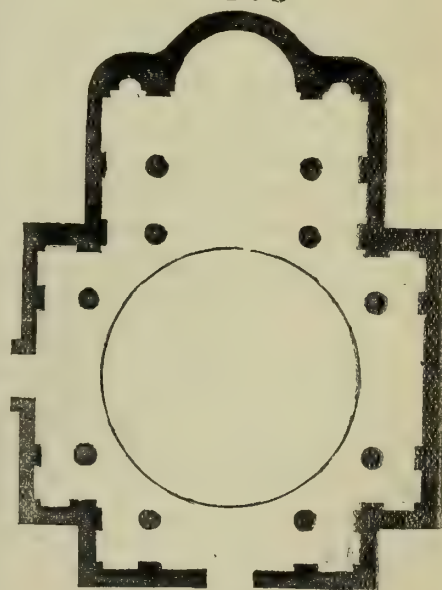
(Continued from page 403.)

I WILL only further (before proceeding to another branch of my subject) notice one other church,—the little church of Santa Fosca (Fig. 10), on the island of Torcello, close to Venice. This church is not domed, or has only a wooden dome, but was clearly planned for a proper domical covering. Its plan is like that of S. Nicodemus, at Athens, already alluded to, and is perhaps one of the most beautiful in existence, and one best adapted of all domical arrangements to modern use. Before I proceed further I must call your attention to a fresh step in advance.

The next step in the development of domes is the adoption of pointed arches for their support, often accompanied by an increase in the height of their own section beyond that of a semicircle.

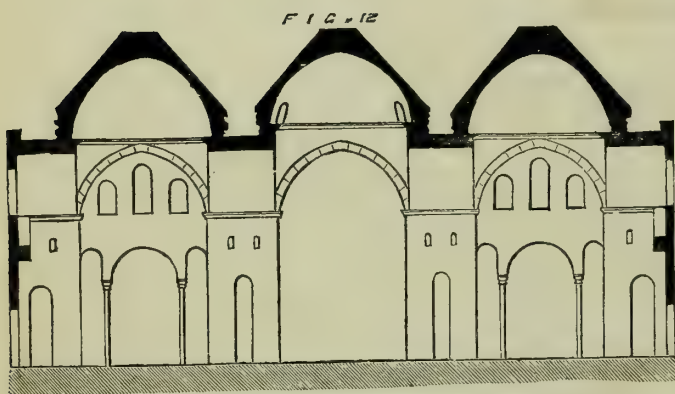
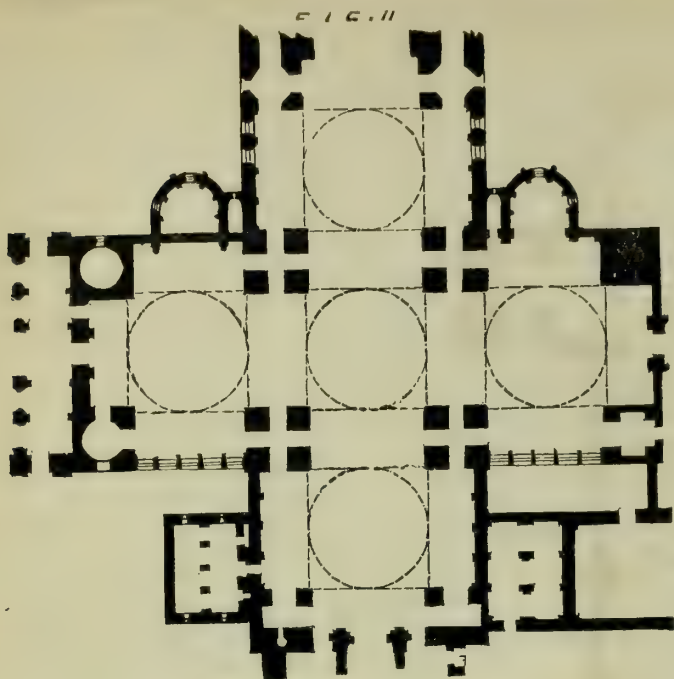
The fact that the pendentive dome is, as it were, suspended in mid-air, so that a perpendicular line dropped from any part of its circumference passes through empty space, renders it imperative that the arches which sustain it in this airy position should be extremely strong, and should have as little outward thrust as possible; and it is equally desirable that the courses of stone forming the pendentives should not form very acute angles with the haunches of these arches. These considerations seem to have led the Mahomedan architects soon to substitute pointed arches for round as the supports of their domes; a step in which they were followed at a later period by the greater part of those western European architects who adopted the pendentive dome. There can be no doubt that this was a very advantageous change. Mr. Fergusson says,

P. G. 10



—“A little reflection . . . will show how difficult it is to adapt the curves of a pendentive dome to a circular arch, and how weak the arrangement is when done. . . . With a pointed arch, however, even when the penden-

* Second lecture delivered at the Royal Academy by Sir G. G. Scott, R.A.



tives follow its lines, there is some thickness in every part, and no curve need slope forward at a greater angle than 45 degrees."

On the other hand, the change was attended with the loss of geometrical accuracy. Hitherto we have dealt with none but perfectly correct geometrical figures; but, the moment the pointed arch is introduced, the pendentives lose this exactitude, and have to be adapted by what is vulgarly called "rule of thumb" to conditions not precisely suited to their forms. A pendentive between pointed arches has, it is true, a geometrical form of its own, but this is so awkward in its sections that it has only to be seen to be rejected; for, instead of its central section being a regular arched curve, suited to a domical surface, it is a curve of *double flexure*, its lower part concave (as seen from within), and its upper part convex—in short, an *ogee*. This being inadmissible, the curve has to be accommodated the best way we can, so as to avoid this weak and unpleasing form. We have, in fact, to determine, according to the best of our judgment, what shall be the vertical section of the pendentive, and adopt such horizontal curves for the courses of masonry as will make it reach the extrados of the supporting arches in the easiest manner we are able. This was really done so successfully by the French architects, whose works I shall shortly have to describe, that, for myself, I must say I never found out the difficulty from seeing them, and was unaware of it till I worked out the profiles geometrically.

After all, however, it is only parallel to what we have to do in filling in the spaces between the ribs of Gothic vaulting.

The pointed arch, though beautiful and practically excellent, is no regular geometrical figure, but the union of portions of two; its use, consequently, induces irregularities which would be at once avoided by the substitution of an ellipse. But, then, our geometrical accuracy would be purchased by the sacrifice of beauty.

would be semi-ellipses; but, there is no regular solid figure, more than one of whose sections are pointed arches, so it is natural that when they are used, some part should have to be accommodated to fit them.

It may, however, be as well at this point to mention that pendentives, after all, had become mere rudiments of a form which had lost its original intent. Ever since the dome ceased to have the same curvature with its pendentives, and to be a continuation of their surface, the latter had become a mere form of *corbel*, for which any other variety might at convenience be substituted. This fact was amply acknowledged in every region where the dome was made use of; so that from the Pillars of Hercules to the Bay of Bengal, and among those who occasionally adopted and developed upon Byzantine ideas in Western Europe, we find all forms of corbelling used in addition to the typical pendentive. I shall presently have to show you some of these varieties, and will only now remark that, though they are perfectly legitimate means of support, the pendentive has still the advantage of them in its simplicity and in its superior adaptation to coloured decoration.

About the beginning of the eleventh century, the Byzantine style, in all its integrity (excepting only in its richer decorations), was conveyed into Aquitaine, as it is supposed, by Venetian merchants, who at that time had extensive commercial establishments in that part of France.

The earliest work carried out under this semi-Byzantine influence was, so far as we know, the Church of S. Front, at Perigueux (plan, section, and interior shown in Figs. 11, 12, and 13),—a building obviously copied from S. Mark's, at Venice. The two churches are, in fact, nearly identical in their plans and sections, the one being an almost unadorned copy of the other, showing us what S. Mark's would be if stripped of its marble encrustations and its mosaics.



All the sections of a sphere being circles, the supporting arches of a true pendentive hemispherical dome are semicircular arches, and in the same manner those of an elliptical spheroidal dome

There is, however, one important difference, and one which bears directly upon the foregoing observations:—The domes at S. Front, as well as the great arches which support them, are *pointed* instead of *round*, though all the minor arches retain the older form. This agrees with what I have stated in my earlier lectures, that the pointed arch was introduced, not so much as a matter of *taste* as of *construction*. Thus, in the buildings in which it first appears, we usually find it in the arches carrying towers, in the wider vaulting, and in other positions where great weight had to be sustained before it made its appearance in minor features.



Here, at S. Front, we have it appearing at a date a century and a half earlier than in our own country, and used solely in the parts where the constructive necessities were the most urgent.

The style once transplanted into this region,—widely separated though it was from all its previous seats,—seems to have seized powerfully

upon the public mind, and to have become, within a century, the nucleus of a new form of architecture, of very great beauty and interest, uniting the domical construction of the East with the Romanesque and the Early Pointed architecture of the West.

The entire district, some 200 miles in extent, adopted the dome as its acknowledged form of vaulting, but nearly always supporting it by the pointed arch, and usually adopting it as the section of the cupola itself.

At Souillac we find a nave, apparently nearly as early as S. Front, covered by a series of pointed domes supported by massive transverse pointed arches, and terminated by a semi-domical apse, all carried out with scarcely an attempt at architectural detail.

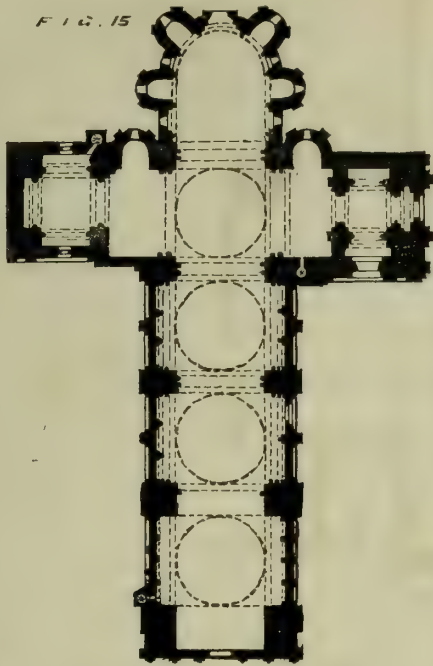
At the Church of S. Stephen, at Perigueux, commonly called La Cité, we have an imperfect early nave of simple character, with one remaining of its domes, but to the east of it stands a later compartment (Fig. 14), in which the same construction is carried out with very fine architecture, agreeing in character with our own Transitional style.

This brings us to the new development, for the style now ceases to be Byzantine. It is very noble Gothic, united with domical construction.

The enlarged copies from my sketches of this and S. Front serve to show the greatness of the change,—the one a rude transcript of S. Mark's without its decorations,—the other a noble

The influence, however, of the dome extended, in France, far beyond the district in question; for we find it spreading eastward into Auvergne, and beyond that again to Lyons.

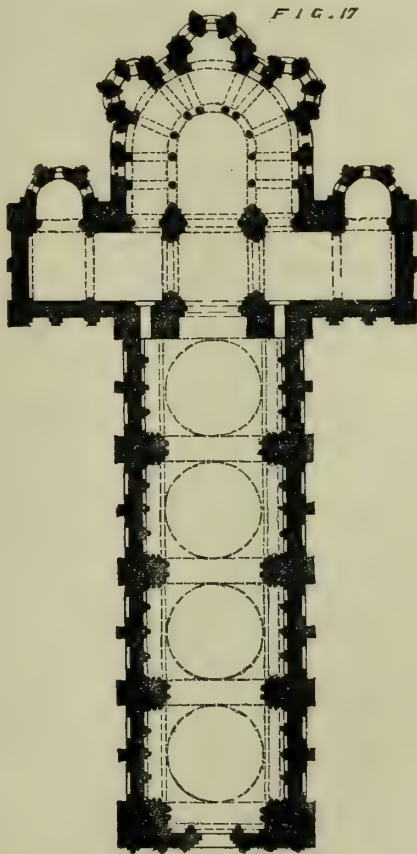
FIG. 15



In Auvergne, it usually covers the intersection of cross churches, beneath the tower; at Le Puy it is used in a very unusual form to cover, not only this central space, but the bays of the vaulting.

The nave is divided into oblong bays by transverse arches, and the intervals are reduced to elongated octagons by corbels, doing duty for pendentives, and these octagons are domed over on the angular system. The same form of covering exists at Ainay, near Lyons.

FIG. 17



interior of the Transitional style, but with a pendentive dome; and it will be seen that this addition in no degree clashes with the style into which it is adopted.

At Angoulême we find this development carried out to full perfection (Fig. 15). We have there a complete cruciform church, precisely in the style of the work last-named, the bays of the nave almost exactly like it, but the crossing rising to a far greater height, with a sort of drum forming a clerestory over the arches, and imperfect pendentives, and bearing the dome aloft. I also give an enlarged copy of my sketch of this noble interior (Fig. 16).

I may mention that this dome is not circular in plan, but that the middle of each side is flattened.

A very parallel arrangement exists in a church far more to the north, on the banks of the Loire, and one in which we, as Englishmen, are specially interested, as being the burial-place of our earlier Plantagenets. I refer to the Abbey Church of Fontevrault (plan given in Fig. 17).

This church has four domical bays to the nave almost identical with those at Angoulême. The church is now a prison, and in some obscure portion lie the beautiful effigies of King Henry II. of England and of Eleanor of Guienne his queen, of Richard Cœur de Lion, and of Isabel of Angoulême the queen of King John, and mother to the rebuilder of Westminster Abbey.

There are in this district of France fully forty domed churches, so I will content myself with those I have alluded to, my main object being to show how perfectly compatible is the cupola with Gothic architecture.

I may mention that the pendentives in many of these French churches give place to corbels of varied design, as at Monthron, near Angoulême, Notre Dame du Pont at Clermont (of which

I give a copy of my sketch, Fig. 18), Notre Dame des Dons at Avignon, and very many others. The last-named dome rises into a beautiful tower, and I may mention that small lantern turrets are common upon the Aquitanian domes.

I will not dwell upon the German domes, because they do not illustrate any special development. They seem to have been the offspring of those Italian domes which followed Roman traditions. They mostly cover intersections of cross churches beneath central towers. Those at Aix-la-Chapelle and Nimègue are of the ordinary type of domes covering octagonal buildings. That at Worms covers a square, but is by corbels brought out to an octagon, and then domed in that form.

In our own country, I knew of no nearer Mediæval approach to the cupola than the semi-dome covering the apse of the chapel in the Tower of London.

The last form of dome which I will allude to is what may be called the *modern* type. It does not differ in essentials from what may be found among those of earlier periods, but is distinguished from them by several of the elements which it possesses in common with some of these, being developed on a larger scale and becoming more pronounced and more essentially characteristic.

[This type of dome is:—1. Raised high in the manner of a tower; 2. The dome becomes an important external feature; 3. It is crowned by a smaller tower rising out of the dome; 4. It usually assumes internally the form of a lantern,

FIG. 18



with a range of windows beneath the dome; 5. In some instances the external and internal domes are independent structures, the former acting as a roof to the latter, with, perhaps, an intermediate structure to carry the culminating tower on its apex. Now, every one of these features is to be found in earlier domes.

The raising of a dome upon a drum or tower is common both in the East and West. In many instances, and especially in Mahomedan buildings, the dome becomes an important external feature. The crowning of the dome by a small tower or lantern on its apex is frequent among the early domes of Northern Italy, and is seen on the five domes of S. Front at Perigueux, and, in a different form, on its prototype at Venice. The internal range of windows beneath the dome is found both in the true Byzantine districts, in Italy, in France, and in Germany; and finally, the independence of the external and the internal domes,—the former becoming the roof to the latter, with even the intermediate structure to support the culminating turret or lantern,—is found in its full integrity in S. Mark's at Venice, where its early date is proved by its being represented in the most ancient of the external mosaics.

Why, then, if all its essential characteristics are to be found in ancient examples, do we call this form of dome "*modern*"? I would reply that, though its elementary ideas were old, their systematic combination, and the vast scale on which they were worked out, is due to the architects of the Renaissance. It is, in my opinion, their greatest achievement, being the union of the Classic with the Byzantine and the Mediæval ideal, and the working them into a

feature which no previous style had produced in so complete a manner or on so noble a scale. In saying this, however, I do not intend to praise this as being an internal feature superior to the true Byzantine dome; on the contrary, I think it a less reasonable and an even less beautiful covering, because it is raised to so vast an elevation as not to be visible at any natural angle of vision, nor to become a part of the general internal view of the building. It must, however, be confessed that, *when seen*, it is of wonderful and almost magical aspect; while externally it produces a nobler form of tower than is to be found in any previous development. I do not think it in any degree belongs essentially to the Renaissance, though it chanced to be developed under its influence. On the contrary, the first complete type of this form of dome (though happening not to be pendentive) was designed as the completion of a Gothic structure, and its only serious fault is that it was not carried out with more perfectly Gothic detail. I refer of course to that of the Cathedral at Florence.

(To be continued.)

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN extra meeting of this Institute was held on Monday evening last, the President, Mr. T. H. Wyatt, in the chair. This extra meeting was held in consequence of Mr. George Ledwell Taylor, the surviving author of Taylor & Cressy's "Architectural Antiquities of Rome" (who is now in his eighty-sixth year), having expressed a wish to read a paper on "Classic Architecture, as principally Exemplified in the Buildings of Rome;" but as papers had previously been promised for all the ordinary general meetings, the Council arranged for this special meeting. The paper was illustrated by a large number of original drawings and plans, to a large scale of some of the principal buildings of Rome.

The PRESIDENT, after paying a warm tribute to the services which Mr. Taylor had rendered to architecture, said he regretted to say that he had received a letter from Mr. Taylor, who was unable to come to London, owing to a sudden severe illness. Mr. Eastlake therefore proceeded to read Mr. Taylor's paper—

ON CLASSIC ARCHITECTURE, AS PRINCIPALLY EXEMPLIFIED IN THE BUILDINGS OF ROME.

At the outset the author invited his hearers to take a ramble with him through the principal ruins of ancient buildings at Rome—that is, the greatest number of interesting objects on one spot, extending from the Colosseum to the Forum and Column of Trajan, in the centre of which occurs the Roman Forum. He would suppose that they would enter on the arena of their labours from the east, following the line of the ancient sacred or triumphal way under the Arch of Constantine, with the Colosseum on their right hand, round the north-east angle of the Palatine Hill, past the Temples of Venus and Rome to the right, through the Arch of Titus then, with the Basilica of Constantine on the right, past the Temples of Remus, then the Temple of Antoninus and Faustina, still to the right. Then on their left hand they would encounter the three beautiful columns originally supposed (erroneously) to have belonged to the Temple of Jupiter Stator, now found to be those of the temple dedicated to the Dioscuri, or Castor and Pollux. Then they would be in the midst of the veritable *Forum Romanum*. The southern side of the Forum Romanum is clearly defined by the pavement still left and disinterred of the *Basilica Julia*, erected by Augustus in honour of his daughter Julia, and in his will he directs that if it is not completed at his death it is to be, remarking that it extends between the Temple of the *Dioscuri* and that of *Saturn*, which used formerly to be called the Temple of Concord. This settles the locale of these two temples. They would now approach the sacred *Clivus Capitolinus*, which is fully occupied by the Temples of the *Dii Consentes*, the Temple of Jupiter Tonans, and the real and true Temple of *Concord* (of which a full-sized drawing of the magnificent marble cornice was shown). The depth for these temples is so restricted that the usual rule of *double* the number of columns in front to be allowed for the returns could not be followed out. These temples extend the whole length under the ancient *Tabula-*

rium, the date of which is defined in an inscription. The Sacred Way passes under the arch of Septimius Severus, ascending rapidly, and winding round in a double curve to the entrance of the Tabularium at the side, and one at the rear of the same, to the Temple of Jupiter Feretrius, where the *Spolia Opima* were deposited, at present the site of the church *Ara Cali*. We are on Mons Capitolinus, approaching the Tarpean Rock. That defines the general route of the Sacred Way. They would now have to diverge to the northward and westward, and thread their way through modern streets to discover among the modern buildings the ruins of the *Fora* and Temple which once adorned that space up to Trajan's Column, and lay them out, as the author had done, by actual measurement in their various situations, tracing from them, with the aid of history, the probable extent and disposition of the principal *Fora* of Trajan, Augustus Caesar, Nerva, and the Temple of Peace. This was the general description of the ancient buildings he had to notice in detail, and the author hoped to be excused if, for the benefit of younger members and students, he proceeded to define them more minutely than was required by the elder members and those who have visited and know the spot. The scale of the drawings enables the audience to pause and look around at any point and almost fancy themselves there.

The Colosseum.—This is probably the largest building of the ancient world. Its extent in length is 620ft., the half columns of each pier projecting 2ft. 10in. beyond that, and in breadth 513ft. 8in., and 2ft. 10in. beyond; oval in form, the external wall being 157ft. 6in. in height. This outer wall is 10ft. thick, including the half column on its face at the ground-line, and 6ft. 8in. thick on the upper story. The exterior circumference of this immense pile is 1,800ft., divided into eighty widths of about 22ft. 3in. each by so many half columns, with eighty arched openings, having semicircular arches 14ft. wide; making 240 arched openings in the three lower stories: all the arches are 14ft. wide. The height of the outer wall is divided in four stories. The first 34ft. 3in. high, including the entablature of the Doric order; then a stylobate of 6ft. 7in. The second 32ft. high, including the entablature of the Ionic order; then a stylobate of 6ft. 2in. The third 32ft. high, including the entablature. All these have arched openings to each division, 240 in all. The upper story has a stylobate of 7ft. 9in. and pilasters to each division, and is 38ft. 2in. high, including cornice; making the total height of 157ft. 6in. This story has square openings to every other division, and corbels which formerly received the masts of the velarium. The arches were all numbered. Some of the numbers remain on the north side. It is stated that these numbers enabled the spectators to find their seats readily, according to their different classes, and to communicate throughout the building by the means of two corridors, one 16ft. wide, one 14ft. There were also two other corridors of communication near the podium, where were the places of distinction. Eighty-four thousand spectators are said to have been congregated at one time. The arena is 287 feet by 186 feet. It is not known who was the architect of this stupendous pile, but he must have been a man of consummate skill to erect such a pile on a spot which had been a marsh or formed by Nero into an artificial lake, the outer wall of which is 157ft. 6in. high, and seems to have shown no symptoms of settlement. From an inscription found on the spot with the name *Gaudentius*, a Christian, some have imagined he was the architect; others that it recorded his martyrdom. It was commenced by Vespasian and finished by Titus, and said to be opened A.D. 81. The demolition of this magnificent building has been effected at various times; fires and earthquakes have assisted therein, but the main quantity of travertine stone was carried away and used in the Cancellaria, Palazzo Farnese, Palazzo di Venezia, &c. To the westward was the site of the famous golden *Statue of Nero*, the foundation of which still appears. Southward were the remains of *Meta Sudans*.

The Arch of Constantine.—Dropping a little to the south, we have the Arch of *Constantine*. This is a lamentable instance of spoliation and misappropriation, the fine triumphal arch erected to the honour of Trajan having been demolished and the best parts used by Constantine. This is evident in the cornices, which (except the salient ones) are very finely executed, while the latter are rough; but the fine bas-reliefs repre-

senting the events of Trajan's life are endeavoured to be made to represent those of Constantine, but without success. The details of this arch are all shown in the author's work on Rome. The opening of the central arch is 21ft. 8in., and its length 37ft. 8in. The extent of the mass is 83ft. 2in. and the height 67ft. 7in.

The Temple of Venus and Rome.—We now come to the Temple of Venus and Rome, built by Adrian. The extent of these temples can be accurately traced by the parts remaining. They were surrounded by columns 60ft. in diameter, ten in front and twenty on the return; and the peribolus wall was to the extent of 500ft. by 350ft., which was ornamented with columns of granite 4ft. in diameter, of which several blocks are lying about. The Temples themselves are small, placed back to back. It is recorded that Adrian, desiring to have the opinion of Apollodorus, his architect, on his design, he observed that if the goddesses wished to rise from their seats they would hit their heads against the top of the niches on which they sat. The opinion cost the architect his life. Next comes the little Arch of Titus, which is too well-known to require more description.

The Basilica of Constantine is a massive construction of tiles and concrete; the length of the body of the building is 280 feet, the central division 85 feet in width. The side divisions had on each side three arched openings, the soffits divided in immense panels, ornamented, moulded, and probably gilt. The centre was covered by arches and cross springers, springing from eight columns 100ft. high with their pedestals, one of which is set up in front of Santa Maria Maggiore.

We next pass the little temple of Remus and the Temple of Antoninus and Faustina, then on the left we find the Temple of the *Dioscuri* or Castor and Pollux. This used to be erroneously called the temple of *Jupiter Stator*, but the will of Augustus sets us right on this subject, and determines also that the other temple west of the Basilica Julia was dedicated to Saturn, and not the Temple of Concord, as previously supposed. The temple of the *Dioscuri* must have been one of the most beautiful of its time; three columns only remain of the eastern flank, but by excavation the author was able to discern clearly its original extent, and to find that it was a fine octastyle temple, with grand flight of steps for the entrance. It is most wonderful how these three columns have been preserved in place, for they seem what is vulgarly called *top-heavy*; the very fine and true construction of the joints of the marble of which the shafts are composed seems the cause. Of the *Basilica Julia*, which ranges between these two temples, to an extent of above 300ft., the pavement only remains. The outer range is composed of marble in three widths, 6 inches thick, each block 6ft. by 3ft. 10in., of which there are 79 remaining in the length; the next range of blocks were 6ft. 7in. by 3ft. 10in., 3in. thick, in 2 widths, 79 of which remain in the length. There are indications also of piers, by which and the thinner marble, we may gather that the covering of the Basilica extended over them. We also may conclude that the central opening was 80ft. in width. We may conjecture how this may have been covered in; the Basilica Ulpia was attached to Trajan's Forum, the central opening of which was 85ft. in width; these two must have had timber roofs. We now approach the *Clivus Capitolinus*, the temples of which were described at the commencement of this paper. The author drew particular attention to the noble cornice of the Temple of Concord, which was collected in fragments and set up in Tabularium by Canina, and which was illustrated full size. It may safely be said to be the finest example extant of a Corinthian cornice, and will speak for itself. One must travel northward and westward among the modern streets to find remnants of the ancient buildings over that extensive space from the Basilica of Constantine to the Column of Trajan which was appropriated to the several *Fora* of Trajan, Augustus, Caesar, Nerva, and the Temple of Peace. The author called attention to the marvellously fine workmanship and the immense blocks of marble used in some of these structures. To take the Column of Trajan, which with its pedestal is composed of 30 blocks of marble; the pedestal has 2 blocks 18ft. long, 9ft. wide, and 5ft. 7in. high. The *toro* or cornice of the pedestal is in one block 20ft. square, 6ft. 7in. high. The *fuso* or shaft, has 19 blocks of marble 5ft. high each, and the capital is 14ft. square, 5ft. high in one piece, all the

joints true to a hair. Now how could this fine block be got up into its place? Vitruvius, in his tenth book, treats on raising large blocks. Mr. Taylor recommended young architects to study that author carefully, and to calculate the weight of these several masses from their dimensions. A careful inquiry into the restoration of these buildings will be found in the second volume of the author's Autobiography, lately published. As regards the walls of Servius Tullius, and those of Aurelian, Mr. Taylor explained that the former are composed of large blocks of tufa, generally 1 bracia, or 1ft. 11in. square, and 2 bracia or 3ft. 10in. long; while in those of Aurelian, the outer half of the wall, about 12ft., is solid, while the inner part has cross walls about every 15 feet carrying arches, and having passages through communicating to the whole extent; over them was a terrace with parapet wall, and at uncertain distances, towers with staircases, in which the warders were placed to give notice of the approach of an enemy, when the whole army could be brought together on any spot. In conclusion, the author pointed out a view of Michael Angelo's intention for S. Peter's in a fresco painting in the wall of one of the libraries of the Vatican; and directed attention to a copy he was permitted to make of the original design of Arnolfo di Lapo for the east end of Siena Cathedral, showing how the architects of that day did their drawings.

A long discussion ensued, in which the President, Mr. Seddon, Mr. P. Anson, Mr. Hebb, Mr. C. F. Hayward, Mr. Eastlake, Mr. Newton, Mr. Thomas Morris, and Professor Kerr took part. A copious report of the discussion is in type, but is crowded out until next week.

PARLIAMENTARY NOTES.

DECORATION OF THE CENTRAL HALL AT WESTMINSTER.—Mr. Osborne said, on Monday night, it would be interesting to the House if the First Commissioner of Works would give some explanation with respect to the specimen of encaustic work set up in the Central Hall, and state whether he was going to fill the vacant niches with that specimen.—Mr. Ayrton was not able to magnify the specimen in question into dimensions sufficient to fill the vacant niches. That specimen had been hung up because it was the work of an eminent firm, who thought they had discovered and were able to carry out a process of wall decoration which was perfectly indestructible, and would not be liable to any of the accidents which had befallen the frescoes painted in various parts of the House. As the specimen was a copy of the original work which had been put up in mosaic in the Central Hall, he thought it desirable that the two should be hung side by side, in order that those interested in the subject might be able to compare them and see which produced the most agreeable effect. If those who were interested in the question and able to form a judgment upon it should think that the mode of decoration exhibited in the specimen was better than that of glass mosaic, then it would be open to consideration whether it should not be used instead, because it would possess this advantage—that it would represent ultimately the actual work of the artist, and not be a mere mechanical copy of it in small pieces like the mosaic. It would also have a further advantage. A sum of £150 was paid to the artist whose work the mosaic in the Central Hall was; but upwards of £500 was paid to the mechanics who put it up. That did not appear to him the proper mode of patronising the fine arts, but rather a mode of patronising mechanical art. He had thought it desirable that some means should be found by which the work of the artist should be painted on the walls in a durable manner. The House was aware that the attempts to paint frescoes had not succeeded, and by a deliberate vote of last session they had determined in Committee of Supply not to adorn the walls with that kind of painting. Therefore, it was necessary to find some other mode of decoration which might be new without being a revival of the art of a semi-barbarous age.

The freehold of Crosby-hall, Bishopsgate, formerly the palace of Richard, Duke of Gloucester, has been purchased by Messrs. Gordon and Co., together with the adjacent houses, which form part of the estate. Messrs. Gordon and Co., had already as tenants expended a large sum in restoring and preserving the building, and although a considerable extension of the premises is now to be made, its character, and even the architectural details, will remain unaltered.

Civil Engineering.

A QUEENSLAND BRIDGE.—A bridge of some importance has been completed over the Caboolture river in Queensland. The bridge is 288ft. long, and it is constructed entirely of hard wood. There are eight bays, varying from 31ft. to 44ft., and the roadway is 18ft. wide. The bridge is erected on thirty-seven piles, 45ft. in length, and sheathed with Muntz's metal, the height above high-water mark being 17ft. The width of the river at high water is 140ft. The approaches are solidly formed, and on one side there is a timber culvert 20ft. wide to carry off flood water, and for the purpose of protecting the embankment. The contract for the work was taken in September, 1871, the price being £1,387. The actual cost of the bridge was £1,422. Messrs. Walters and Weber were the contractors. A bridge over the Mooloolah river has also been completed; it is similar in every respect to that over the Caboolture, but the length was only 170ft. The contractor was Mr. T. G. Briggs.

EASTHAM.—A new iron pier has been erected at Eastham, and was opened last week. It has been built upon iron piles, from which a bridge depends, the lower end resting upon a pontoon stage. The bridge is 100ft. long, the entire length from the shore wall to the outer edge of the stage being 310ft. It is built upon the principle of the pier at Portobello, near Edinburgh, the roadway being supported on girders, and the bridge is swung from a cluster of piling. The pontoon landing-stage is in every way adapted for the purpose for which it is intended. Its length is 140ft., breadth 24ft., and depth 7ft., and it is kept in position by eight moorings of the aggregate weight of 18 tons. The bridge was designed by Mr. Brunlees, and the plans for the whole work were supplied by Mr. David Walker, architect, Liverpool. The masonry has been executed by Mr. David Readdie, of Liverpool, and the iron-work was constructed under the superintendence of Mr. Thompson, the lessee of the ferry.

TRAMWAYS.—At the ordinary meeting of the Society of Engineers on Monday evening, Mr. Jabez Church, President, in the chair, a paper was read by Mr. Henry Gore on "Horse Railways and Tramways." The author commenced by giving a brief sketch of the rise and progress of road-making in England from the time of the Roman invasion down to the period when Telford, M'Niel, Macadam, and others, devoted their attention to perfecting our great highways. He then described the early attempts to construct tramways or trolley-ways in the mining districts, commencing with the wooden railways of the Tyne and Wear of 1680. He then traced the history of this description of roads and the application of iron in their construction, showing also, by reference to documents in the Patent Office, that so early as 1803 the idea was started for constructing street tramways with iron rails. A drawing of the rail and mode of laying was exhibited. Mr. Gore then referred to several Acts of Parliament which were passed at the commencement of the present century authorising the construction of horse railways and tramways for general traffic, particularising the roads between Gloucester and Cheltenham, and that between Stratford-on-Avon and Moreton-in-the-Marsh. The author then described some of the earlier street railways in the United States, and the attempts made by Mr. Train to introduce the system into the metropolis, and pointed out the cause of their failure. Mr. Gore here alluded to the tramway he had himself constructed in 1863 at Valparaiso, on the west coast of South America. Having concluded the historical sketch, the author then proceeded to describe the principal features of the various forms of construction adopted in the street tramways which have recently been laid. This part of the paper was illustrated by a series of carefully prepared diagrams, embracing all the important details of each type of construction, including the use of concrete, transverse timber sleepers, cast iron block chairs, and continuous cast iron girder rails. After describing each system of construction, the author pointed out the more prominent objections observable in the several types now in use, among the chief of which was the employment of concrete, which he held to be highly prejudicial. He pointed out the effect of vibration in destroying the cohesion of the particles of cement, and the constant tendency there was for the mass to be broken up. He then called especial attention to the evils arising

from the want of sufficient bearing surface or proper lateral support to maintain the gauge. Mr. Gore advocated very strongly the use of transverse sleepers as the best means of distributing the load and neutralising the effects of vibration. He also pointed out the importance of thoroughly sound workmanship, both as regards the laying of sleepers and rails and in well consolidating the foundation of the road by ramming and packing. He recommended the use of a species of tar or asphalt concrete as a bed to receive the stone pavement, and also for packing round the timber sleepers. He discountenanced the use of lime or cement concrete as a foundation for tramways, and concluded his interesting paper by urging the use of thoroughly desiccated and prepared timber, so as to insure the greatest possible durability, and a system of paving or roadway which should be as far as practicable free from any material that was liable to break up into dust or mud.

CONCRETE BUILDINGS.

VERY considerable improvements in the shape of land drainage, and the erection of farm-houses, farm buildings, labourers' cottages, &c., have been effected within the last four years on the Wiltshire estate of Lord Ashburton,—principally in the parishes of Steeple Langford, near Salisbury, and All Cannings, near Devizes. An important and novel feature in connection with these improvements is that the walls and other portions of the greater part of these buildings have been constructed of Portland cement concrete, the total quantity of concrete so used being equal in bulk to brickwork requiring about two and-a-half millions of bricks. The materials used for mixing with Portland cement have varied according to local facilities for obtaining them; they have been principally slag from iron ore, river gravel, flints, and the debris from old buildings such as brickbats, old stones, tiles, &c., crushed to the regular size by one of Blakes powerful stone crushers. It would appear as a general result that although all of these materials make excellent concrete, yet slag is superior to the others for that purpose; then flints, and the crushed materials from old buildings, mixed if possible; and river gravel last, on account of its irregular and uneven surfaces becoming smooth and rounded from attrition. This extensive use of concrete was the result of an impartial trial of its merits and cost as compared with other materials, no owner or patentee interested in the manufacture of cement, or of any concrete building apparatus, being consulted, and on comparison with bricks and mortar it has been satisfactorily proved to be much stronger and more economical. Farm labourers under proper supervision can be advantageously employed instead of skilled mechanics (no inconsiderable advantage just now) and an ordinary 9-in. wall when properly constructed, appears as impervious to damp as it undoubtedly is to the passage of rats and mice. While therefore concrete seems especially suited for farm buildings, it would also seem that dwelling houses so constructed maintain more even temperature, require less fuel, and are healthier than brick-built ones. The materials, cement excepted, can be obtained in almost any neighbourhood, frequently at little or no outlay beyond haulage, and it is one of the advantages of concrete that it can be applied to a variety of purposes besides wall construction, such as water and manure tanks, coach-house, courtyard, cattle shed, granary, and other floors,—cattle mangers, drinking troughs, ponds, bridges, culverts, and hatches, for all which purposes it has been used in these improvements. As some of the cottages have been built and inhabited nearly four years, some test has been obtained of the enduring powers of concrete, and, as far as can be observed, the work first done is undoubtedly stronger and shows signs of durability much superior to ordinary brickwork. Great care was exercised in these buildings in the selection and use of the materials. Adie's cement-testing machine was employed to test the strength of the cement, Drake's apparatus was used for constructing the walls, and the Burham Company supplied the cement. The whole of the work was superintended by Mr. T. Potter, clerk of works, from instructions of J. E. Knollys, Esq., agent to Lord Ashburton, and the general result has been so far satisfactory that a considerable amount of building is about to be commenced in a similar manner on his lordship's Hampshire estate.

OUR LITHOGRAPHIC ILLUSTRATIONS.

PRACTICAL ILLUSTRATIONS OF FIGURE-SCULPTURE.

We this week report and illustrate Mr. Redfern's third and concluding lecture "On the Figure-Sculpture in the Architectural Museum." For report, see page 435; and for illustrations, see photo-lithograph.

SOANE MEDALLION PRIZE DESIGN.

Our illustrations this week represent the drawings for which the Soane Medallion was awarded this year to Mr. William Frame, the design being for a large public hall to be used for concerts and public meetings. The restrictions to competitors were these: The ground was supposed to be surrounded on two sides, and of the proportions as two to three. The author has placed the large hall upon the first-floor, surrounding it with a wide corridor, the part below being used as shops, retiring-rooms, and entrances. We must warmly compliment Mr. Frame upon the execution of his drawings, and hope they will prove the forerunner of a successful career in his profession.

SPECIMENS OF STALLS.

We publish this week an illustration of church-stalls from an architect's note-book. From different countries and varying dates, they illustrate several styles, but need little description. The two sketches from the cathedral of Perugia and Sant Eusebio, Rome, are characteristic examples of Italian super-arms, while San Francesco, Arezzo gives the full arm of about the same date. Those of S. Pierre, Saumur, of the fifteenth century, are quaintly arranged round a curve, with very bad canopies (not shown), and a peculiar splayed angle filled in solid, though it would have looked much better open.

San Andrea, Ferrara, has a good arm, while the backs are of tarsia, representing streets and court-yards, all in parallel perspective.

S. Caprais, Agen, is an old Romanesque church, but the stalls are modern.

The nave seats of the Frauenkirche, Nuremberg, are generally alike; but the little tracery panels, differing in every case, give them an elegance and lightness that contrasts strongly with the more solid design of the choir stalls in Frankfurt Cathedral. This latter seems to have had a run, as the writer has seen two or three examples of it in different parts of Germany.

ARCHITECTURAL ART IN ENGLAND.

ON Thursday evening, the 6th inst., Professor Kerr read a paper at the rooms of the Society for the Encouragement of Fine Arts on "Architectural Art in England." Mr. James Edmeston took the chair, and there was a large attendance.

In the course of his paper, Professor Kerr said that the fine art of architecture was at the present moment the subject of extremely bitter controversy. There seemed to be little in it to justify the condition of things, and it was remarkable that architects were subject to harsh assaults. Amongst the architectural profession there existed great confusion, even upon the very fundamental principles of design; and it was certainly remarkable that criticism, without which no art could flourish, should be, as regarded architecture, a dead letter. These circumstances are the results of what was called "the battle of the styles," Gothic *versus* Classic, the two causes being continually pleaded together. Architects have been told to ignore this controversy, and to turn their attention to their real duties, but in vain, for this controversy was the index of a deeper one, which lies below the surface. Architecture had been described as history in stone. It had existed in all ages and forms, and had been peculiar to the conditions and the times of the country, and the habits of the people. These and other circumstances have always combined together to mould architecture into a particular form. The variety of artistic product was what we call "style"; and the two styles of Gothic and Classic represent two different schools of thought. All other styles were either subsidiary to these, or were out of the category by reason of their being barbarous. We had been asked to invent a new style, but that was utterly impossible; for a style of architecture was a thing that could not be invented suddenly, or on demand. A new style, in whatever country, could not be introduced except by means of the development of

ages. Relative to the foundation of the present styles, if we take the commencement of the Christian era as the fifth century B.C., and the fifth century A.D., that would correspond with the Classical style; and another thousand years would bring us to the Gothic period. The Greeks, in the 5th century B.C., exhibited that extraordinary, that incomprehensible development of intellect. Their school of intellect was continued by the Romans, and it was the Romans who carried down this self-same school; and the state in which they left architecture was one of considerable advancement. After the Romans came the Goths, and through them the Gothic architecture became developed. The architects of that period were accustomed to call the style "Early English," and this style now is particularly in favour. The fourteenth century then led forward into the Decorative Period, and the fifteenth century to the Perpendicular Period; but the Reformation completely disturbed the system of social organisation which had previously existed. At this time architecture was most prominently made the subject of the revival of antique forms, and the Neo-Classic style, which still prevailed throughout Europe, was called the Italian style. At the beginning of the seventeenth century this Italian style was first introduced into this country by Inigo Jones. Relative to the influence of religion on architecture, Professor Kerr went on to say that from the commencement of human history temples were, and always would be, the great standard works of architecture; amongst the Greeks and Egyptians this was so, and in the present day our churches fully testified to this. There were two great schools of architecture in Europe—the French Classic and the English Gothic. The French represented the tendency of modern Europe, while the English represented the reaction in favour of the Middle Ages. With regard to the revival of Romanticism, amongst that school there was displayed at this moment an unexampled amount of energy and enthusiasm; their ideas were very high as regarded art, but yet their platform was very narrow. Gothic architecture was extremely attractive to young minds; the youngest architects were Gothic architects, and Classic architecture with them was entirely out of fashion. In France, however, it was entirely the other way. Classic design, too, had almost entirely disappeared in England. Our monumental art and our ordinary art were entirely different. Gothic architecture of the present day becomes extremely ambitious, and therefore eccentric and *bizarre*. The leaning of the leaders of the Gothic school was towards thirteenth century architecture and the French; but in the new school which has sprung up, Mr. Street, a most distinguished man, was at the head. We are driven back upon the adoption of a crude, rough, and rude mode of design, in order to escape the imputation of weakness. The public of late years have become both alarmed and astonished at our position; and the profession is becoming unpopular, there being every evidence of a general distrust. But the fashion in architecture must change; it never had stood still, and it was vain to think that it would. Our progress had been a great deal too rapid. The reaction, he thought, in conclusion, would be towards the adoption of the French Classic style, because that was the modern European manner from which we have gone away, and to which we must ultimately come.

Mr. BROWNING, the Secretary of the Society, agreed entirely with the substance of the lecture, and thought that the fashion in architecture would so change that there would be a fine future before the young architects of the present day.

The CHAIRMAN, in proposing a vote of thanks to the lecturer, said that the different styles of architecture were governed by tradition. In criticism not founded upon real canons of taste, how was it possible for any art to flourish and to occupy that position which it ought to?

Professor KERR having briefly responded, the meeting terminated with a vote of thanks to the Chairman.

Mr. Hunt's great picture of "The Shadow of Death," which was submitted to the inspection of Her Majesty the Queen on Thursday week, and which has exclusively occupied the time of the artist during the last four years, will not be exhibited for some months to come. Mr. Holman Hunt returns to Palestine immediately, and it is probable that the result of his long labour may be submitted for public criticism in November next.

THE CHURCH OF S. NICHOLAS, CARRICKFERGUS.

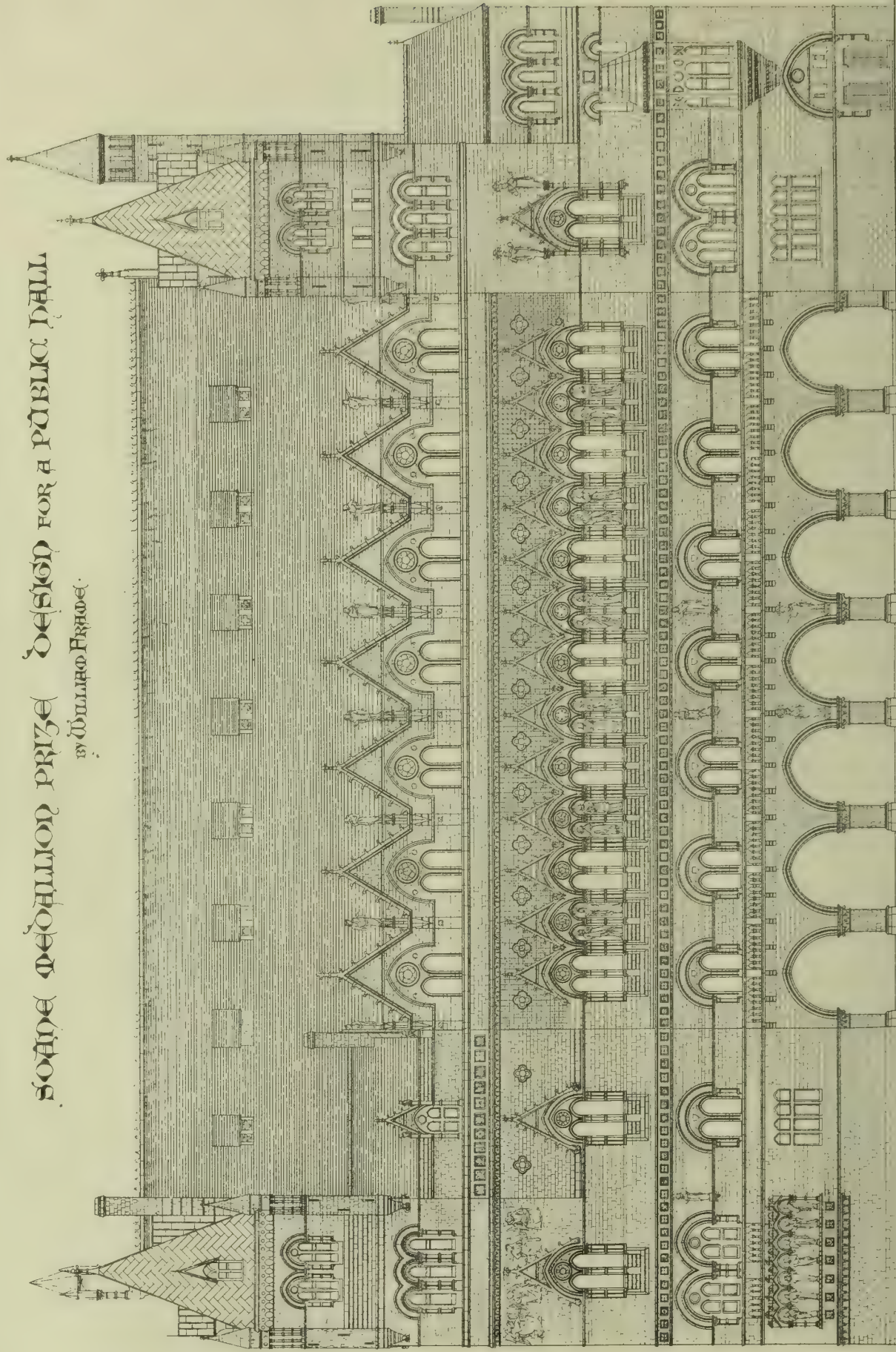
THIS ancient Irish church is the subject of an interesting report recently made to the Bishop of Down and Connor and Dromore, by Mr. Thomas Drew, F.R.I.A.I., of Dublin.

The original foundation of the church appears to date from A.D. 1220, when the rectory of S. Nicholas appears to have been an endowment of the Premontre canons of Woodburn. It does not appear, however, whether it was an ancient Irish foundation anterior to the English occupation, or whether it was founded some years later. The absence in the plan of the church of the unique and distinctive Celtic type has induced Mr. Drew to believe that the present fabric at least is a wholly English foundation, dating from a period not earlier than the occupation of "Cragfergus," about 1230. The building then founded probably consisted of a nave about 75 feet long, and—a strange peculiarity—26 feet wide at the west end, while it was but 22 feet wide at the east end. The first authentic record of the building dates from the beginning of the fourteenth century, and has reference to the work of Robert le Mercer, which there is little difficulty in identifying as the long choir, 65 feet in length, and 21 feet wide. This choir still retains its old window openings, four in number, on the south side, the great east window, and one at least as ancient, on the north side. The last-mentioned still retains traces of fine character. On the south side is an ancient priest's doorway, built up: and on the north side, in a very unusual position, a "sepulchre" tomb, also built up. An extensive alteration appears to have taken place in the fifteenth century, under the rule of a rector or prior, who seems to have had but little respect for architectural congruity or beauty. Another century passes; the old Faith has been rudely handled; Elizabeth is queen, and the church "has been burned, spoyled by the rebels," and in spite of assistance rendered by Lord Deputy Grey, the ruined nave appears to have remained forty years roofless. In 1614, "Mr. Thomas Paps, freemason," made a very sweeping renovation. He built up the arcades on each side of the nave, substituted a solid wall for the two easternmost arches of the north arcade, and rebuilt the southern chapels in the form still remembered as "the Donegal transept." He also built a porch on the south side, entered through a semicircular arch, which, disused as a porch, exists now as "the Welsin Tomb." The church was again repaired in 1699, 1712, 1754, and 1788. In the latter year the western entrance was adopted, and Thomas Paps' porch disused. The ancient "steeple," which appears to have been only a bell-cot, standing on the west wall, was also then removed, and the present tower and spire erected. In 1787 Dean Dobbs built the present ugly vestry. In 1812 the western portion of the roof fell in, and in 1818 and 1830 the restorer was again busy, to such an extent that it is marvellous that so much remains of the ancient church as to enable its plan to be traced. To this ancient plan, with but trifling deviation, the church deserves to be restored, both from æsthetic and utilitarian considerations. Mr. Drew proposes to restore the side aisles, with their arcades, at a moderate expenditure, and thus gain additional room. By restoring the beautiful clustered column on the north side, and reinstating its fellow as it once existed on the south side, with the choir arch, the beauty of the old plan would again be seen, and a trifling variation—the prolongation of the lateral arcade one bay farther east on each side, and then crossing the choir with a chancel arch proper—would practically shorten the long chancel. Such a restoration, including a new roof, and some other necessary works, Mr. Drew believes might be effected at a cost of £2,000 to £2,500. The increased accommodation gained would be from 450 to 500 persons.

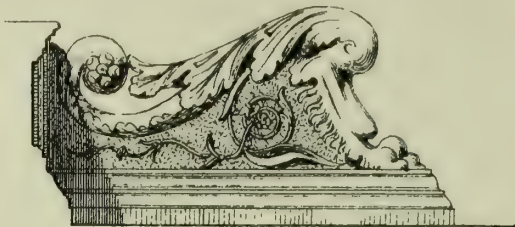
METROPOLITAN BOARD OF WORKS. — The annual accounts relating to the Metropolitan Board of Works, presented to Parliament, were printed yesterday. The Consolidated Stock was £3,527,978. 0s. 2d. The application of the money raised by such stock is set forth in detail, showing a balance in hand on the 31st of December, 1872, of £99,161. 9s. 5d. The estimated expenditure of the Board, for the year ending the 31st of December, 1873, as working expenditure, is £517,382. 18s. 6d. The estimate for Metropolitan Improvements, &c., is £938,000, to be provided for by the issue of Metropolitan Consolidated Stock.

THE BUILDING NEWS. APR. 11. 1873.

SCHEME PROPOSITION PRIZE DESIGN FOR A PUBLIC HALL
BY WILLIAM FRANK.



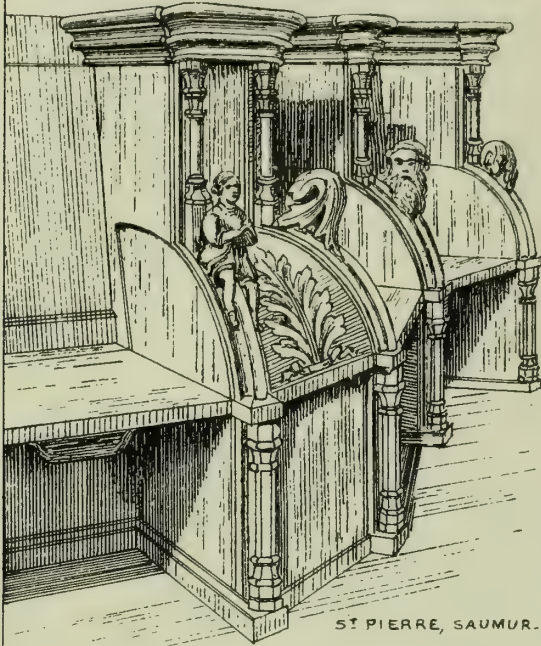
. side elevation.



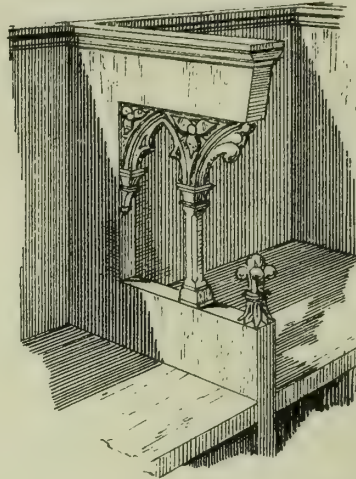
THE CATHEDRAL, PERUGIA



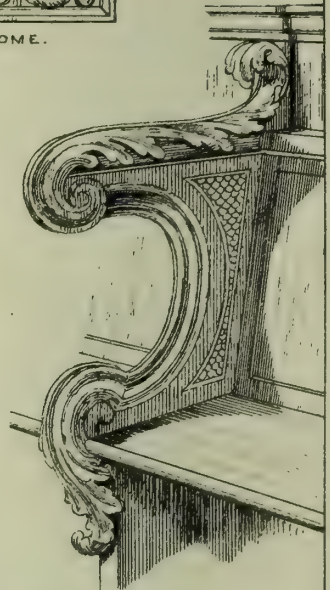
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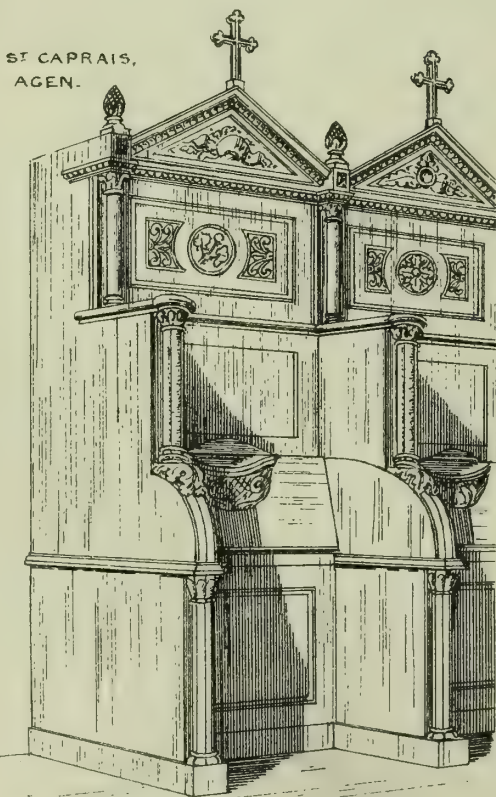
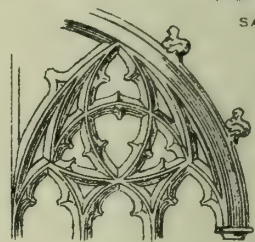
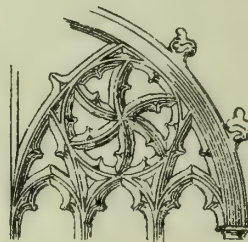
ST PIERRE, SAUMUR.



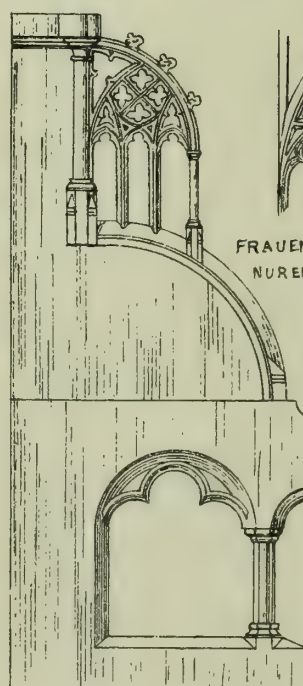
SAN ANDREA, FERRARA.



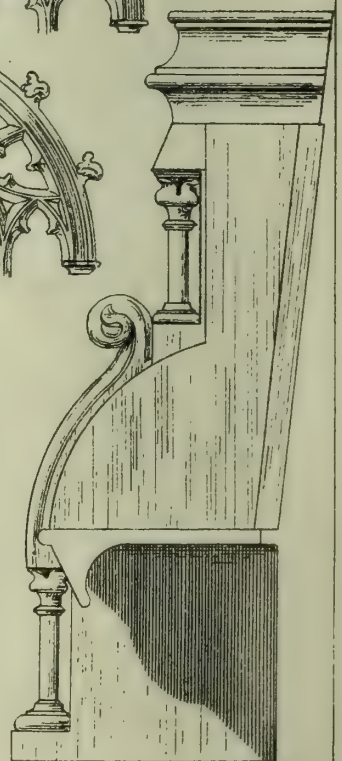
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ST CAPRAIS, AGEN.



FRAUENKIRCHE, NUREMBERG.



THE CATHEDRAL FRANKFORT

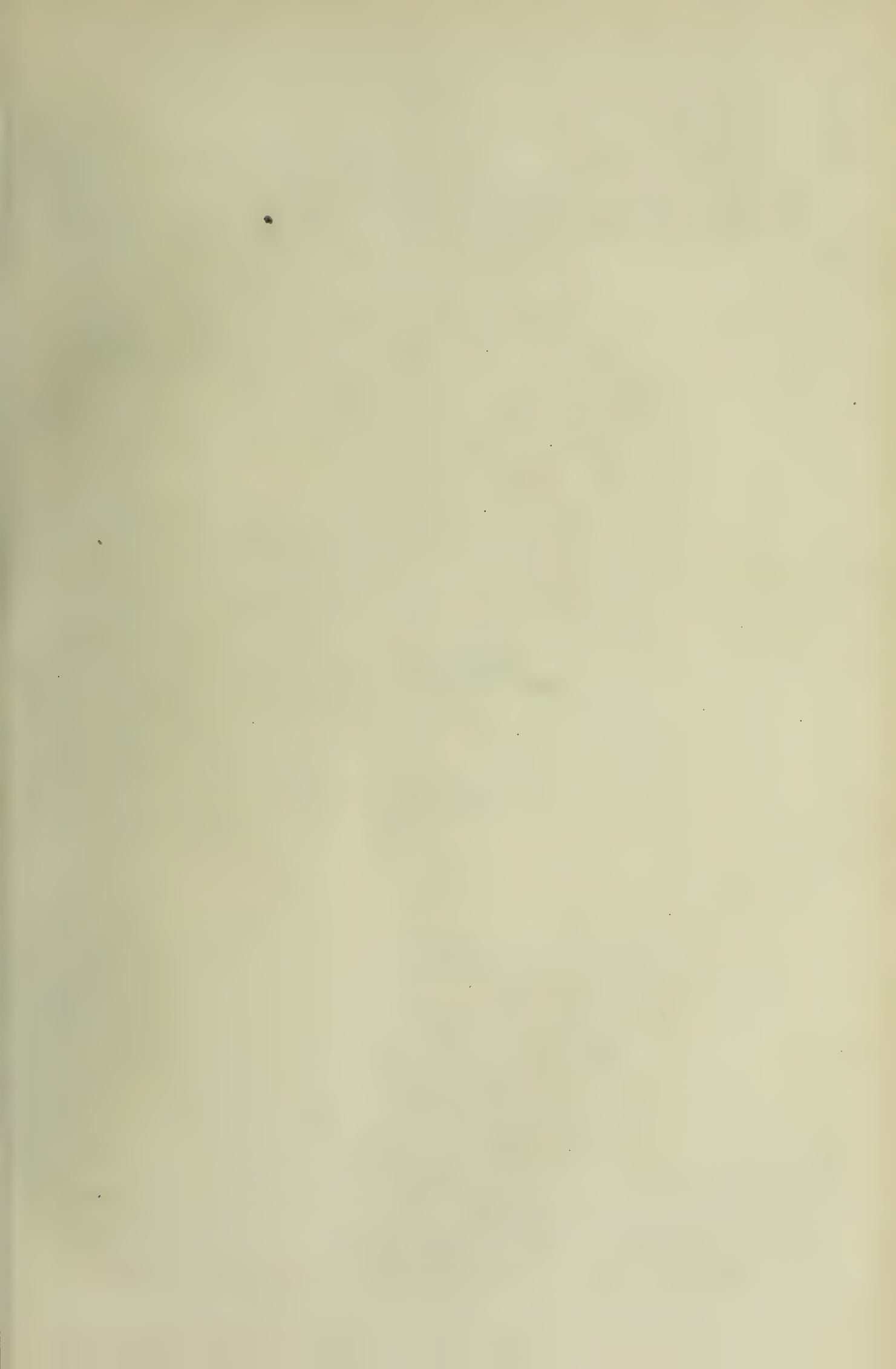
G. Vaughan del.

SPECIMENS OF STALLS.

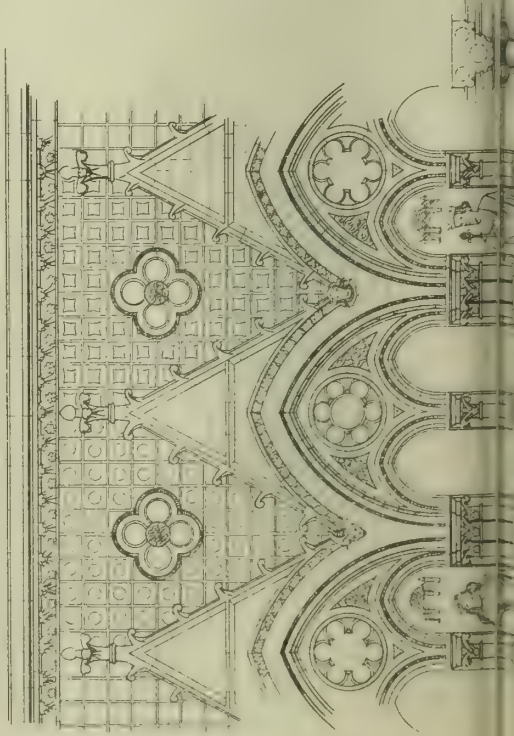
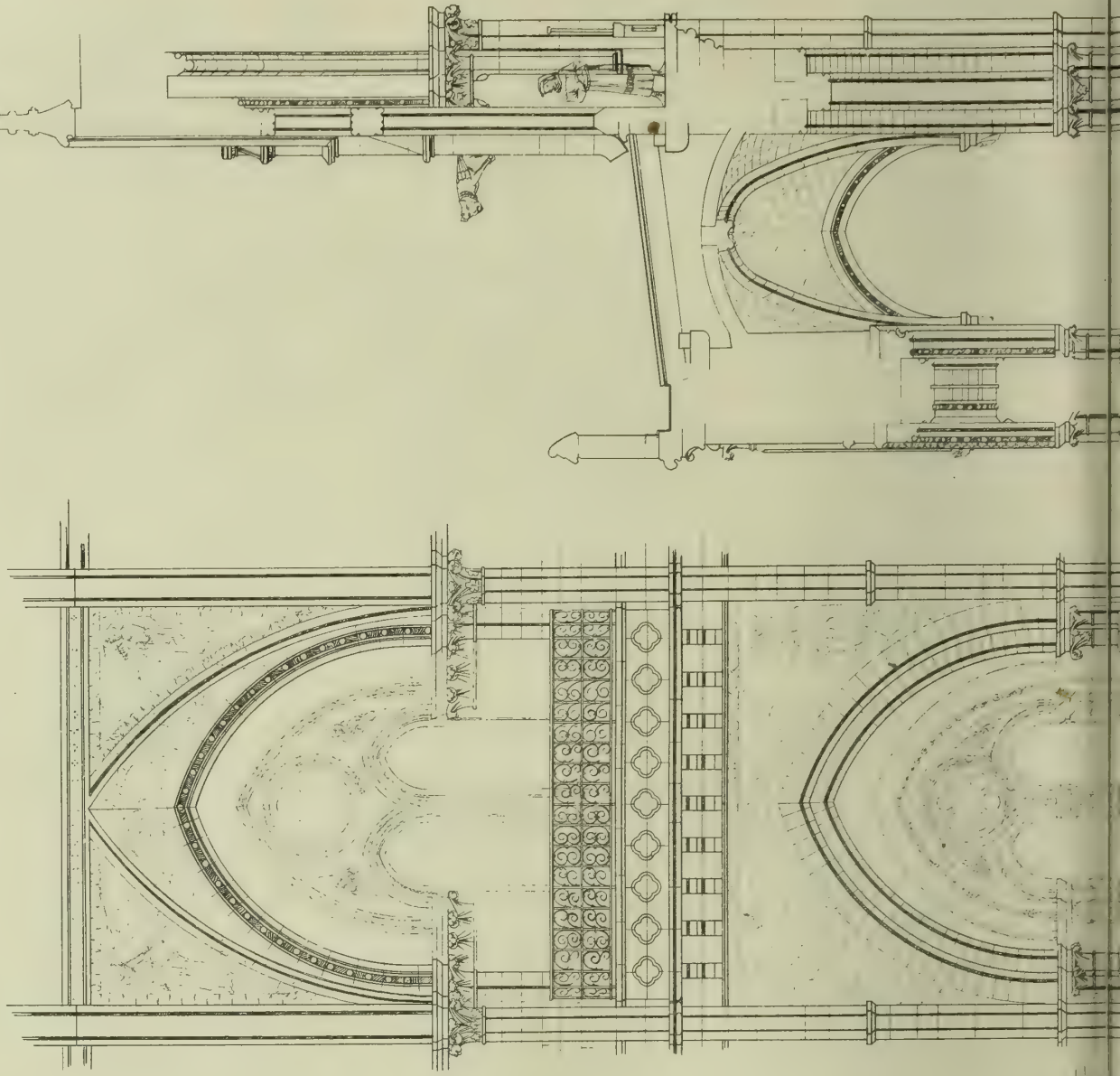
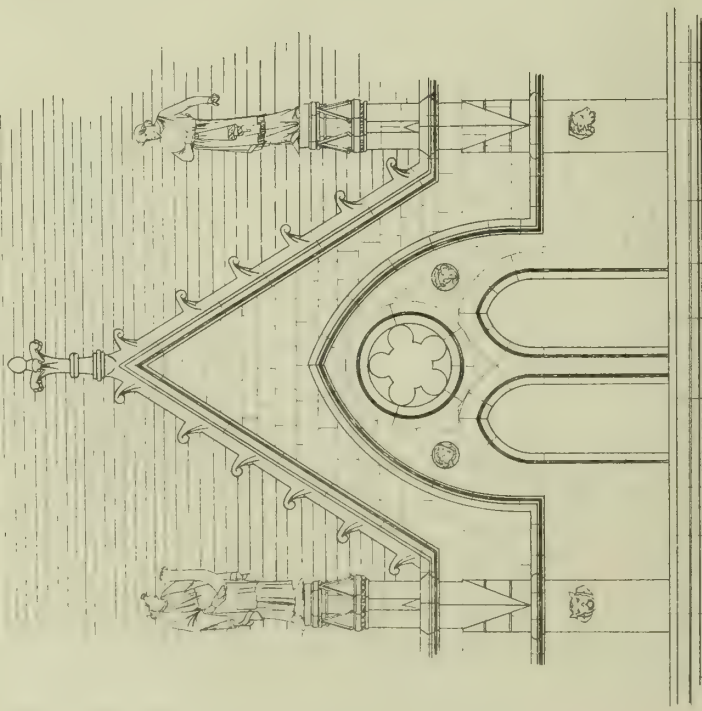
JAMES AKERMAN, PHOTO LITHO, 51 GRAYS INN ROAD, W.C.

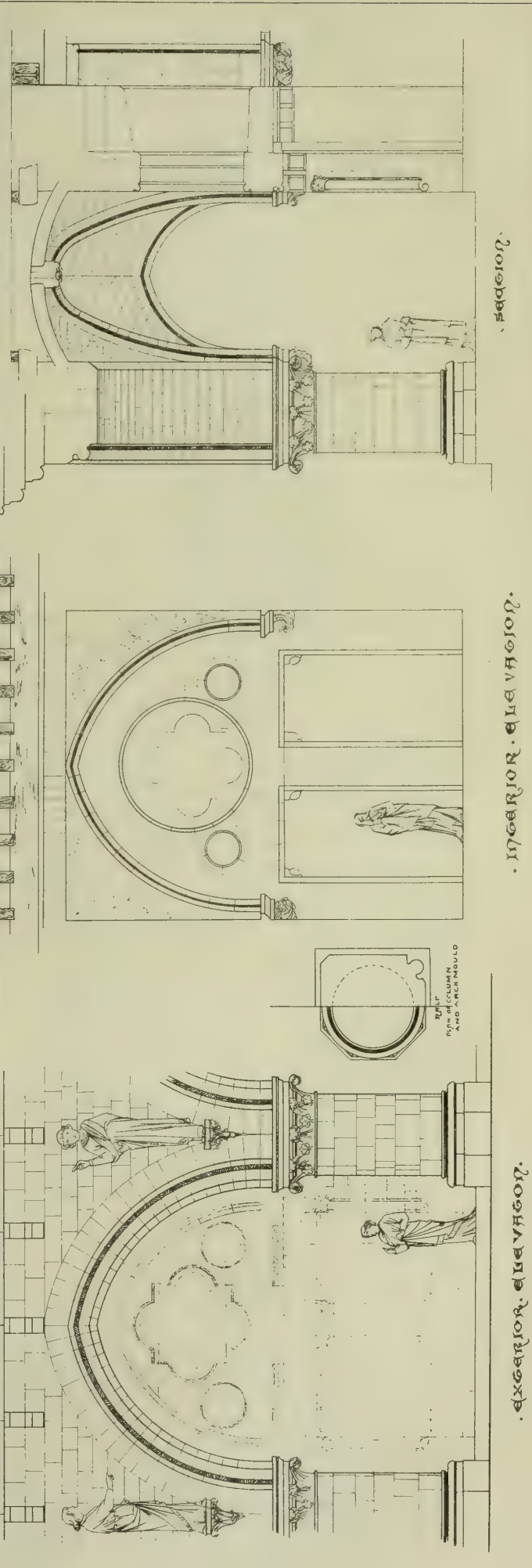
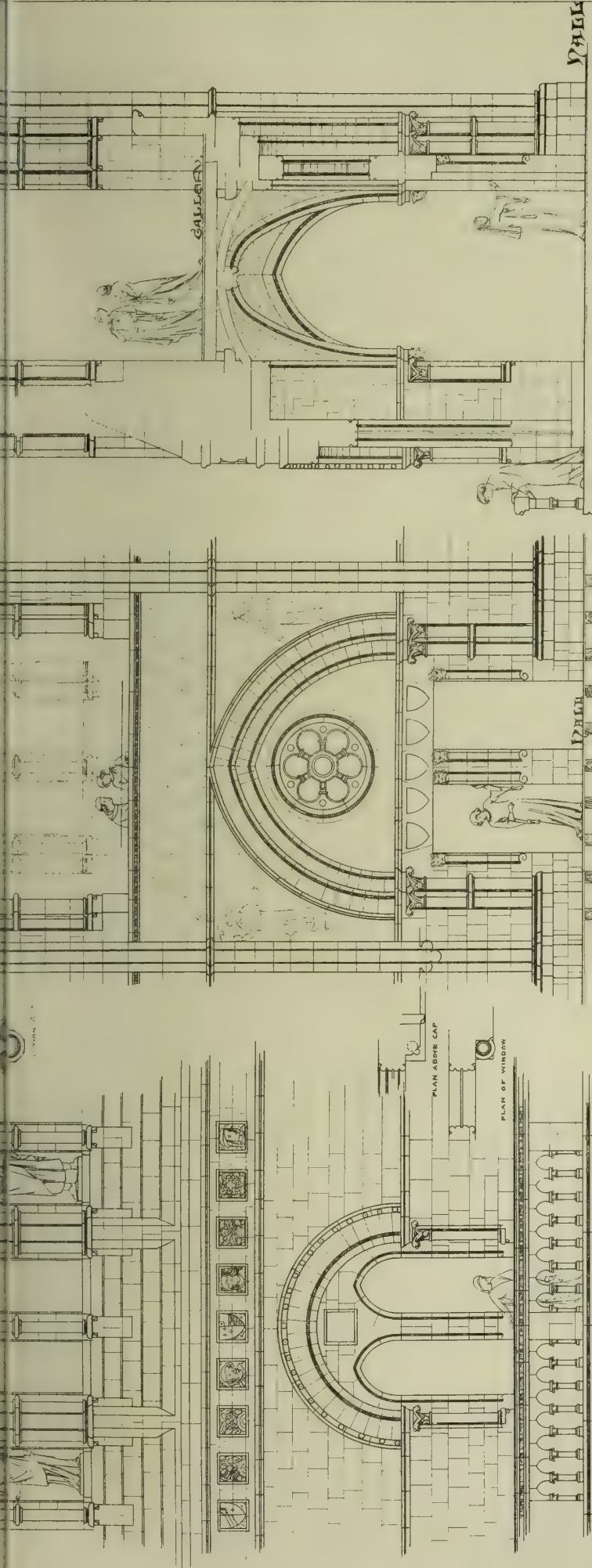
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SPECIMENS OF STALLS SKETCHED BY G. VAUGHAN.



SCOTT MEDALLION PRIZE DESIGN FOR A PUBLIC HALL
by WILLIAM FRASER.





PRACTICAL DESCRIPTIONS OF FIGURE SCULPTURE BY J.F. REDFERN.

(ILLUSTRATING LECTURE DELIVERED AT THE ARCHITECTURAL MUSEUM)



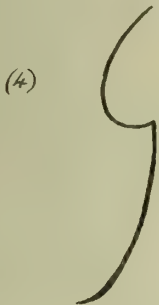
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(2)



(3)



(4)



(5)



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(c-a)



(6)



(6 a)



(7)

SOANE MEDALLION PRIZE DESIGN FOR A PUBLIC HALL
BY WILLIAM FRANK.



FRONT ELEVATION.

INTERCESSORY ART.

ART at the present day is practised in a most unnatural method. Its professors follow it at second-hand, like the practice of some religionists who offer their prayers by deputy, or receive blessings after the same fashion. In one case the "antique" or ancient masters and models, and in the other a "priesthood" or the traditional "Church" intervene between the student or suppliant. In both instances there is a gratuitous assumption of a depravity of human nature—a falling off or defection from the original or source. Why there should be such an admitted defection and leaning on tradition in matters of art and religion only, while all other knowledge has advanced apace by a conscious progression both of our mental faculties and our experience, is an anomaly of our civilization that can be explained only by the philosophic observer, perhaps, who has watched closely the action and re-action of ideas. That there exists no foundation for such an assumption, and that it is the product of a mere sentimental thought or fictitious conventionalism of the day, I have endeavoured in previous papers to prove. I will here simply note a few circumstances that indicate this prevailing feeling in art, especially architecture.

One marked result of the school of draughtsmanship design (?) so prominent in the present day is that of taking a "model," or a "style," and working therefrom to every part of a structure. Sometimes this is impossible, through the varying conditions of site, or the special purposes of destination of the building. In such cases alone we find some amount of originality or invention displayed, the architect having to set aside every ordinary type or conventional pattern, and to work out his problem rationally, or *de novo*. Some peculiar configuration of site, or some special necessity arises to exercise ingenuity and contrivance, and we often get something fresh and vigorous, if not unique, and this simply because no antecedent type or traditional mode has hampered the mind. Now where do we usually find such exceptional cases? Chiefly in secular buildings—houses, business premises, factories, and the like. In these classes of building, too, there are requirements of a special nature to enlist the architect's attention and study. But the chief point I have yet to observe about them is, that the process of thought necessary for their design is the *natural* one—one proceeding from actual want and common-sense ideas of fitness. We reason *inductively* in planning and conceiving such structures—we draw our inferences from *facts*, not from ideas and types. Now, we must observe that this process or mode is totally opposed to that adopted by our church architects. The procedure may be termed "deductive;" not from reason, be it observed, nor from facts, but from traditional types and conventions. The inferences are drawn from a *résumé* of the past—from particular examples of an antecedent age. Traditional custom, age, or association is the motive—it may be a kind of religious enthusiasm. It is, and must necessarily be, a procedure also from *non-essentials* to essentials. As I have shown before, education has a good deal to do with this system of architectural "design;" implicit copyism, in fact, becomes the perfection or result of its operation. Inherently defective as this system is, it becomes more or less reasonable as we allow fundamental ideas of plan or construction to influence our type or model. Generally, however, we find "style," or the period chosen, the keynote, and every part follows suit. Let us take the recent case of the competition for the new Cathedral at Edinburgh, and let us take Mr. Street's own explanation of the motives which gave rise to his design; and let us note the order of the report. 1st. We have, not consideration of fitness for our reformed worship; not whether the usual cathedral scheme or cross plan may not give place to a more commodious and unobstructed arrangement; not whether the plan chosen is

the most economical in construction—but the guidance afforded by "our national tradition and examples" in style and arrangement. It is true the nave is said to be made "unusually wide" for the convenience of its occupants, but we see no special provision for such increase externally, though we have all the evidence of a desire to reproduce the general effect and detail of thirteenth century Scotch examples. Mr. Street is a very painstaking examiner and delineator of the peculiarities of Mediæval works, and to give him justice in this particular instance, he has wisely abstained from introducing any foreign element; for as he himself says—almost in direct opposition to his previous ideas or earlier designs—the country which can boast of Glasgow, St. Andrew's, Dunblane, and Elgin cathedrals, and the abbeys of Melrose, Dryburgh, and Holyrood, "has no need that the architects should leave their own country in search of what is most appropriate." This sounds rather strange, coming from an author who has probably done more to Italianise our Gothic than any one, yet it betokens a hopeful awakening to a juster sense, which it is to be regretted did not influence the design for the New Law Courts.

In Sir Gilbert Scott's design we find a more independent conception, less influenced by customary methods, the result being—and I think every one will admit it—a far nobler one, a design which, when realized, will reflect credit alike on our art and its successful author.

THE BUILDING NEWS has given the profession a means of comparing the two designs, which emanate respectively from the leaders of the two schools of modern art here indicated.

G. HUSKISSON GUILLAUME.

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association on Friday evening last, the President, Mr. J. Douglass Mathews in the chair. Messrs. A. Fairhead and C. T. Holmes were elected Members. The thanks of the Association were unanimously accorded to the Directors of the Alexandra Palace for permitting the members to visit that building a fortnight ago, and it was announced that the next visit to buildings in progress would be made to-morrow (Saturday) fortnight. Further particulars will be duly announced. Attention having been drawn to the Classes for Surveying and Chemistry which are about to be started, the President remarked that he was sorry to find from the reports of the various classes which had been that evening submitted to the Committee of the Association that one or two of the classes were not so well attended this year as hitherto. This diminution in the attendance was more especially noticeable in the Class of Design—the class which, above all others, had always been well attended, and which had been looked upon as the backbone of the Association—the class, too, which had always been regarded as the barometer of the Association, for when the class was flourishing the Association also flourished, and when the class was languishing, the Association began to languish. While, however, he did not think that the Association was now on the wane because from some not very evident causes the Class of Design was not at present very flourishing, he appealed to all the members to join and work in the classes, as the strength and almost the *raison d'être* of the Association would always consist in its classes.

Mr. BANISTER FLETCHER, A.R.I.B.A., then read the following paper on

DILAPIDATIONS.

No subjects can be more important to us than those which have reference to our daily occupation, and believing that all will agree in this view, I bring before you to-night this practical question of Dilapidations. Every one is prepared with an answer to the question, What is a dilapidation? yet how difficult is its application in practice! How varied are the views expressed when we meet our professional brethren. Let me first recount a few instances of recent experiences. One case where the lease contained the words, *fair wear and tear excepted*. This was a lease granted many years ago for a term of 50 years, and contained the usual repairing covenant

and the other usual covenants to insure and deliver up, &c. It was contended that because the words I have mentioned were inserted I could not claim that the painting and other repairing covenants should be fulfilled, but that those words being in the lease I could merely claim for wilful damage done by the lessee. Now, imagine for one moment that this view was correct: it would follow that the lessee need not at any time during the 50 years have painted, white-washed, or repaired the premises at all, and the grantors of the lease or their successors at the end of the term would have received back premises in a most dilapidated state, or even in ruins. I put this idea before my professional brother, but his answer was *naïve*—It did not matter to him—it could not affect his position, which was that fair wear and tear precluded his client from making any outlay; his sole responsibility was to prevent wilful damage and injury to the premises. My reply, that surely during 50 years some repair must have been contemplated, even if we omitted from consideration the express covenant, elicited the same reply in different words thus—My client is entitled to the use of the premises with fair wear and tear. By fair wear it must clearly be meant that he is to have the use of the premises, and can only be liable for wilful injury. Now, what can be done, when you meet such an arbitrator? Only one course seems open to you—to suggest calling in the umpire. Very often this has great effect; but as it adds to the expense, it is wisest to resort to it only as a last method of settling the matter. Architects and surveyors are called unpractical, unbusiness-like; and I would therefore most earnestly call attention to this expression of the commercial world, because I believe in a great measure it is undeserved, and as to the small portion that may have a foundation in truth, I feel confident that if we discuss the practical portion of our practice, earnestly endeavouring to find the proper basis of action, we shall remove, if we act thereon, the modicum of truth in the assertion. Certain is it that in matters of taste no decision can be arrived at. We may design the most perfect, elegant, and appropriate building, but if it be not in the style of our *critic*, he will damn it, find fault (where none exists), discover errors, which are simply excellences, and blunder on in his criticisms until you wish most heartily that the critic had not been invented. If however the *style* please your critic, all your work is good; and this fulsome praise makes your face crimson, not with the honest glow of well-deserved praise, but with the feeling that the praise is not *true*, is not just. It is simply the critic airing his absurd theories of a particular style. In matters appertaining to the practical questions of our profession, where the critic is excluded, surely it is easy to arrive at sound conclusions, at sound bases to guide. Such questions as Quantities and Dilapidations are surely amongst those that can be placed in the category of "non-debatable." On these at least we may agree, and feel that when we have to meet our brethren no umpire need be called in. The next point I would touch upon is very delicate. It often happens that a friend is going to take a house on lease. To illustrate what I mean, I will mention a recent instance. A friend proposed taking a house. I offered to look at the house without charging any fee. He objected. If he wanted a survey he would pay for it, he said, but he thought he did not. Well, in the end he took the house without professional assistance. He has told me since how much he has regretted it. The rent was more than the value. This he has discovered in a very practical manner, for, wishing to leave the locality, he has tried to let it. The building has sunk and cracked, and at much expense it has been underpinned. Conclusively, this must show how the old proverb holds good, "Penny wise—pound foolish." All who wish to save the expense of employing the architect and surveyor are nearly sure to repent it. I mention this, because my friend and client said he felt confident he could leave the house directly the settlement took place; the grantor of the 21 years' lease was bound to keep it up. Of course he discovered his error. The little knowledge possessed by the general public on those subjects with which we have to deal is really wonderful, if we consider that men live in *houses* and usually take leases. Is it not marvellous that scarcely any non-professional man has the slightest conception of what dilapidations are? As some illustration of this expression of opinion, I would refer my hearers to the appendix to my work on this subject. Let us try then to arrive at funda-

mental principles to guide us in assessing Dilapidations. First we have to consider the lease then the premises, thus—(1) Its covenants, (2) The date of the lease. (3) The probable state of the premises at the granting of the lease. The covenants must be carefully considered. If you find no specified time mentioned for the painting, then you will find the safe guide to be—as to external repair—that the more exposed the position and the aspect, the earlier will painting be required. You will notice blistered paint and particularly the sashes, as they best show where the necessity arises for the renewal of the paint. As to the inside paint, it is much more difficult, for the reason that, where no time is expressed for painting, it requires to show some injury to the fabric to require inside painting. This is just; the necessity being to uphold the premises that they may be delivered to the lessor in good condition. Now internal painting usually has little to do with preserving the premises from damage. Therefore, where the covenant is silent as to the internal painting, it is safer to limit the requirement, if the painted and framed work be in fair condition, to such portions only as are chipped or “worn to wood.” This last item sounds very formidable, but it must be remembered it may occur very often, as, for example, cupboard doors, doors of rooms much used, and in such like instances. Next let me notice a few things that are often asked in a dilapidation claim, but cannot be enforced. Where drains act fairly, no claim can be made for taking up paving or boards to inspect drains and making good; no claim for sweeping chimneys, if they have been done within a reasonable time; no claim for roofs, if they keep out the wet and the filletings are in order; no claim for painting, if done within the prescribed time, unless special injury can be shown; no claim for papering, if done within prescribed time, unless damaged or torn; no claim for ceiling, if done within prescribed time; unless improperly injured. Flooring, again, cannot be claimed unless broken, cut, or worn through; paving, only if cracked or broken; Bolts, bars, or fastenings, only if they cannot be made to fulfil the intention of their position. For walls out of the upright, it is difficult to sustain a claim unless the *cause* can be shown in some neglect of the fabric. Here I would remark that should the wall be condemned by the surveyor, under the clauses of the Dangerous Structures Act, the lessee would be bound to reinstate it. It must be borne in mind that dilapidations mean a very different item to the requirement of making a house ready for a new tenant. The new tenant fairly expects a house *done up*, fresh papered, painted, &c., but the outgoing tenant is not bound to leave the house in such a state; he is only bound to keep in repair in accordance with certain covenants, which all have for their basis, the idea of the tenant having the *use* of the premises. The taking of dilapidations is very difficult, until practice has rendered it easy. I would advise all surveyors, acting for lessors, where they have to meet another surveyor, and they have not had much experience, not to wait for the meeting to take their list, but go before the day of meeting, and prepare their schedule, so that nothing may be omitted. When they meet the surveyor against them, I advise handing him a copy of such schedule, as it saves much time, and is also a friendly act. Should you find in the covenant the words to *keep in good repair*, you would naturally try to find out what is good repair. In vain, if you want an exact definition. Good repair is about equivalent to habitable repair. What is the latter? you would inquire. The reply is that habitable repair and tenantable repair are about equivalent, or of equal value. Practice alone then can enable you to decide, but I trust I shall be able to give you the principles which should guide us. Next let me notice an absurdity in the law—you cannot explain matters of details, only the general state and condition of the premises at the time of the demise. This point arises where you wish to show the landlord or grantor of the lease is not entitled to a new house, and therefore want to show the state of the premises at the time of the demise. Well, you cannot go into the detail, which would fully explain the state of the house, but you must state generally the condition. Surely this system of giving evidence might with advantage be amended. The next point I would call attention to is very important, for the reason that I think we should all strive to alter it. I allude to the custom, on

certain estates where the freeholders are peers of the realm (I do not wish to allude more particularly to the freeholders), on the near determination to arrange terms of renewal with the occupying tenant, and when these are fully arranged, and the agreement embodying them signed, require payment in *cash* for the dilapidations under the old lease. Can anything be advanced in favour of such a claim? I venture to say, all will agree with me in saying *No*. There is not a *scintilla* of justice in the claim. What right has the freeholder to that money? Not one *iota*! The position is this: the lessee says, I will repair and surrender to you in accordance with the covenants of the lease under which I hold, but if we can arrange terms of renewal, it will suit me better (because either his business will suffer from removal, or, if a private house, he wishes to avoid the expenses connected with a removal). The negotiation continues carefully, in many cases, extended by the freeholders' agent; so that no time is left in which to do the repairs under the present or existing lease. The new agreement signed, the tenant feels happy: he thinks, poor innocent fellow, that he has nothing to do but make the alterations and outlay agreed to in such new agreement, within the time specified therein, and he is free. What are his feelings, and what would be those of my hearers, if such a case happened to them when the freeholders' surveyor comes in a few days before the expiry of the lease, to take a schedule of the dilapidations? To the indignant reply of the tenant—“There can be none; I have the new lease, and have agreed to improve the property and fully repair,”—calm reply of this great freeholders' agent,—“The new agreement in no way affects your liability under the old lease; and as, to-morrow, that old lease expires, there will be no time to do the repairs, and I shall therefore require the amount or value thereof paid in cash.” Such an instance of injustice has happened only too often in my experience. On what ground can the freeholder justify the receipt of the money? What loss has he sustained? The new lease is valued by his surveyor as if it were in thorough repair, and the valuation is so taken by the lessee. Surely you cannot admire such practice, and therefore it behoves us all, as far as lays in our power, to prevent such extortion, which, curiously enough, seems only to obtain in a few estates in London, where the freeholders are peers and men of high mark. While dealing with this portion of my subject, I cannot refrain from comparing the position of the English leaseholder with the Irish tenant. Recent legislation has certainly created an anomaly. Now the Irishman can lay out almost any sum he chooses in improvements and building, and if required to go, gets fully compensated for his outlay. His landlord may consider the outlay stupid and unprofitable, but he cannot prevent the outlay, although he is bound to repay it. He has no voice in the matter, although, as I have said, he must at some time or other find the money to recoup the tenant for a great portion of the outlay. Now, to turn to the position of the English leaseholder: he may build and improve as much as he likes, but not one penny can he require his landlord to repay him: worse still, he is liable for dilapidations on the very improvements he makes. Pardon this digression. I have made it to show forcibly the exact position of the English leaseholder. To further exemplify it, I need only mention, that if modern sanitary science, through its official medical officers, considers the premises unfit for habitation, and that they cannot be structurally altered to render them fit, the lessee has the pleasure of pulling them down, or, if not, the authorities will do it for him: the result being, he is deprived of his income, while the freeholder scarcely suffers. More frequently he does not suffer at all, for this reason: he acquires at a much earlier date the reversion, and the value of the time thus gained compensates him for having the ground vacant. Surely, if modern science considers that premises, which everyone considered fit for occupation years ago, unfit, some portion of the loss should fall on the freeholder, and he should have to find some portion of the money to render the premises fit and proper to meet the requirements of advanced scientific knowledge. Let us try to look at this point, as it bears much on dilapidations generally. A and B enter into a contract. Both believe that the premises at least are fit for habitation. Improved science says, some time afterwards, “We find these premises are unfit for habitation.” Now, what in the name of common sense ought men to do? The grantor of the lease should say, “I am sorry

the article I gave you for a number of years for a certain sum has become valueless, from causes over which we have no control, and about which we could have no idea: therefore, *pro rata*, will meet you in making the property what is requisite to meet the necessities of advanced science.” Such a course would appear right; only I regret I cannot mention an instance where it has been done. Bear in mind that in Ireland the outlay made by the tenant would have to be repaid him when he quitted the premises. I dwell on this point because I feel it is the keynote of dilapidations. Unquestionably, dilapidations are more favourably construed as regards the tenant than they were formerly. The most recent decisions show that in repairing, to avoid a heavy payment, it is not necessary to use new materials; old stuff may be used, provided, of course, that it is of proper quality. Tindal (C. J.) stated that the lessee was only bound to keep up the house as an old house, and not to give the freeholder the benefit of new work. More recent decisions appear to incline even more favourably to the lessee. In repairing, it must be remembered that if the treads of stairs be worn so that they require repair, only *nosings* can be claimed; that if a door be injured, the only claim that can be sustained would be piecing. I think the foregoing will explain how at the present time we must take our schedules. Next, as to the time of doing the works to prevent a money claim for dilapidations. They must be performed *during* the continuance of the lease. One point I would here mention, as it is intimately connected with this subject. It is, that fixtures *must* be removed during the tenancy, or continuance of the lease. It is so often that in a settlement the fixtures are made a set-off, to some extent, to the claim for dilapidations, that I find it wise to mention how the right to the fixtures may cease by effluxion of time. Now having, I think, considered how to take the dilapidations, how to meet your opponent, and what can be claimed, we come to an equally difficult subject, namely, *How to assess their value?* Here I think it would be an advantage if we could settle some standard of prices. What value is a broken (stone) front hearth? What value is the reinstatement of a bead to a sash? What price would you affix to taking down and rebuilding a chimney stack, or a wall out of the upright? Try to think of all that is necessary in the last-named matter, and then you will realise the difficulty of estimating the money value of this dilapidation. First, there will be the shoring up, then the taking down, then to estimate how many of the bricks can be reused. Next the new plate for the joists to rest on (or, better still, providing for the courses in cement); then in your schedule you must price the making good all cornices disturbed, all ceilings, and other work—of course the plastering inside of the new wall, the new skirting (to correspond with the rest of the skirting). When you have tried to honestly give all the quantities you will find the labour great for so small a matter. Still if we wish to be faithful in our vocation, we must spend the time necessary to complete the evidence. The deduction I draw from the foregoing is, that if some scale could be drawn up, with authority to give it proper weight, there can be no question that one great stumbling-block would be removed. I am confident that this will commend itself to all who have had experience in this subject. One has, at last, settled every point except pricing out. Here, at least, there should be little difficulty—a scale of prices should enable the surveyors quickly to settle the dispute. Is it so? No; almost more, certainly as much, trouble is discovered in fixing the price, as in determining what are the dilapidations. Next as to *waste*. Probably waste is even less understood than dilapidations. Shortly, it may be described as of two kinds—namely, voluntary and permissive. The former being defined as acts of commission; the latter as acts of omission. The definition is of little consequence to us, who have to deal with the money value of the subject, which is not regulated by the *kind* of waste. Here let me mention a curious decision which I am afraid will not commend itself to your judgment. It is—suffering houses to be uncovered, whereby the rafters or other timbers become rotten, is *waste*. But the bare suffering them to be uncovered without rotting the timbers is *not* waste. Again, it is not *waste*, if a house be uncovered when a tenant comes in, if he suffer it to fall down. I would here mention that altering premises is voluntary waste, and it is no defence to any action that may be brought, to say, and

even prove, that the alterations materially increased the value of the premises, not even if you substantiated your position by showing that in consideration of the alterations or improvements you have obtained from a substantial tenant a considerable advance of rent. Therefore most carefully guard your clients against altering any premises they may hold on lease until the assent of the freeholders be obtained. One item I would mention, as sometimes a claim is made for it, which cannot be sustained. Should a lessee omit to paint at one of the periods required by his lease, and at the next paint in a proper manner, the omission to paint at the earlier period is not a dilapidation, unless some special injury can be shown. Next, it must be remembered, that where the lessee does not repair properly during his lease, the lessor can claim rent for the time such repairs would take to do to satisfy the dilapidations. It is sometimes difficult to assess what that rent should be, but the surveyor will try to find some house in the same locality of a similar description. I should advise fixing a moderate value, as it would be more likely to obtain the assent of the jury. As to the form of reference it is too well-known by us to need my alluding to it. One difficulty many of us must have had to encounter—it is to assess the dilapidations where the tenant has held over for some time after the lease has expired. He holds on the same covenants as those in the lease, but they are regarded less stringently. It requires care to fairly determine the exact liability of such a tenant. I would point out an error that I have sometimes had to encounter. Some surveyors consider the notice to repair of the lessor illegal unless it contains a definite list of the repairs that are required of the lessee. This is not so. It would be quite sufficient if the notice merely contained these words—"I require you, within — months, to repair the premises you hold of me in a proper manner in all respects, in accordance with the covenants in the lease dated &c. No more need the lessor do, although it is a graceful act to give a detailed account, so that the lessee may know exactly what is required of him. The dispute may be referred to two surveyors and the umpire they may select, which is certainly the cheapest and most satisfactory method of settling the question. I will not tonight go into the method of conducting the Arbitration, as I have already trespassed on your patience, and in my recent paper on this subject read at the R. I. B. A.,* I tried to go most fully into that portion of our practice. In conclusion, I would say, I trust the suggestions I have made will bear fruit, and a more uniform method be the result.

DISCUSSION.

A VISITOR inquired whether the claims which Mr. Fletcher had referred to as having been made by certain noble freeholders could be actually sustained at law if a determined opposition were made? No doubt the facts were as Mr. Fletcher had stated, but the practice was most disreputable. He had always been under the impression that in order to prove a claim for dilapidations, the lessor must prove damage, but in the cases in question the noble freeholders had obviously sustained no damage.

Mr. LACY W. RIDGE, A.R.I.B.A., one of the surveyors of ecclesiastical dilapidations under the recent Act, on the invitation of the President, proceeded to point out wherein ecclesiastical differed from lay dilapidations. He remarked that the two subjects of ecclesiastical and lay dilapidations were so totally different, the principles on which they were assessed, and the whole of the circumstances of the case, were so utterly at variance, that the present was hardly a fit opportunity to go into the matter of ecclesiastical dilapidations at all. The two classes of dilapidations were much more easily described by their contrast than by their similarity. In lay dilapidations the question as between a leaseholder and tenant presupposed that there was an existing freeholder, who had freeholder's rights and duties, and that there was an existing tenant who had the right and duty of living on the premises. In ecclesiastical dilapidations there was a freeholder, but a freeholder only; but he had only a life interest in his freehold, and there was no tenant—the ecclesiastical holder of the benefice not being obliged to live on the premises. This probably arose from the fact that in days gone by it was a very common thing for the same man to hold con-

siderably more than one living; obviously he could not occupy all at once. The result had been that ecclesiastical dilapidations concerned far more the fabric of a building than lay dilapidations. If the fabric of an ordinary house tumbled down when let to a tenant, the landlord had to put it up again. If a parsonage-house or anything attached to any benefice tumbled down, there was no one to put it up again but the holder of the benefice for the time being, who was bound to re-erect the building in order that his successor might not sustain loss. Ecclesiastical dilapidations affected the fabric and stability of a building far more than the finishings and decorations, which latter, indeed, did not come in at all. The courts of law had held that an incumbent, not being obliged to live on the premises, was not bound to keep them in habitable repair in regard to anything in the nature of decoration. He was therefore not obliged to do internal painting, paperhanging, or whitewashing; but he was called upon to do external painting, whenever necessary, because it was considered he was bound to do that in order to keep the woodwork and ironwork from decay. On the same account, colouring or painting on cement work could not be claimed. There was no allowance for wear and tear in ecclesiastical dilapidations. The theory was that a house or premises, once built, had to be maintained as a new and perfect house for ever, and therefore any wear and tear that took place during the incumbency of any individual had to be made good either during his incumbency or at the end of it, and at the cost of the incumbent or his estate. Of course in practice such a requirement was somewhat ideal, as no man could make good (say) the amount of the thickness of floorboards that had worn away during a number of years that he had been incumbent. No such ideal view was taken, but the moment that a dilapidation had taken place—for instance, as soon as the floor was broken through—he would have to make it good; and whereas, in lay dilapidations, the tenant might satisfy the requirements of the law by patching the floor, if it was very generally worn the incumbent would have to put down a new floor, and he would have to make not only such repairs as would satisfy a life-tenant, or the tenure of years by an ordinary tenant, but such repairs as he, being the freeholder, ought to make—such repairs, moreover, as he would make if he were the freeholder for ever. The recent Act had done a good deal towards removing from the law some of the points which worked rather hardly upon incumbents. In lay dilapidations, if a man put up any additional buildings he had to keep them in repair as well as the older buildings, and under the existing law of ecclesiastical dilapidations, the incumbent had of course to keep in repair anything that he put up himself; and he had to keep up everything that was on the spot, and everything that had been on the spot within reasonable memory, although there was, Mr. Ridge believed, a statute of limitations in regard to the subject. Under the old Act, if it was shown that an old barn had been taken away by his predecessor, the existing incumbent was liable for its reinstatement, the theory of the law being that when he entered on the benefice it was his duty to ascertain if anything had been taken down, and if so, to proceed against his predecessor for the money entailed in its re-erection, and whether he recovered the money or not, he would nevertheless be liable for its re-erection. In the case of there being any useless buildings, formerly a very intricate process had to be gone through in order to obtain a faculty from the bishop for permission to remove them. This had been greatly simplified by the new Act. It was now also made more easy to throw the cost of repairs on the revenues of the benefice, through the medium of Queen Anne's Bounty. The great feature of the Act was, that a man putting his premises in repair during his incumbency to the satisfaction of the diocesan surveyor of dilapidations, obtained a certificate freeing him from all liability for repairs for a period of five years from the date of the certificate. This was a great advantage, as it enabled the holders of benefices to execute their repairs in their own way (subject of course to the approval of the surveyor), and often at much less cost than would otherwise be the case, and the holder or his estate was free from any further claim for dilapidations if he resigned or died during any period of five years covered by the certificate, except, of course, wilful waste. Mr. Ridge concluded by moving a vote of thanks to Mr. Banister Fletcher for his paper.

Mr. THOMAS BLASHILL, in seconding the motion, said that the paper was very instructive and interesting, but in one point he disagreed with Mr. Fletcher—viz., that of the possibility, suggested in the paper, of fixing a standard schedule of prices at which dilapidations ought to be executed. He (Mr. Blashill) could not see his way to the fixing of such a schedule of prices which would do equally well for the same articles of dilapidation under varied circumstances and in different localities. The rates at which dilapidations could be fairly priced in the City or the West End of London would differ from the rates at which they could be priced 8 or 9 miles out, or further still from London; so it would be impossible for a standard schedule to apply. It was the architect's business to settle the prices in each case, after taking due note of the various difficulties and modifying influences. Architects, he thought, ought to meet such difficulties boldly, and not seek to surmount them in the way suggested by Mr. Fletcher, for very often injustice would be done to the client.

Mr. JOHNSON asked what was the result of the case cited by Mr. Fletcher in his paper in regard to painting? Was the tenant bound to do the painting or not?

A MEMBER asked whether a ceiling, the key of which had been broken, and on which paper had been put to hold the plastering up, the paper being whitened over, would be deemed a dilapidation?

Mr. CLARKSON said that what particularly struck him during the reading of Mr. Fletcher's paper was a point which must have been constantly evident to all—namely, that the injustice, ill-feeling, and inconvenience continually experienced in connection with leasehold tenures would be done away with if the leases were better constructed. The fact was that lawyers had a form of lease, and used the same form over and over again, and in the majority of instances they roughly adapted this form to what they considered to be the circumstances of the case, with the result that very frequently nobody knew exactly what the clauses meant, and especially the repairing clauses, even at the time the thing was signed, and when their eccentric phraseology came to be interpreted, perhaps after a lapse of twenty years, their haziness became still more apparent. Mr. Fletcher was particular, in dealing with buildings which at the time of being leased were not in good condition, to show that it would be desirable that the condition of such buildings should be sufficiently definitely stated to enable the surveyor to easily ascertain what amount of money ought to be paid on account of dilapidations on the termination of the lease, so as to put the buildings in the condition in which they were when the lease was taken out. He thought that was only reasonable. Such defects as existed in a building or buildings at the time of the lease being granted should be definitely stated, in the same manner as schedules of fixtures were drawn up, and of course such defects were always to be recognised as not coming within the province of the tenant to make good, although, on the other hand, he should not necessarily be allowed to neglect them, if by proper means within the meaning of ordinary repairs he could prevent them becoming more dangerous to the structure of the building. As to the very odd way in which lawyers compiled leases stipulating that every possible kind of dilapidation should be repaired, he would remark that such minuteness was altogether wasted, especially when such obsolete or unheard-of terms as "wide-raft" &c., were introduced, as they generally were, for nobody knew what such terms meant. In the matter of the notice, the fact that the notice should be absolutely compulsory after a certain time had been given during which compliance with the terms of the schedule could be effected, if the forfeiture should occur necessarily because the tenant had neglected the repairs, never expecting that the landlord would pay any attention to the question of dilapidations, it seemed to be iniquitous. As to the Labourers' Dwellings Act, which Mr. Fletcher had incidentally alluded to in his paper, if the requirements of modern sanitary science rendered it necessary that the standard of the dwellings of the people should be raised, it was manifestly unjust that the leaseholders should lose the whole of whatever was lost in the matter. It was obvious that if any law of the kind was to be justly brought into operation, the freeholder should at least take his share of the cost of improving his property, especially as he would be the ultimate gainer by its improvement. He

* Reported in BUILDING NEWS for January 10 last, pp. 38 and 39.

(Mr. Clarkson) was inclined to endorse Mr. Blashill's remarks as to Mr. Fletcher's proposal for a schedule of prices for dilapidations. As to the fighting and squabbling which so often took place as to the meaning of repairing covenants in leases he was afraid it always would be so, so long as people were expected to understand the meaning of phrases; which the lawyers who used them could not construe.

Another member asked Mr. Ridge to whom, in ecclesiastical dilapidations, an incumbent was responsible for the execution of repairs, because, if a poor man, his ideas of what was essential to be done might differ considerably from the ideas of his successor. If any poor incumbent received preferment, or died, leaving the building in an unsatisfactory condition, and supposing that neither he nor his estate, if proceeded against, could defray the cost of putting the building in substantial repair, how would the new holder of the living be reimbursed under the existing Act?

Mr. RIDGE replied that under the old condition of things the incumbent was liable to keep his premises up to a certain standard of repair, which was quite "unwritten," but which was perfectly well understood. If he failed to do this, he or his estate was proceeded against for the amount, and if his successor failed to recover, well—so much the worse for him. Under the new state of things, almost exactly the same thing occurred, the only point being that the official surveyor was the party to whom, in the first instance, it was referred to settle what ought to be the state of repair. The other side had the right of appeal, and the bishop had to finally adjudicate. The new incumbent, if he failed to recover from his predecessor, could borrow the amount of the cost of repairs from Queen Anne's Bounty on the security of the living. In answer to a further question as to whether the surveyor of ecclesiastical dilapidations represented the bishop, Mr. Ridge said he did not think that was the case. The surveyor was nominated by the arch-deacon and rural deans for the approval of the bishop, and his reports were submitted to, and his action taken under the direction of, the bishop, but the surveyor really represented the lay owner or owners of the church property, whoever and whatever they might be.

The PRESIDENT remarked that the subject was a most important one, and a branch of practice that should not be by any means given up by the architectural profession. He had always maintained that the surveyor, as a practical man, was the proper man to deal with dilapidations, although it was to be regretted that the assessment of dilapidations was allowed to get very much into the hands of auctioneers, who really did not understand the subject, and consequently, were not able to look after their clients' interest in the way a surveyor could. The practical surveyor was a far better man to assess dilapidations than the man who merely had cognisance of valuations of house-property. Although very often the amount involved was comparatively trifling, yet in numerous instances the sum to be expended in making good dilapidations was very considerable. The reference of matters to an umpire was to be deprecated, except perhaps in rare instances, and there ought to be no difficulty in two upright and honourable men, representing different sides, coming to an amicable settlement. He should like to know whether the reinstatement of premises, which had been altered by the tenant, could be insisted upon before the termination of the lease. For purposes of business, buildings were very often materially altered without pulling the building about much, and if the tenant was obliged to reinstate the premises before the expiration of the lease, it would very often be a very serious thing, as the reinstatement of the premises would make them more or less useless to the tenant for the purposes of his business. And was it absolutely necessary that the repairs should be carried out within the time stated in the lease—i.e., within three calendar months? Leases were copied one from another, and were the same in their conditions whether a large or a small building. In large properties the lessee often let the property to sub-lessees, and when he had received notice to reinstate he would have to give notice to the sub-lessees to reinstate, and it was often impossible for them to comply in the time available. Was the lessee subject to an action for ejectment if the sub-lessees failed to execute their repairs within the prescribed time? He agreed with Mr. Blashill and Mr. Clarkson as to the difficulty of fixing a list of prices for the assessment of dilapidations. He did not know a more diffi-

cult thing than to assess dilapidations properly. He should like to know whether the lessee was liable for the carelessness of the sub-lessees? He was afraid that such was the case; but what power had the lessee to prevent injury to the premises by the tenants? He thought he could not demand admission to inspect the premises, whereas the freeholder of course could at any time go and view the premises and give his notices.

Another MEMBER asked whether, in renewing a broken brick floor which had been originally laid upon the earth and set in mud, the lessee would be bound to lay the new bricks on concrete and set them in mortar?

Professor KERR (who entered the room during the discussion), having been invited to speak on the subject, said that the question of dilapidations was one in which he had taken a good deal of interest, and it was a question upon which the administration of the law was so extremely uncertain that the amount of interest which prevailed throughout the country in respect of the valuation of dilapidations was greater than one would believe. He did not know whether in Mr. Fletcher's paper or in the discussion any allusion had been made to the new Bill of the Lord Chancellor for constituting a Supreme Court of Judicature. He was inclined to think that if that Bill passed into law, it would, though indirectly, it was true, effectually do away with a good deal of the inconvenience of what might be called "lawyers' assessments." The Bill expressly provided for the introduction into the Supreme Court of Judicature of that most important of all assessment, so far as the architectural profession was concerned, viz., that of lay assessors. The Court was to have the power of appointing permanent assessors—men of business, not lawyers—to whom would be referred all questions of fact, such as dilapidations. Without referring to the various descriptions of businesses or professions which would benefit by that provision, it would be quite enough to remark that surveyors' business would in all probability, for the future, be placed in the hands of surveyor-assessors. Regarding dilapidations as an abstract principle, there was this to be borne in mind: that that which lay at the root of the claim of the landlord against the tenant was that the tenant had covenanted to keep the premises in repair. Now the precise language in which that covenant was expressed was notably quite immaterial, because, as all surveyors knew perfectly well, neither landlord nor tenant ever pretended to understand it. (Laughter.) That was a grave fact, and one which lay at the bottom of all the disputes which occurred. The attorneys worded their leases in accordance with the forms which they found in their books, or according to previous leases, they themselves having no sort of adequate conception of what the various words meant, nor did they pretend to have any conception of their meaning; they were only concerned in taking care that there were as many of those words as possible—i.e., that the partitions, windows, sashes, pilasters, and so on should be stated at sufficient length, and therefore, to all appearance, with sufficient comprehensiveness. That, in the plainest possible speech, was all that the solicitor held himself responsible for. If he found in the draft of the lease that such obsolete terms as "wide-raft" were omitted, he had them inserted, all he cared for being to see that the words were inserted, as they were in old leases; and that was perfectly right on the part of the attorney, because he was responsible for omissions. What was it that the landlord and tenant really engaged to do? The landlord expected the tenant to use his property fairly and keep it up fairly. He knew no more, and he expected no more; and if the question were put to him by the tenant at the commencement of the tenancy he would say, "I expect you to do as I would do myself. I want you to use my house fairly and keep it up fairly." The tenant intended to do precisely the same thing, and if the landlord were at the commencement of the engagement to ask him, "What is it, now, that you really intend to do?" the answer would be in precisely similar words: "I shall use your house fairly, and I shall fairly keep it up." The Professor said he was of opinion that if such words as these were inserted in leases, they would do far more towards establishing—strange as the proposition might appear—a definite principle or basis upon which valuations for dilapidations could be assessed than all the words and terms introduced into leases at such great length. When the assessment of dilapidations was placed in the hands of

his surveyor by the landlord, the Professor said he was sorry and ashamed, for the credit of his profession, to have to say that in too many cases the landlord's surveyor—following the, in many cases, excellent rule of each man doing the best he could for himself or his client—considered himself retained to make the most exacting terms he could with the tenant. This practice was, he was ashamed to say, far too common, even amongst surveyors of high repute, and could not be too strongly condemned by all honourable men. He was told that at the present moment, on one of the largest estates in London, the surveyor was making most extraordinary demands; to sweep all the chimneys was an invariable demand, and also to cleanse all the drains, whether they wanted it or not, and no matter how recently they had been done. Anything more utterly at variance with the honour of the profession of architects and surveyors he could not conceive; for such demands were radically wrong, and utterly opposed to the spirit of the agreement which the landlord and tenant had come to between themselves as men of business. If Lord Selborne's Bill passed into law, the permanent surveyor-assessors would be men of distinction and eminence amongst architects and surveyors—men who had been accustomed to such business, and to whose honour could be safely referred all matters in dispute. Such surveyor-assessors would have it pretty much in their own hands to interpret the law equitably, especially if, as he supposed was to be the case, an attempt was to be made to fuse Law and Equity together. Let them try for a moment to understand what really was the intention of the honest engagement between landlord and tenant as meant to be expressed in the ordinary lease. A man took a property (say) for twenty-one years, and at the end of that period he must obviously leave the property so much older than he found it. This did not seem to be understood by a great many surveyors, but it was a proposition which had been repeatedly laid down in the courts of law, and one which was laid down again only a few months ago by Mr. Justice Blackburn, and to such good purpose that in respect of a certain old house the jury gave a verdict for the defendant—a thing which hardly ever occurred, because the lawyers' idea of dilapidations was that, however well a tenant might have repaired the premises, he was sure to have made a slip somewhere; that however independent of repair the premises might have been, there was certain to have been something which had been overlooked. Looking at the matter in the abstract—for the lawyer did not investigate the matter very closely—the lawyer said that there must always be dilapidations; but surveyors knew better: there was no necessity in any case for there being dilapidations. If the tenant kept up and used the property fairly, so as to have none of what was called "tear"—if he wore a property fairly and kept it up fairly, why should there be any dilapidations? There was one covenant which, under ordinary circumstances, it was extremely injudicious to make, both for landlord and tenant. Usually, the tenant covenanted to paint externally every three years, and internally every seven years. He who covenanted to do the latter was a great fool, and if any surveyor allowed his client to covenant so without protesting against it, he did very wrong. There was this difference between painting externally every three years and internally every seven years. (It should be borne in mind that the term "painting" as used in leases and in connection with dilapidations did not imply anything of a decorative nature; painting was simply a preservative of wood or iron, or whatever else it might be, from the oxidation of the atmosphere. Therefore a coating of paint or so many coatings of paint was simply the covering of a perishable surface with a comparatively imperishable and preservative material. That material was white lead, the oil was the vehicle, and if any colour was introduced into it, to the extent to which the pigment was introduced for the sake of decorative effect was the preservative coating tampered with; like many other things, directly ornamentation commenced, substantiality was lost.) External painting was the periodical coating of a perishable surface exposed to the atmosphere with a protective coating of white lead. Internal painting did not perish by oxidation to anything like the same extent, and besides, it was invariably more or less decorated, from graining and varnishing up to the extreme richness of decorative art. While, therefore, a man covenanting to

paint his premises externally once in three years was merely covenanting to protect perishable materials from the action of the weather, if he covenanted to paint internally every seven years, he covenanted to do what was really unnecessary, for woodwork left entirely unpainted indoors would not suffer in the least, and indeed, up to a comparatively recent time, internal woodwork was usually left unpainted. The tenant usually covenanted to paint the external wood or iron-work once in every three years with so many coats of paint. Was that always enforced? Certainly not; if enforced rigidly and strictly it would soon produce a revolution in leases, and people would decline to take houses on lease at all. In the country, where the atmosphere was purer than in London, external painting would stand good for several years, and internal painting would last for twenty or thirty years. With regard to the external painting, the surveyor for the landlord, at the expiration of the lease, had to determine whether or not the property had been painted within the three years. But with regard to internal painting; supposing a man took a valuable property at the West-end and covenanted to put the place in perfect decorative repair, and covenanted to paint all internal woodwork once in every seven years; if that were strictly interpreted, the immediate result would be that the graining, varnishing, and other decorative work, would be painted over in plain oil colours and obliterated, to the landlord's loss. In all such cases, the landlord's and tenant's surveyors had to bargain for a compromise of the matter. He was not given to say much in favour of lawyers, but one thing he could say for them, viz., that they were not prone to create disputes about dilapidations, and that when they did occur, it was the surveyors who must take all the blame. The lawyers knew very well that there was nothing, except perhaps an action for ejectment, which it was so difficult to conduct to a successful issue as an action for dilapidations, because the judges could never be got to take the strict view of the covenants which an extreme surveyor in the landlord's interest might be inclined to ask for. Lawyers must not, therefore, be blamed for disputes about dilapidations. What ought a landlord's surveyor to do? The Professor contended that he ought to assess the repairs requisite to the property upon the simple basis he had laid down, and so that the property should be left in such a condition as it would have been if fairly used and kept up. Anything more than that he ought, if possible, to ignore. If the surveyors on both sides would act upon this basis, they would find the lawyers ready to settle. If, as he had stated, the provisions of the new Bill of the Lord Chancellor were carried into effect, it would be a most important alteration in the administration of the law in this particular matter, because there would then be an end of arbitrations. When a dispute got into court, it would, as a matter of course, go to the assessors, instead of an attempt being made to settle it in the ordinary haphazard manner of surveyors' references. The discreditable way of choosing an umpire by each arbitrator writing the names of proposed umpires on pieces of paper, and then drawing them from a hat, would be done away with, and not before it was time, for the arbitrators might just as well toss up for umpire. The proposed lay assessors would be continually exposed to public criticism, and constantly liable to have their decisions revised. These considerations would compel a conscientious discharge of their duties, and though they might make some mistakes at first—as judges new to the bench frequently did—still they would learn by experience to avoid such mistakes, and after a time would become of the most essential service.

The Chairman, in putting the motion to the meeting, expressed the indebtedness of the Association and of the younger members of the profession generally to Mr. Banister Fletcher, not only for his paper on that occasion, but for his very able and instructive articles in the *BUILDING NEWS* on "Dilapidations" and "Quantities." The preparation of such articles must entail the expenditure of much time and trouble; but he was sure that the articles in question would be of great benefit, especially to the younger men in the profession. The motion having been carried by acclamation,

Mr. BANISTER FLETCHER, in reply, said that as to the question whether the claim under the old lease could be sustained, although a new lease had been granted, the answer was clearly yes. The granting of a new lease for the same premises did

not in any way affect the covenants of the old lease. He quite agreed that morally this was wrong, but legally it was correct. As to his proposal for fixing a schedule of prices for dilapidations, he had not heard anything which tended to show that it was impossible. It had been objected that one set of prices would not do equally well for all districts, but it was also true that other work could not be executed in all districts at the same prices, and yet there were builders' price-books published. True it was that by constant practice the architect got to be independent of such aids, or almost so, and, indeed, no one ever thought of being bound by the statements of any price-book, which were of value simply as an approximation to what was needed. If it were possible, then, to have compiled a series of tables showing the approximate prices of new works, it was just as easily possible to publish approximate prices at which various kinds of dilapidations could be executed, leaving it to the judgment and experience of the surveyor to modify or alter such prices as he saw fit. Such a book would be very useful for placing in the hands of a surveyor on the opposite side, who perhaps had no idea of the price at which dilapidations ought to be assessed, and would save no end of trouble and misunderstanding. He should like to ask Mr. Ridge whether the certificate given by the ecclesiastical surveyor exempted the incumbent for a period of five years from any liability for repair except wilful waste, and whether, if the house tumbled down during the period of five years, the incumbent would be exempt?

Mr. RINGE said that the certificate gave such exemption, and although it might be very discreditable to the surveyor if the house did come down, the incumbent was not liable unless it could be proved that he had contributed to the disaster.

Mr. FLETCHER, in continuation, said that a ceiling held up by paper was most certainly a dilapidation. He concurred very much with nearly all that Mr. Clarkson had said, especially with regard to the manner in which leases were usually drawn up, and he thought it would be very desirable if a schedule of the exact state of the premises at the time of the granting of the lease could be appended to the schedule of fixtures. With regard to the President's questions, as to whether the dilapidations should be made good before the expiry of the three months' notice, and whether the lessee was liable to an action for ejectment in the event of the sub-lessees failing to comply with the notice, there was no question that that would be so. A remedy for this could easily be found on the basis of the recent alteration in the insurance clause. Formerly, when the insurance was dropped, although accidentally or by mischance, the lease became absolutely forfeited, and there was no remedy. Two or three years ago an alteration was made to remedy this hardship. He quite agreed with all that had been said as to the failure of justice which often resulted from barristers' references. With regard to the Labourers' Dwellings Act, there was no doubt that it entailed considerable hardship upon the lessee, and it would be very desirable if a good strong agitation could be got up for remedying the evil. In any case, the freeholder ought to bear some proportion of the cost of applying such an arbitrary Act. Admitting that sanitary improvement was desirable, the freeholder ought to bear his share of its introduction, especially as he would be the ultimate gainer and would reap almost the entire benefit. He heartily concurred with the President's remarks as to the incapability of auctioneers to deal with the subject of dilapidations; as a rule, auctioneers had not the remotest knowledge of the subject. As to the President's question about reinstatements, they would certainly have to be effected before the expiration of the lease, unless the consent of the lessor had been obtained for the alterations to be made—then, no reinstatement was necessary. On the other hand, were the premises altered without the consent of the lessor, the lease would be forfeited. The enormous power which was vested in the hands of landlords and lessors was hardly credible, and the only reason that such powers existed was that they were not exercised except occasionally by exceptionally "sharp" people. A lessor could only proceed against the lessee, or "his administrators, executors, and assigns," and not against a sub-tenant. He agreed with Professor Kerr, that if the Lord Chancellor's Bill passed in its integrity, it would operate most advantageously to the profession. He could not say that he had often met with unprincipled surveyors, although he had had many years' expe-

rience. Of course each surveyor felt bound to do the best he could for his client, but he thought it was rare for a surveyor to make exacting terms regardless of any one but his own client. The Professor had very fairly stated that no surveyor would advise his client to take a lease in which the "painting externally every seven years" clause appeared; but in point of fact nearly every lease contained the clause, and there was no prospect of any alteration so long as the lawyers, who drew up the leases, entertained their present notions as to what was necessary in the wording of a lease.

The meeting then terminated.

ON THE FIGURE-SCULPTURE IN THE ARCHITECTURAL MUSEUM.

LECTURE III.—ITALIAN AND LATE NORTHERN. SCULPTURE OF THE MIDDLE AGES.

MR. J. F. REDFERN delivered the third and concluding lecture of this course at the Architectural Museum on the 8th ult. The author remarked that although he was only able to bring his last lecture (On Early Mediæval Sculpture) to the end of the twelfth century, there consequently remaining the productions of nearly another century which strictly belonged to early work, yet, in commencing the present lecture with the thirteenth century he started with a period when the whole life of the western nations was being changed by the great Crusades, and when sculpture, like most other things, was throwing off the darkness in which superstition and severe monastic discipline had enveloped the preceding age. The contact of the west with the east, caused by the Crusades, wrought several great results beneficial to the West. The civilisation of the Mussulman and the Greek opened up to the gaze of the Crusaders a state, of refinement of which, in their half-barbarous state they had no previous knowledge, and the peculiarities of foreign national life becoming familiar, a host of prejudices were swept away. Utterance was first given to this enfranchisement of the mind in the lays of the Troubadours, and it was perhaps the stirring poetry of these wandering minstrels which, more than anything else, was the immediate cause of the new vigour which became infused into the plastic arts of the thirteenth century. As from the heroic songs of Homer sprang the great achievements of Classic art, so, from the chant of the Provencal knights was first breathed the life of that Mediæval art which alone had been worthy to compare with the great time of Phidias. Since the best days of Greek art, never had sculpture and architecture so genuinely and harmoniously combined as we saw them in the works of the Early Gothic period. Both pursued by the same artist, an order and balance existed of the happiest effect. The old confusion of the Byzantine and Romanesque, where sculpture was pressed into use in the most crowded and haphazard way, had quite disappeared, and in portals and porches, and on façades and buttresses, was seen everywhere apparent that well-ordered arrangement, that intelligible scheme of decoration, which could be read like a book, and was a grand, symbolical, and historical hymn of praise, so to speak, wherein was displayed the whole wisdom and faith of the day. The central idea of these grand schemes was generally formed by the stories of the Redemption and Fall of Man. No longer was the figure of Our Lord found seated, enthroned, and simply surrounded with the emblems of the Evangelists; but angels, prophets, patriarchs, apostles, and saints, each in their order, stood round the "Majesty," which occupied the most worthy place on the fabric. In other positions the relation the Virgin had to the Redemption found expression, and with this, scenes and figures from the Old Testament were typically combined; while, in more subordinate positions, local saints or worthies were represented, and by reliefs well-placed the Last Judgment was depicted. Lastly, there were often added scenes from the natural and intellectual life of man, his amusements, and his labours; the productions of the seasons and the courses of the heavenly bodies; and strangely mixed with all this true expression of reverence and the religious mysteries, were found the oddest displays of humour, with caricatures which sometimes sank to the absolutely gross, but yet combining with the whole scheme, in a way we

* Lectures I. and II. were reported and illustrated in the *BUILDING NEWS* for March 14 and March 28, and this week we illustrate some of the works mentioned in the third and last lecture of this series.

could scarcely comprehend now, to form one grand *Te Deum*, or at any rate, to point out that everything should be done to the glory of God. Before further considering the great schemes of sculpture, Mr. Redfern said a few words as to the grotesques, remarking that the modern mind could not but condemn them for overstepping the limits of decency, as they often did, and condemned they had been most severely. On the other hand, they had found apologists. It had been said that the ascetic mind invented them to test the resistance of the flesh—to tempt temptation, as it were. Then, again, they had been likened to the objectionable language in Shakespeare, as quite belonging to the time, and which must be tolerated in consequence. The first theory Mr. Redfern did not believe was correct at all; the second was nearer the truth. The lively imaginations of the Northern races, now nearly freed from the goblin-creating superstitions of the previous age, not only sought expression in the songs of the troubadour, or in strictly religious art, but overflowed in wit and humour. Many of these grotesques were simply and solely intended for æsthetic ornament, whether they were found on console, capital, gargoyle, miserere, or elsewhere. Many excellent examples of these grotesques were to be found in the museum. Although the first evidences of the new style were perhaps seen at the Cathedral of Laon (1210), and although perhaps the most important of the earliest Gothic work was the decoration of the portals of the façade at Notre Dame at Paris, yet it was at Chartres (see Fig. 1.) that the transition from the earlier severe style to the freedom of the Gothic was perceptibly to be traced. There, in the sculpture of the transept gables, it could be followed step by step. At first the figures were constrained and solemn; the draperies, hitherto formal, with perfectly straight, or parallel shallow folds, become varied with rich curves; the heads heavy and the hair hard and stiff, were altered by the endeavour to get individual expression into them; but the effort still left them somewhat sharp and cold. Afterwards the columnar uprightness of the statues was considerably got rid of, and a more natural and varied outline was sought for; and lastly the heads, which drooped heavily forward in the earliest specimens, were now placed naturally on the shoulders. But it was at Ste. Chapelle in Paris, and at Wells Cathedral in our own country, where we first met with the style in its complete development. Every trace of the rudeness of the earlier styles had vanished in the statues of the Apostles and angels in the interior of S. Chapelle, and for the first time in Mediæval art we found religious dignity blended with the grace of nature, for now had been rediscovered and again adopted that graceful and easy line of the figure which in the antique had been used with such beautiful results, but which from the Byzantine period till the middle of the thirteenth century had been quite lost. This line was of great importance to all art, but in none perhaps was it so much a characteristic as in Mediæval art, where at first it was used with the most delicate artistic taste, but which in the decline of Gothic art degenerated into the most exaggerated mannerism and theatrical attitudinising. At Wells this swing of the figure was less apparent than in the S. Chapelle, but the other characteristics of the Gothic were here fully ripened. In the grand colossal statues of the kings and queens something of the severity of the Romanesque seemed purposely retained, as in keeping with the regal dignity required. (See Fig. 3). On the other hand, in the seated colossal figures of the bishops, and in other representations, the draperies fell in grand, deeply-cut, and flowing folds, while the heads had assumed a type of nobleness and power that could not be found in any other works of the period. In not a few of the figures there was also the naïve feeling and delicacy so charming in the works at the Ste. Chapelle. Englishmen ought to be proud of this great work, for it was not only one of the most complete of those grand schemes of sculptured decoration which had been before alluded to, and which had been said by Flaxman to embrace the noblest, most useful, and interesting subjects possible to be chosen; but it was the work of Englishmen at a time when Cimabue, the restorer of painting in Italy, was in his infancy, and when, in that country too, Nicolo Pisano had scarcely commenced his labours of reviving Italian sculpture. Among the 600 figures in relief, and the statues that covered the west front of Wells Cathedral, there were some that would not

disgrace the sculpture of any time. Having given at some length an enumeration of the varied subjects of this magnificent scheme of sculptured decoration, Mr. Redfern remarked that the grand attitudes of the colossal seated kings, so far removed from the eye, were well worth attention; particularly as the architecture of the present time was attaining to loftier proportions every day. We found in their foreshortening, proportion, and general treatment, an effect the most admirable for figures placed in a lofty position. We remembered the competition between Phidias and Alcamenes, with the result that the works of the latter appeared best in the studio, and those of the former carried off the palm when placed in their destined and exalted place in the temple. The short thigh of the great statue of Theseus was an evidence of the knowledge of the great Greek master in this respect; and the seated statues at Wells proved that another secret of the success of the prince of Greek art had been discovered by the sculptors of the thirteenth century. But in Gothic figures the means to attain this right effect in works highly placed were not identical with those used by the Greeks, but were these:—The head was placed well back (Fig. 2), the shoulders brought forward, and the chin kept in: the body was made long, the thighs very short and sloping. Mr. Redfern was here speaking of seated figures; but, with the exception of lengthening the body and shortening the thighs, this treatment equally applied to erect figures (see Fig. 2). The legs, when standing, were not allowed to show the joints of the knees prominently; but while the position of the limb was indicated, the necessity of pressing back the knees did not admit of the form being plainly shown through the drapery. All this was matter of proportion, and did not affect the treatment of detail or the line of drapery a wit: and so valuable was it to Gothic art, that, with scarcely a modification, it was retained to the end of the chapter, bearing with success all the variations of style, both of expression and drapery, which marked Gothic sculpture to its decline. It was not only adopted in figures placed far from the eye, but afterwards in those intended to be seen closely. The working of the detail of the statues at Wells—as, indeed, in all Early Gothic productions—was the same in figures placed 70ft. from the point of sight as those at 7ft. and was done with the greatest care and precision. The coarse execution of the large late fourteenth-century figures, an example of which we have in the Apostles on the Wells west front, contrasted strangely with the fineness of the early work of the rest of the statues. The drapery bore a remarkable likeness to that of Greek work, both in its fine flowing circular lines following the form of the limbs, and in the ribbed and gouged treatment of the thin folds, the costume of the period, which was still the same as that introduced by the Romans, yet further helping this affinity to the classic. In fact, in so many respects did these two periods of the plastic arts resemble each other, that we found the point of difference reduced to just this: that while the Greek artist portrayed the beautiful of the outward nature, the Gothic strove to exhibit the inner nature of man, and so in the latter art, more results were asked for from art feeling than from art knowledge. As far as figure sculpture was concerned, it is perhaps at Rheims, which belongs to the latter end of the thirteenth century, where the early Gothic style is brought to perfection. The dignity and grace here attained are truly marvellous, and the extent to which sculpture is used makes the architecture almost lost. In the fourteenth century the treatment of the drapery was entirely new. Now the thin circular fold quite disappeared, and in the first half of the century assumed a character more like natural drapery than any ever produced. If it were not for the grand conventional lines adopted and rigidly adhered to, this drapery would have sunk at once to the mere copying of nature, and when at the end of the century the pursuit of that crumpled kind of fold demanded the neglect of these great leading lines, drapery soon became little else than confusion. The fundamental line of a Gothic figure now came to be made up of two curves, and was adaptable both to the sitting (see Figs. 6 and 6a) and to the standing figure (see Figs. 4, 4a, and 4b). It had only this variety, that when the top curve was not carried through the head, the lower one was made to be so (see Figs. 5 and 5a). It was marvellous how rigidly this prevailing line was adhered to, and with what skill it was made the basis of the most varied

and beautiful drapery that was ever produced. Its origin, Mr. Redfern thought, was from that binding fold between the knees which was noticed in Romanesque work. In the Early Gothic it dropped from the knee in a diagonal straight line towards the other foot (see Fig. 3). The later Gothic had it sweeping from the knee to the ground in the manner shown in Figs. 6a and 7. When the garment was thus thrown on the knees, its upper leading line, if a cloak and fastened at the shoulders, would pass under one arm, across the lower part of the body till it met the leading line of the knee drapery. The higher curve, both in the sitting and standing figure, was usually made by the margin of the garment, while the lower was formed by a thick rolling fold. It was of the utmost importance that the student should well regard this characteristic, for it was essentially the very backbone of a Gothic figure. Towards the latter end of the fourteenth century, English sculpture began to take that broad, exaggerated, and angular style, that afterwards debased the plastic arts to so low an ebb; but that there was good in this style was proved by the fact that the great reformers of Germany, with whom we connected the name of Albrecht Dürer, based their new efforts upon it (see Fig. 7). It had its origin in the change of costume that both on the Continent and with us had assumed the most fantastic and even grotesque form.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

ARCHÆOLOGICAL DISCOVERY IN FRANCE.—The *Impartial du Loire* states that the Comte de Vernon, a member of the Orléanais Archæological Society, has recently made a most remarkable discovery in the Church of Notre Dame de Cléry. At a depth of more than two feet under the pavement on the south side of the nave, not far distant from the tomb of Louis XI., the Comte found a small tomb, in which was a leaden box carefully soldered. In the middle of the nave, and at the same depth, a small leaden coffin was found, containing a woollen cloth, in which the body of a newly-born infant had been enveloped. Although there was no inscription upon the coffin, there is every reason to believe that it contained the remains of the infant child of Louis XI., interred near his father. The leaden box was afterwards opened in the presence of several members of the Archæological Society, when it was found to contain a human heart, wrapped in woollen cloth. The metal had become so rusted that it was difficult to discover any inscription, but after a careful investigation the Comte de Vernon deciphered the following, written in characters of the 15th century, "*C'est le cuer du Roy Charles huitième, 1498.*"

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting on the 26th ult., Mr. H. Syer Cuming, V.P., in the chair, Mr. E. Roberts exhibited some specimens of earthenware and glass of the fourteenth century, and of Roman antiquities in metal, as well as a series of jugs and jars with and without handles, mostly of the Bellarmine or Gray-beard type. Mr. W. H. Cope produced a specimen of a pilgrim's bottle, supposed to have belonged to the Leining family, about twelve inches high, of German stoneware, ornamented with floral designs in relief and in two colours, having coats of arms on each side. Mr. W. Henfray exhibited a small hexagonal bronze seal, with a figure of S. Catherine impressed thereon, with the legend, "*Sancta Catherina;*" and some further specimens of Roman articles of domestic use were produced from the collection of the late Mr. J. W. Baily. Mr. G. R. Weight read a communication "*On the York Stairs,*" once the water-gate of the famous York House. The object of this paper was to urge upon the Association the necessity of calling upon the Metropolitan Board of Works to rescue the gate from its present decaying and forlorn condition. It was agreed to refer the matter to the Council to bring the subject immediately before the notice of the Metropolitan Board of Works. The Chairman read a paper "*On Sundials or Solaria in and around the Metropolis.*"

ROYAL ARCHÆOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.—At the monthly meeting on Friday, the Rev. J. Leo-Warner read "*Remarks on a Charter of Cuthwulf, Bishop of Hereford, of the time of Berhtwulf, King of the Mercians.*" Mr. G. M. Atkinson followed with "*Notes on Photographs of Objects found in a Mithric Chamber under the Church of San Clementi,*

Rome." The Rev. J. F. Russell exhibited a very rare book, showing Protestant "emblems" of the latter part of the seventeenth century. Mr. Nightingale also contributed a finely-carved ivory tablet of the Virgin and Child—late fourteenth century—a leaf of a diptych. Mr. J. E. Lee, of Torquay, exhibited a cast of a handle of a brazen sickle, lately found in one of the "Lake dwellings" in Switzerland, and which was the first that had been found. The original was of yew. Mr. Golding sent copies of drawings of wall paintings in several churches in Suffolk. Mr. Fortnum contributed a remarkable gold ring, of late seventeenth century work, having the bezel set on a swivel, showing on one side a coat of arms, on the other a skull, with the legend "Memento Mori."

TUMULI ON THE YORKSHIRE WOLDS.—On Saturday last, Canon Greenwell, of Durham Cathedral, and Professor Rolleston, of Oxford, completed a series of very interesting excavations among the ancient barrows which exist in the Goodmanham and Elton Wolds, near Beverley. The group consists of 31 tumuli, and in 1851 some half-a-dozen of these were opened by Lord Londesborough, when some bodies were found, associated with urns of very ancient date. In 1866 Canon Greenwell opened six others, the result of which was that he found a very large number of burnt bones, with urns, and one unburnt body in a deep grave. During his present excavations, some eight or ten tumuli have been opened, and some very interesting remains have been discovered, including an urn which has the very rare addition of a cover or lid to it. The body found in this grave was that of a young man, about 25 years of age, the skull being of the round-headed type and in excellent preservation. The remains of two young girls were also discovered in a shallow grave on the farm of Mr. Edmond Riley, of Kiplingcotes, and that of a woman in a mound in the old racecourse, the latter being about one foot under the natural surface. There is a singular absence in these barrows of the implements used in those remote ages, and so frequently found with human remains in many parts of the country. Not only in the present excavations, but in those formerly instituted by Lord Londesborough, implements usually associated with ancient interments are entirely wanting. Contrary also to the generality of the barrows found on the wolds, which contain chiefly unburnt remains, in this locality they are for the most part burnt. Although this part of the country seems to have been extensively peopled, as these sepulchral remains betoken, there is a singular absence of implements, whereas in the north and middle wolds flint implements are found scattered about in all directions. Stone axes and other rude implements are abundant in the rest of the wold district, but they seem to have been entirely unknown in this locality, as many persons have searched for such remains without result.

Building Intelligence.

CHURCHES AND CHAPELS.

CHESTER DIOCESAN CHURCH-BUILDING SOCIETY.—The annual meeting of this Society was held on Thursday week, under the presidency of the Bishop of Chester. Total contributions from all sources during the year, £668. 0s. 9d., as compared with £523. 2s. 8d. in the previous year. The committee had granted £25 towards a free church enlargement at Cheadle Hulme; £155 for the erection of a church at Gee Cross, Compstall; £350 towards the erection of a free church at Wigan; and the second of the Society's temporary mission churches, at a cost of £900, had been opened in the district of S. George, Everton. The report was adopted, and the officers and committee for the ensuing year were appointed.

DUNFERMLINE.—A new (Roman) Catholic School-Chapel was opened on Mid-Lent Sunday. The chapel accommodates 300 persons. The building is sixty feet long by twenty-five wide; the chancel is separated from the body of the chapel by a stone arch, having on one side an entrance to the sacristy, and on the other to the dwelling-house above, which is to be occupied by the priests in the meantime. The style is Early English Gothic, and Mr. Thomas Frame, of Alloa is the architect.

RIPON DIOCESAN CHURCH BUILDING SOCIETY.—The annual meeting of this Society was held on Friday last. The registrar presented the

account for the past year, showing surplus of about £980. The Central Committee determined to raise its scale of grants in respect of new churches, and increase of church accommodation, from 19s. per sitting to 15s. per sitting. The following grants were then made:—*New Churches.*—At S. Catherine's Sandal Magna, to contain 315 sittings, at a cost of £1,545, £236; and at Wrenthorpe, in the parish of Alverthorpe, to contain 280 sittings, at a cost of £1,385, £210; at Green Hammerton, in the parish of Whitley, to contain 120 sittings, at a cost of £2,000, £90; to S. Mark's, Manningham, to contain 780 sittings, at a cost of £8,600, £500. Applications were made for second grants to the new churches at Armley Hall and Beeston-hill, in the parish of Leeds, and grants of £75 were made to each. An application from Upper Armley for aid towards paying off a debt of £1,006, remaining due on the church recently erected and consecrated there, was considered, and £100 was granted. An application for a grant towards the erection of a mission chapel at North Bierley was declined, as not being within the rules of the society. The application from Green Hammerton was referred to the Deanery Committee to be properly filled up. An application for the erection of a church at the Town End, Morley, was declined, as the plans were not approved by the diocesan architect. *Increase of Church Accommodation.*—At Almondbury, by 124 sittings, at a cost of £4,500, £63; at Armley, by 298 sittings, gained by rebuilding the church, at a cost of £615,000, £224; at Buslingthorpe, by 136 sittings, at cost of £350, £102; at Longwood, by 154 sittings, gained by rebuilding the church, at a cost of £4,500, £108; at Marsden, by 200 sittings, gained by rebuilding the church, at a cost of £8,900, £165; at Marton-cum-Grafton, by 42 sittings, gained by rebuilding the church, at a cost of £2,520, £34 10s.; and at West End, or Thruscross, by 27 sittings, gained by partial rebuilding, £21. 10s. An application for a second grant towards increasing the accommodation in Great Horton Church was declined. *Towards the erection, purchase, and improvement of parsonage, houses.*—At Upper Armley, at a cost of £1,703, £100; at High Bentham (S. Margaret's), purchase, at a cost of £1,500, £100; for Holy Trinity, Bingley, at a cost of £2,000 and the site, £100; at Dawley-with-Dowbiggin, at a cost of £1,000, £30; at Hartshead-cum-Clifton (improvement), at a cost of £250, £50; for S. Silas, Hunslet, at a cost of £690, a second grant of £50; at Newsome, at a cost of £1,500, £100; at Penistone (enlargement), at a cost of £300, £20; and at Thurstonland, at a cost of £1,500, a second grant of £40; at Haworth, (enlargement), at a cost of £750, £30; at S. Thomas's, Batley, at a cost of £1,900, £50. An application for a grant towards a new parsonage at Luddenden-foot was declined, as the plans were not approved by the diocesan architect. An application for a grant towards the enlargement of Nun Monkton Parsonage was declined.

BUILDINGS.

KNUTSFORD.—The erection of the new college of S. Paul, Knutsford, will shortly be commenced. The main building is arranged on the quadrangular collegiate plan, the principal facade having a length of 400 feet, with two flanks or wings projecting 75 feet; that on the south containing the senior warden's residence, with spacious reception rooms and reference library; that on the north the residence for the junior warden and resident masters. In the centre of the principal front rises a tower of simple and dignified proportions, 24 feet square at the base, and of a height of upwards of 200 feet, which serves as a carriage entrance, and at the same time gives access to the quadrangle. The building is designed to accommodate 500 students, 24 junior masters, and a senior and junior warden, with the necessary servants. The style of the buildings is that of the Late Middle Pointed Gothic. The external walls and those of the cloisters, dining-hall, staircase, and library will be faced with deep red bricks made in the vicinity, and pointed with black mortar, the surfaces being relieved by a sparing use of stone and black bricks, and with traceried panelling, bosses, labels, and devices cast in red brick earth. The whole of the exposed woodwork is stained and varnished, and the roof will be covered with dun-coloured tiles. This portion of the building is from the designs of Messrs. Pennington and Bridgen, of Manchester. The chapel, designed by Messrs. Goldie and Child, of London, will be connected with the main building by a cloister, 100 feet long, and is of large dimensions, being 175 feet in length by a width across

the transepts of 95 feet. The form is that of a Latin cross, of which the head forms the sacrum, terminating in a polygonal apse; while the choir or chapel proper forms the stem, with a western ante-chapel, and the transepts, or arms, accommodate the visitors and servants. The style of the structure is what is known as Geometrical Gothic. Externally the gable of the chancel will be crowned by a lofty belfry of stone and brick, flanked at the junction of the chancel and transepts by two turrets, the whole forming a picturesque pyramidal group rising to the height of 120 feet. In the interior the chancel arch will be of great depth and massiveness, in order to support the turret. To harmonise generally with the college buildings, red brick is to be used in the construction, but inasmuch as the chapel is a separate and distinct building, a less sparing use of stone is made than in the secular buildings.

SCHOOLS.

EVERTON.—The foundation stone was laid last week of a new Mission Room and Schools in Everton, Liverpool. Accommodation will be provided for about 300 boys, 200 girls, and 200 infants. The style of architecture will be Gothic, of an unpretentious character, and the principal gable will be surmounted by a bell-cote. The cost of the building will be a little over £2,000, in addition to £1,100 which has been paid for the land. The architects are Messrs. T. D. Barry and Sons, of Church-street, and the builder is Mr. Hugh Dyer, of Low-hill.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.

To OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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Correspondence.

ANCIENT ROME AT THE INSTITUTE.

To the Editor of the BUILDING NEWS.

SIR,—From the discussion which usually follows the papers read at the Royal Institute of British Architects, as from papers themselves, much useful information is to be gained, and it is sometimes very amusing to the audience to notice the remarkable aptness with which the various speakers wander from the subject under discussion; but I do not know of any instance where this appeared

so marked as in the observations made by the members after the very brief paper on the "Architecture of Ancient Rome," which was to have been read by the octogenarian architect, Mr. G. L. Taylor, but who, from an unfortunate illness, was prevented from attending the meeting.

One may assume that the speeches at the Institute are not made (as was admitted some time ago, by one of its then leading members, as those at the Architectural Association were sometimes made) for the purpose of acquiring lessons in elocution; but as far as the majority of the speeches were related to the subject under discussion this evening, such purpose might have been that in view. Two or three speakers waxed eloquent on the subject of Mr. Taylor's operations and labours as a devoted architect—very proper and truthful remarks. But what had they to do with the architecture of ancient Rome? The meeting was not convened for a biographical sketch of Mr. Taylor. Mr. L'Anson, Mr. Hayward, and a gentleman who had worked with Mr. Taylor, did certainly speak to the point, but the whole of the annoying divergence was crowned by Professor Kerr. Professor Kerr is looked to by the members to say something after every paper, and he does so, often with advantage to his hearers. To-night he had before him diagrams and paintings of ancient Rome, and the whole of his speech was nothing more nor less than one on political economy. The parsimony of the present Government is by no means unknown, neither is it connected with the architecture of ancient Rome. That ratepayers have objections to contribute towards lavish expenditure on public buildings is not an original idea of the Professors.

Nor do I trace its connection with the originators of the round arch. The Professor's was not the maiden speech of a young architect, whose nervousness might be the excuse for exposing, floating through his imagination, indistinct visions of 5 per cent. Why, with such a magnificent opportunity for expressing his thoughts on Classic architecture, did he continually revert to "filthy lucre?" With Mr. Seddon opposite to him, and with the sympathy generated by the drawings on the walls, he might have made such a decisive onslaught on Mediæval architecture, that its supporters would never have recovered from the attack, and we should have had—instead of the vile Christian architecture—Trajan columns, Arches of Constantine, and Arches of Titus, meeting us at all points; but to be serious, and with no desire to be hypercritical, I do think it to be lamented that with such an interesting and useful subject before them, the members should have so wandered therefrom, that the practical lessons gained may be represented by the word "nil."—I am, Sir, &c.,

April 7th, 1873.

A LOOKER ON.

MASONRY.

SIR,—As the author of the paper on "Masonry," to portions of which your correspondent "T. W." takes exception, I have to ask you to be good enough to afford me space for a few words in reply. I may say, then, that while quite agreeing with "T. W." in the belief that nothing but accurate information should be brought forward, I submit that in those points at which we are at issue the accurate information is rather to be found in the paper than in your correspondent's criticisms upon it. The earlier part of these criticisms call for no remark, as they do but supplement the portion of the paper to which they refer; but with regard to the terms "headers and stretchers," even if they are in "T. W.'s" opinion "unmasonic," they are at least more concise and less cumbersome than "bond stones and stretching stones."

The two principal charges of inaccuracy are brought against the use of the terms "block in course" and "coursed rubble" masonry. In respect to the first of these, to say that "there is 'blocking course,' the course that finishes a parapet or chimney," is not to prove that there is not "block in course," as applied to a particular description of walling. Again, as to the second, your correspondent says there is no such thing as "coursed rubble." I can only say in reply, that I am surprised to hear it; for while, on the one hand, all the professional men to whom I have spoken about it agree with me in saying it is as common a term as any in masonry, on the other hand, in the books on the subject to which I have had access "coursed rubble" is described, as well as "common or random rubble." It seems that

the only real difference is that "block in course" is sometimes called "blocked coursed," while "coursed rubble" is in some localities known as "snick walling."—I am, Sir, &c.,

CHARLES H. REW.

WAGES IN THE BUILDING TRADE.

SIR,—In the article on the above subject of the 4th inst., there is a statement from a Mr. Broadhurst to Mr. Thomas Brassey, that the hours of work were 56½ at £1. 17s. 8d. per week, but it is not stated that this was the wages for London alone. If you take into account the time worked and wages paid for the whole of England and Wales, it averages 55½ hours per week, at 29s. 7d., which is a vast difference to the published statement. As there are a great many not connected with the building trade who read your valuable journal, I trust you will give this publicity.—I am, Sir, &c.,

Charwood-street, Leicester.

A. H. PARKER.

PLUMBER WORK, AND PROPERLY COVERED FLATS, &c.

SIR,—In Mr. Fletcher's articles on "Quantities," there is much valuable information. In No. XII, however, I can hardly agree with him that a "properly constructed roll" on a lead-covered flat is such a one as he has depicted in Fig. 31, page 385. If that be the regular way in which London plumbers do this portion of their work, I fear they are rather behind the Glasgow men in making a proper substantial job. A Glasgow plumber neither requires nor uses any wood in turning his rolls, and so far as I can judge, he makes a far better job without it, and especially for exposed situations. With your kind permission, I shall illustrate the two styles, so that each may speak for

FIG. A



FIG. B



itself. Fig. A is the London style alluded to by Mr. Fletcher, while Fig. B is the Glasgow style. In Fig. A, C is the wooden roll, over which the lead is simply lapped as shown. In Fig. B, however, this wooden roll is dispensed with, and the roll, or seam, formed out of the lead itself, which latter, as a plumber, I consider to be the most tradesmanlike job. The particulars of this latter style of covering flats, or "platforms," as we here designate them, are given in the BUILDING NEWS for March 8th, 1872.

In speaking of soil-pipes also, Mr. Fletcher gives their size as "4in.," just as if that were both their proper and general size. Now, as I have given considerable attention to the working of soil-pipes and their connections for a number of years past, perhaps I may be excused saying that I would have been better pleased had he mentioned either 4½in. or 5in. as his size for soil-pipes, and as an illustration which comes quite apropos, perhaps you will allow me to relate what I came across just this week. With a friend, I was examining the plumber's work in certain houses, got up, so far as appearance was concerned, in really first-class style. We lifted the handle of a water-closet, when lo! What was that curious gurgling noise which smote our ears? Why, it was simply the water being drawn out of the siphon-trap of a wash-hand-basin, which stood several feet back from the water-closet! We went into another house, also splendidly fitted up, lifted the water-closet handle there, when our ears again told the tale of the emptying siphon-trap. I asked the size of the soil-pipe (the work of the joiner and upholsterer being all finished) and was told that it was 4in. Now had the water-closet been a pan-closet, perhaps the 4in. pipe might have served. It was, however, more of the style of the Bramah, sending off a large body of water when the handle was pulled. As properly fitted-up soil-pipes are really a matter affecting the health and happiness, yea, sometimes even the life and death of the inmates, they ought to be put in of such a sufficient size at first as to be able to meet such common and probable contingencies as a change of water-closet, or the pouring down of a little extra water. From all that has been said almost everywhere in connection with this subject of late, I humbly suggest that it would be so far a good practical outcome if it were made a law that no soil-pipes should be fitted up of less diameter than 4½in. internally. The difference of the price is nothing in comparison with the importance of the advantage of the extra size.

In speaking of the traps, I see Mr. Fletcher mentions "lead D traps." Now while I have taken many out which were holed and corroded, I do not remember ever putting one in, because the lead siphon-traps, if properly made out of good lead, are simpler, cheaper, and better.

In his "Table IX." I think that in reference to zinc flats, Mr. Fletcher has forgotten to mention the zinc roll-caps, which are measured by the lineal foot. As to their application, the BUILDING NEWS for March 15th and April 5th, 1872, contains information on the subject. I see there is a difference in the style of measuring, as given by Mr. Fletcher, from our style

here in some points, such as paying for the number of soldered joints. These are included with the estimate price of the pipes.

In conclusion, I trust that Mr. Fletcher will not be offended at my remarks. If he can show that in any point I have erred, I shall only be too glad to admit it, and to thank him for the information. In the interchange of ideas good is often the result.—I am, Sir, &c.,

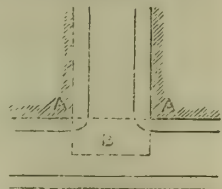
Glasgow, April 5th, 1873.

W. P. BUCHAN.

Intercommunication.

QUESTIONS.

[2822].—The True Law or Rule of Apportionment.—Would any of your intelligent readers kindly inform me what is the true law or rule of apportioning to owners of property the paving, &c., of new streets. I send with this an ink sketch showing two streets, one leading out of the other. What I wish to know is, whether the owners of the two corner properties marked A are liable to pay for that portion of the street inside the dotted lines marked B, which forms the junction of the two streets; or ought the cost of this junction to be distributed amongst all the owners of property in one or both streets in proportion to their frontage?—ALPHA.



[2823].—Water-Tight Fountain-Basin.—Could any one kindly inform me of the best method of constructing a water-tight fountain-basin in a garden?—L. H.

[2824].—Iron Window-Frame Fastening.—Can any one tell me the address of Clunn and Co., makers of these fastenings?—A SUBSCRIBER.

[2825].—Cement for Aquarium.—Can any of your readers kindly inform me of a good cement for putting aquariums together? I have one holding thirty gallons, made of strong zinc angle bar. I have tried Portland cement and red and white lead and gold size for bedding the glass, but still the water comes through.—J. R. H.

REPLIES.

[2797].—Durability of Stone.—Has not "Stonemason's" general inquiry for information respecting tests to prove the durability of building-stones generally almost drifted into a controversy as to the individual merits of granite versus limestone? All that "H. T." argues in favour of the former, in his second letter, is, to the point, and cannot be gainsaid. His quotation of the old granite monuments in the British Museum, however, seems to suggest the remark that Mr. C. Smith's Chaldean sun-baked clay tablets are still older, and seem to speak well for terra-cotta in its various forms. Perhaps S. Mary Magdalene's at Launceston (Late Perpendicular) is even a better specimen of early Cornish granite work than is S. Mary's, Truro, both as a sample of what may be done in that material as well as of its lasting powers. And yet, upon examining the unique and romantic ruins of the castle hard by, some of it presumably Saxon work, we find the local stone used in its construction as sound as the granite upon the church. "H. T.'s" inquiry as to whether Plymouth limestone will stand in London is a question I wish some kind reader informed upon the subject would answer. The query suggests the remark that, although a stone may be admirably adapted for one locality, it does not necessarily follow that its enduring powers should prove equally as satisfactory in other places. Of this one might quote, from personal observation, a score of illustrations, were they needed. I give a few.—We all know that Caen stone, when exposed to outdoor influences, is affected greatly by the action of the weather, and, as a rule, is not suitable for an English climate. It stands moderately well in its native country, although many of us can call to mind buildings in Normandy where the stone does not stand as it ought to do. Mr. Street is using it in the restoration of Christ Church Cathedral, at Dublin, where the old dressings were of Caen stone, and have stood wonderfully. Curiously enough, at Bray, in County Wicklow, scarcely a dozen miles from Dublin, I remember a little chapel being put up some nine years ago, in which Caen stone dressings were used, and these began to go before the work could be "cleaned down." Ham Hill stone, a warm-coloured Somersetshire production, of great beauty, and looking splendid when in mass (as see Messrs. Slater and Carpenter's new hotel at Sherbourne) is a material that, as a rule, stands well. At Montacute Hall, an old Tudor building, near the village of Montacute, and four miles from Yeovil, this stone was used, and the arries are still as sharp as a knife; but at the comparatively new church of Holy Trinity at Yeovil, built not many years ago from Mr. B. Ferrey's designs, the same stone has "gone" everywhere. The beautiful white gristone raised near to, and used extensively in and about Glasgow, does not stand as well as one would wish, and upon some of the many buildings in Belfast and Dublin into which it has been introduced it is possible to see signs of decay. Bath stone is worthless when fixed out of doors in the north of England. It was used some years ago in the dressings of the large new Railway Hotel at Buxton, and long before the job was completed the frost got into it, and it became a gigantic ruin. Under the architect's directions, the builders—Messrs. Hall and Sons, of Nottingham—afterwards cut it all out, and re-inserted Hollington, a stone that resists the bleak weather at Buxton very fairly. Again, a couple of years ago Bath stone was used for the internal work of Mr. J. H. Hirst's new Church of S. Peter, Harrogate. The winter set in before the job was covered in, and the stone all went "to smash." The next spring, however, fresh Bath stone was put in, and the building being roofed over before the next

winter came round, it is in great measure a success. Beer stone stands admirably indoors, and was used almost universally in the diocese for church-building in early times, but when used externally the action of the weather, even in this favoured county, twists it all ways, and, as a rule, it does not last long. As an illustration of this, I foundered over the roof of our cathedral recently with an old mason who has worked all his life upon that building, anxious to find, with his help, the oldest existing pinnacle. When we had found it, he told me he remembered putting it up himself less than forty years ago. The other day I was at Ripon Cathedral, lately restored by Sir G. G. Scott. A verger pointed out to me the plinth of the west front. This has been renovated by new stones being re-instated in place of such of the old work as was decayed. Oddly, the new stones have followed suit, and have decayed also!—J. V., Exeter.

[2819].—Concrete Walls.—In reply to J. Grainger, gravel alone does not make good concrete. It is necessary to add just sufficient sand to fill up the interstices of the gravel when gauged. According to the size of the gravel, judgment is required as to the quantity of sand necessary. Too large a proportion of sand will weaken the concrete. Ground selenitic lime can be used instead of Portland cement in the same proportion, and make a concrete quite equal, at less than one half the cost, and with an admixture of ground selenitic clay, the saving will be still greater. He will obtain the necessary instructions from the Selenitic Mortar Company, 6, Wharf, Belvedere-road, Lambeth.—JAMES HOLE.

[2819].—Concrete Walls.—Decidedly not; a fair proportion of sand is very essential, and the more irregular the size of the material the better, provided none is larger than a small hen's egg. A very great point to be observed is that the material used is clean—that is, free from clayey or argillaceous matter—and the water employed for mixing not muddy. Ground lime could be used, and has been tried for the purpose, but with not much success, as the very best quality is required, and its slow-setting properties is a great disadvantage. The walls of a small church near Hatfield, built in this way a few years since, had to be strengthened with brick piers; and a large engine-shed, in course of construction for the Underground Railway Company, fell to the ground, through the lower portion of the walls being built of lime concrete which had not hardened. One part out of eight, by measure, is a fair proportion of cement, and makes most excellent walls; one part out of ten, if the respective materials are of the best quality, would do for garden walls, but no advantage would be gained by this, as a wall 8 in. thick with the first-named proportion would be as strong as one 9 in. thick with the latter proportion of cement. Lime and cement can be used mixed, but with no beneficial result as regards strength or cost, except unusual facilities exist for obtaining lime, in which case it should be hydraulic and finely ground. Long stretches of low walls are liable to slightly crack through expansion and contraction of material, caused by change of temperature; but in a 4 ft. wall if two courses of iron hoop are built in about 6 in. from the top, and through its entire length, it will prevent this to a great extent.—W. W.

[2819].—Concrete Walls.—It is not necessary to sift any sand out of the gravel used. The minimum of Portland cement will be one-seventh of the whole quantity—say, four of shingle, two of gravelly sand, one of cement. In preparing concrete all lies in the "tossing" of the stuff. On no account let lime and cement mix. You can have a good concrete of one of rich lime in lumps, three sharp shingle, two sand or ballast, slightly loamy. Set in trench dry and carefully mixed, then throw in water *ad lib.*—JOHN S. SLOANE.

[2820].—Agreements, &c.—A stamp is not only necessary, but if the Excise officers are aware that you have not had the agreement stamped, they can demand it and stamp it *per force* with a penalty-stamp after fourteen days of first date. Price of stamp, in first instance, sixpence, either impressed or adhesive.—JOHN S. SLOANE.

[2821].—Limestone.—I assume that Mr. Kelly's query is respecting limestone as a building-stone. Now, very much depends upon the locality in which such stone is to be used, therefore I think I cannot assist Mr. Kelly in this matter better than by giving him the locality of a few of the best quarries of limestones of different geological ages, and where such has been used. The carboniferous, or mountain limestone of Hopton Wood quarry produces, perhaps, the best and most useful material for building. It is a compact carbonate of lime, with encrinal fragments. Chatsworth House, Belvoir Castle, Grammar School, Birmingham, are constructed with it. Penryn Castle is also a good specimen, built from the same age of limestone, from the Penmon quarry, in Anglesea. Neoth Abbey and Dunraven Castle, South Wales, were built with the same age of limestone from Sutton quarry, near Bridgend. The magnesian limestone of Bolsover and Mansfield-Woodhouse quarries afford beds of the most beautiful fine-grained stone, composed chiefly of carbonate of lime and carbonate of magnesia, semi-crystalline, used for Southwell Church, the monument to Lord George Bentinck at Mansfield, and the Houses of Parliament. York Minster and Roach Abbey, near Rotherham, are built of magnesian limestone. Oolitic limestone, Barnack quarry, Stamford, Lincolnshire—a very strong, excellent stone; composition—shelly oolite, oolitic grains, of moderate size; carbonate of lime, compact and oolitic, the shells often in fragments; coarsely laminated in planes of beds; used for the construction of Burghley House, Peterborough Cathedral, Croyland Abbey, Boston Church, &c. Ketton quarry, near Stamford—Great Oolite. The oolitic grains are of moderate size, slightly cemented by carbonate of lime; much used at Cambridge, Stamford, Peterborough, and Ely Cathedrals, S. Dunstan's Church, Fleet-street, &c. Portland stone—Upper Oolite; composed of oolitic carbonate of lime, with fragments of shells, a very beautiful white fine-ground stone, extensively used in London for many public buildings and for the Fitzwilliam Museum, Cambridge, &c. Caen quarries Normandy, France (the French equivalent of the great, or Bath Oolite)—Caen stone, so termed from being extensively quarried in the neighbourhood of Caen, where the beds are of great thickness and nearly horizontal. It is of excellent quality as a building-stone, of a delicate uniform cream colour, of extreme fineness of texture. Though soft when quarried, it hardens on exposure, and is exceedingly durable. There are several other limestones, of different geological formations, which I think

it needless to enumerate, and indeed there are a variety of beds often in the same quarry. I shall be happy to afford any further information upon the subject of building stone in general.—J. A. KNIFE, 53, Fleet-street.

LEGAL INTELLIGENCE.

THE FAILURE OF PETO, BETTS, AND CO.—In the Court of Bankruptcy on Friday week, before Mr. Registrar Roche, an adjourned dividend sitting was held under this heavy failure, which took place in 1867. The bankrupts were contractors for public works, formerly of Great George-street, Westminster. Debts to the amount of £1,119,512 have been proved against the estate. A statement of accounts was presented, and it appearing that a sum of £44,029. 4s. 10d. cash, and £27,171. 10s. 8d. consols, was standing to the credit of the estate, the creditors resolved that sufficient of the consols should be sold as would, with the cash in hand, pay a dividend of 1s. 10d. and 10d. in the pound to the creditors who have proved since the last dividend, and a further dividend of 1s. 1d. in the pound to all the creditors who have proved or claimed against the estate, leaving a small balance in hand.

Our Office Table.

A PROTEST.—Messrs. Sheard and Hanstock, of Batley, have sent in a hearty protest to the Mayor and Town Councillors of Batley against their unjust decision in relation to the Batley market competition. They say that, in obedience to an advertisement, they sent in a competing design for the market, and that their design and that of two other competitors were sent back to the authors with instructions to send in revised plans, and the cost of the building not to exceed £2,500. They did as they were instructed, but the design that has been selected will cost at least £4,500, and they offer £100 to the Leeds Infirmary if what they say can be disproved. They therefore emphatically condemn the injustice of the decision, and if their allegation be correct we heartily endorse their condemnation.

SOCIETY FOR THE ENCOURAGEMENT OF FINE ARTS.—The members of this Society held their first morning meeting since its establishment 15 years since in the Library, at Lambeth Palace, last week, by permission of the Archbishop of Canterbury. Mr. S. W. Kershaw, M.A., read a paper compiled from his work entitled "Art Treasures of Lambeth Library" containing some interesting notes on the library and the valuable collection of books and illuminated MSS. exhibited. The members afterwards visited the chapel and the Lollards' Tower, the historical associations of which were explained by Mr. Kershaw. On their return they were met by his Grace, who expressed his satisfaction at the visit of the Society, and conducted them through several of the private apartments of the palace.

SIGNOR CASTELLANI'S ART COLLECTIONS.—It has been for some time understood that a collection of Greek and Roman antiquities, the property of Signor Castellani, was likely to be offered for purchase to the authorities of the British Museum. Our readers may remember that, at the time when the gold ornaments of Signor Castellani's collection were bought for the nation, the remaining portions of it, consisting of many valuable works in bronze, marble, terra-cotta, ivory, and amber, as well as vases, were housed, by the permission of the trustees, in the Greek and Roman department of the Museum, independently of any undertaking or understanding to purchase. In addition to these, the offer now made to the nation includes some objects, notably a female head in bronze, and an Etruscan sarcophagus, of a style and importance which place them among the foremost works of ancient art that have ever been seen in the market of the world. We believe that the trustees very properly deferred the consideration of Signor Castellani's offer until the whole of the objects comprised in it should have arrived for their inspection. That is now the case; the entire collection is to be seen within the walls of the British Museum; and we conclude that the consideration of the offer will proceed in the immediate course of business.

Modern art in Paris is by no means dead, according to a correspondent. No fewer than 6,000 paintings have been sent in for the Exhibition which is to open on the first of May, and the Hanging Committee will have some work in deciding which works shall be accepted, as there is not room for 2,000 pictures.

CHIPS.

An effort is being made to restore the interesting and once magnificent rood-screen of East Church, near Sheerness. It is the only one of the kind in Kent, and extends quite across the church considerably west of the chancel-arch. At present it is so dilapidated that it must come away altogether unless something is done, as it is only held together with bits of rope and supported with bricks. Mr. Tarver, the architect, has carefully surveyed it with a view to repair, and copies of his sketches are forwarded to subscribers by the Rector.

A new mission room and schools are being erected at Everton, Liverpool. The style is Gothic, and the cost will be nearly £2,300. The architects are Messrs. T. D. Barry and Sons, of Liverpool, and the contractor, Mr. Hugh Dyer, of Lowhill.

It is stated by a Paris paper that shortly before his death the late Emperor Napoleon III. had invented an economical heating apparatus, "capable of being adapted to ordinary fireplaces."

In connection with the Mostyn-road, Brixton, circuit of the Wesleys, a new chapel is about to be built in Barry-road, Peckham-Rye. Mr. C. Bell is the architect, and Mr. Nutt, of Hampstead, the builder.

At the last meeting of the Metropolitan Board of Works, a letter was read from Mr. H. P. Pitcher, stating that he has had experience in Boston, United States, in executing the raising and moving of houses, and that he is willing to undertake the removal of Northumberland House. This extraordinary communication was referred to a committee.

John Walker, one of Messrs. Jackson and Shaw's joiners, has been committed for leading an assault upon a brother joiner who had given offence to the Society by his conduct during the building strike of last year.

"Jerry building" in Broughton was the subject of complaint to the Salford Council last week by Mr. Dyson, who pointed out the disgraceful condition of some house property in Broughton, and predicted that in a few years the buildings would not be fit for habitation. He hoped the building committee would take the matter up, and compel the builders to use better mortar.

Efforts are at present being made to erect, by public subscription, a building for the School of Science and Art in Inverness, conjoined with which will be a public museum.

The anniversary of Raphael's birth and death was celebrated on Sunday at Urbino, grand *fêtes* and a banquet taking place at the Ducal Palace. The ceremony was distinguished by the handing over to the Municipality, in trust for the nation, of the great painter's birthplace, which has been purchased by a public subscription.

A secession movement has commenced in the Amalgamated Society of Carpenters and Joiners. The trustees of the Lambeth Branch were sued, on Friday last, at Guildhall for the last two calls made by the central committee. They denied having funds in hand to meet the claims, and as contrary proof was not forthcoming, the summons was dismissed.

The Temple Church, Bristol, was reopened, after restoration, on Palm Sunday.

A new hospital at Stroud is to be erected, to cost £4,000, exclusive of fittings. The building is to be commenced forthwith.

On Saturday afternoon the memorial stone of new Wesleyan schools to be erected at Bolton, was laid. The schools will cost about £2,800.

Geologists, architects, builders, and others will welcome the 1872 edition of the excellent geological maps of the British Isles and part of France—and the map of England and Wales, with portions of Scotland and Ireland by Mr. Knipe, which are now ready. It is upwards of thirty years ago since the first attempt was made to exhibit, on a scale of usefulness, a geological map of the whole of the kingdom, and the author has devoted his entire time, from that period to the present—in the elaboration of the details. Notes of the various building stone quarries are arranged near the several formations to which they belong—and the buildings named they have been used for.

Trade News.

WAGES MOVEMENT.

INVERNESS.—The operative slaters of Inverness are at present out on strike. They have been paid at the rate of 5d. an hour, and they now ask for 6d., which the masters decline to grant.

KINSALE.—In Kinsale, all the masons, carpenters, painters, slaters, and plasterers are now out on strike. Some three weeks since the above operatives held a meeting, organised a mechanics' association, and formed a benefit fund and working committee. They then gave notice that on the first Monday in April they would demand a weekly increase of 3s., making in all 27s. 6d. The employers refused to comply with the men's demands, and accordingly the latter

struck, and are determined to hold out until these are agreed to. The ship carpenters also struck for an increase of 3s. per week, which they received, and have resumed work.

LEEDS.—The plasterers' labourers of Leeds have struck work in consequence of the masters refusing to accede to their demand for an increase of pay from 5½d. to 6d. per hour. There are fully 160 labourers engaged in this branch, and as there is about one employed to every two plasterers, and without whose aid the latter cannot work, nearly 500 men are thrown idle.

LIVERPOOL.—The differences between the master painters of Liverpool and the operatives have been adjusted. The men claimed 7½d. per hour for fifty-four hours' work per week, which was rejected by the masters, who offered 7d. per hour for a week of fifty-five hours, this offer being an advance of a halfpenny per hour upon the existing wages. The men declined these terms, and, after several meetings of joint representatives, it was decided to refer the matter to the arbitration of Mr. Clarke Aspinall, the borough coroner and a local magistrate. Mr. Aspinall's award was made on Friday last. It is in favour of 7½d. per hour for a week of fifty-five hours. This, it is expected, will finally settle the matter.

WESTON-SUPER-MARE.—The society men of the carpenters' and joiners' trades in Weston-super-Mare are now out on strike, demanding that their present rate of wage, 28s., be increased to 28s. 3d. per week. They state that an application to their masters to settle the matter amicably has been met with contempt, and they give as their reasons for making the demand that the prices of provisions are much higher than heretofore, and that the wages given in neighbouring towns are far in advance of those paid in Weston.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.					
24 by 12	22 by 12	20 by 10	18 by 10	18 by 9	
430s.	370s.	285s.	245s.	222s. 6d.	
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8½	
222s. 6d.	170s.	212s. 6d.	130s.	77s. 6d.	

Per m of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Ridge Tiles. Large Show all Goods at 14 and 15, Bury-street, St. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

CITY.—For alterations, additions and repairs to a warehouse and offices, Upper Thames-street, City, E.C. Mr. Herbert Ford, architect.

Henshaw and Co.	£4,378	0	0
Higgs	3,703	0	0
Adamson and Sons (accepted)	3,267	0	0

KENSINGTON.—For new relieving offices and alterations to present receiving wards at Kensington workhouse, for the Guardians of the Poor of the parish of St. Mary Abbots, Kensington. Mr. Alfred Williams, architect. Quantities by Messrs. George Lansdown and Pollard.

Selway	£6,020	0	0
Chamberlain Bros.	5,190	0	0
Benstead and Sons	5,215	0	0
Scrivenner and White	5,065	0	0
Hockley	5,018	0	0
Stoner	5,065	0	0
Stimpson and Co.	5,025	0	0
Howard	4,840	0	0
Sawyer	4,800	0	0
Cowland	4,616	0	0
Temple and Foster	4,458	0	0
Lacey	4,346	0	0
Hook	4,373	0	0
Chappell	4,331	0	0

LONDON.—For portion of new premises for Messrs. Cox and Sons, church furniture manufacturers, Southampton-street, Strand. Mr. S. J. Nicholl, 1, Caversham-road, Kentish Town, architect. Quantities taken out by Messrs. Stoner and Ashby.

Kilby	£2,442	0	0
Colls and Son (too late)	2,355	0	0
Thompson	2,345	0	0
Hart	2,345	0	0
Simpson and Sons	2,300	0	0
Howard (accepted)	2,297	0	0

RAMSGATE.—For the erection of a cottage in the Broadway, for Mr. J. T. Le Mair. Mr. John R. Collett, architect.

Keel (accepted) £387 0 0

UPPER HOLLOWAY.—For the erection of twelve three-story houses, St. John's-road, on the Elm Lodge estate. Messrs. Richardson and Waghorn, surveyors to the estate.

Carter Bros.	£5,597	0	0
Kelly Bros.	5,483	0	0
Dunkley	5,285	0	0
Sawyer	5,256	0	0
Edgar	5,155	0	0
Amor	4,275	0	0
Ball	4,200	0	0

WILLESDEN.—For mortuary hall, lodge, priest's house, and dead-house, at the Jews' Cemetery, Willesden. Mr. N. S. Joseph, architect. Quantities by Mr. T. T. Green.

Henshaw and Co.	£3,773	0	0
Browne and Robinson	3,722	0	0
Nightingale	3,675	0	0
Dove Bros.	3,615	0	0
Perry Bros.	3,612	0	0
Langmead and Way	3,570	0	0
Scrivenner and White	3,546	0	0
Manley and Rogers	3,530	0	0
Adamson and Son	3,519	0	0
Newman and Mann	3,436	0	0

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TO ARCHITECTS.

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The Penmoyle Sea-green Slates are specially adapted for Churches, Public Buildings, &c., &c.

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In Railway Trucks, Docks, Gloucester—			
		For 1,200 Slates.	Equivalent to per square
Best Green Slates	14 by 7	2 17 6	16s. 6d.
Do.	13 by 8	2 17 6	16s. 6d.
Do.	13 by 7	2 5 0	14s.
Do.	12 by 7	1 18 6	13s.
Do.	12 by 6	1 7 6	11s.

Prices of large Sizes, Cost of Transit, Reference estimations, and Sample Specimens may be obtained on application to

MESSRS. RANDELL & CO., Corsham, Wilts.

Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tufton-street, Westminster

COMPETITIONS OPEN.

AUDLEM BURIAL BOARD, April 19.—For designs for two chapels for a cemetery. Mr. G. Baker, Clerk to the Board, Audlem, Cheshire.

BOND-STREET.—For the erection of a building on the site of the Clarendon Hotel, to comprise shops on the ground-floor, with suite of rooms or chambers over. Premiums of £50 for the best, and £10 for the second best designs. Mr. Goddard, 1, Great Portland-street, Oxford-street.

CITY OF LONDON, May 25.—The Painters offer the following prizes for competition:—1. For decorative painting, £5 and £3. 2. For painting from natural foliage or flowers, £5 and £3. 3. For freehand drawing and design, £3 and £2. 4. For marbling and graining, £3 and £2. H. D. Pritchard, Painters' Hall, Little Trinity-lane, Queen Victoria-street, E.C.

CREWKERNE BURIAL BOARD, April 14.—For designs for the erection of two chapels, lodge, and other necessary buildings for a new cemetery. E. Budge, Clerk to the Board, Crewkerne, Somerset.

LEICESTER, May 14.—For designs for municipal buildings, to comprise all public offices, assize court, and police buildings. Premiums of £200 for the best, £100 for the second best, £50 for the third best designs. T. Standbridge, Town Clerk, Leicester.

MARGATE, May 15.—For plans for a new building for the branch establishment of the Deaf and Dumb Society's Asylum at Margate. Premiums of 100 guineas for the best, and 50 guineas for the second-best design. Mr. W. H. Warwick, 93, Cannon-street, E.C.

ROUNDBAY PARK, LEEDS.—For plans and designs for laying out part of the above estate for the purpose of a public park, and the remainder as sites for villa residences. Premiums of 200 guineas for the best, 100 guineas for the second-best, and 50 guineas for the third-best design. C. A. Curwood, Town Clerk, Town-hall, Leeds.

YEOVIL SCHOOL BOARD, April 14.—For plans for the erection of school buildings in Rickleford to accommodate 300 children. G. W. Custard, Clerk to the School Board, Yeovil.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tiles, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING

ESTIMATES.

ABERAMAN, April 15.—For the erection of 100 cottages on the Aberaman estate, near Aberdare. Mr. T. Jones, Aberaman Estate, Aberaman.

ADEL, NEAR LEEDS, April 24.—For the erection of a villa residence at Adel. Hill and Swann, architects, 11, Park-square, Leeds.

ADMIRALTY, WHITEHALL, S.W., April 15.—For supplying 1,180 cwt. of snuffless dip candles. F. W. Rowsell, Superintendent of Contracts.

ADMIRALTY, WHITEHALL, S.W., April 17.—For supplying 140,600 lb. of cotton waste. F. W. Rowsell, Superintendent of Contracts.

ADMIRALTY, WHITEHALL, April 17.—For the supply of ash helves for Portsmouth. F. W. Rowsell, Superintendent of Contracts.

BRIGHTON, April 16.—For the erection of station buildings, platform, and approaches, near the Lewes-road. A. Sarge, Secretary, London, Brighton, and South Coast Railway, London-bridge Terminus, S.E.

BRIGHTON, May 6.—Tenders for the supply of 130 fathoms of the best Baltic yellow deal ends for firewood. A. Morris, Clerk to the Guardians, Parochial Offices, Brighton.

COVENTRY SEWAGE WORKS, April 16.—For the construction of sewage works at Whiteley. C. R. Gibb, Secretary, General Sewage and Manure Company, 1, Crown-buildings, Queen Victoria-street, E.C.

GREAT NORTHERN AND LANCASHIRE AND YORKSHIRE JOINT HALIFAX AND OVENDEN JUNCTION RAILWAY.—Station Works.—For the construction of large goods warehouse, with cellaring and upper story, and offices, stone wharf, passenger platform, weigh-bridges, turn tables, and cranes, &c., at North Bridge station for the construction of goods shed and offices, 10-ton crane and weigh-bridges, at Ovenden station; for the construction of

goods shed and offices, passenger platform, stone wharf, engine turn-table, 10-ton crane, and weigh-bridges, at Netherston station. Mr. J. Fraser, engineer, 19, York-place, Leeds.

GLOUCESTERSHIRE, April 15.—For the erection of a police station at Newnham. Mr. Medland, County Surveyor, Clarence-street, Gloucester.

HUDDESFIELD SCHOOL BOARD.—Common Board School, April 17.—For a brick building with stone dressings, and another entirely of stone outside (as per quantities). Otho Giles Abbott, Clerk to the Board, 27, Estate-buildings, Huddersfield.

INNY DRAINAGE BOARD, April 19.—For the erection of river bridges and other masonry. Wm. Mooney, Solicitor, 16, Fleet-street, Dublin.

ISLE OF WIGHT, April 16.—For repairing the roads and highways. A. H. Estcourt, Clerk to the Commissioners, Guildhall, Newport.

LANCASHIRE, April 22.—For the erection of a new residence at Witherslack, near Grange-over-Sands. Messrs. Paley and Austin, Architects, Lancaster.

LEEDS, April 21.—For additions to maling premises in Garden-street. D. Dodgson, Architect, 18, Park-row, Leeds.

LEEDS, April 25.—For the erection of a warehouse in Wellington-street. Henry Walker, Architect, 11, East-parade, Leeds.

LEEDS INDUSTRIAL CO-OPERATIVE BUILDING SOCIETY, April 19.—For the erection of a block of seven houses, called the Industrial-terrace, in South-green, Mount-street, Beeston-hill. John E. Leak, architect, Leak's-terrace, Hunslet, Leeds.

LEEDS INDUSTRIAL CO-OPERATIVE SOCIETY, April 19.—For the erection of a shop, warehouse, and three houses, &c., at Beeston-hill. John E. Leak, architect, Leak's-terrace, Hunslet, Leeds.

METROPOLITAN BOARD OF WORKS, April 25.—For paving and maintaining in repair for six months the carriage-way of Chatham-place and Queen Victoria-street, E.C. J. E. Wakefield, Clerk to the Board, Spring Gardens, S.W.

MIDLAND RAILWAY, April 14.—For the erection of a goods warehouse at Leicester. J. Williams, Secretary, Derby.

MONMOUTHSHIRE.—For the enlargement and restoration of the parish church of Panteg, near Pontypool. Mr. W. H. Cousmaker, Surveyor, Millbrook, Hants.

MORLEY LOCAL BOARD, April 16.—For paving, flagging, and kerbing the east end of Mill-street. John Rayner, Clerk to the Board, Queen-street, Morley.

MORLEY LOCAL BOARD, April 16.—For paving, flagging, and kerbing the Old Fold and Jackson-lane, in Morley aforesaid. John Rayner, Clerk to the Board, Queen-street, Morley.

ST. LUKE'S, MIDDLESEX, April 15.—For the construction of about 342 ft. run of brick sewer, and 140 ft. run of 12-in. pipe sewer. W. W. Hayne, Vestry Clerk, Vestry Hall, City-road, E.C.

THE WATH-UPON DEARNE MAIN COLLIERY COMPANY. For tenders for the sinking of a 10 ft. shaft. Manager to the Colliery, Wath-upon-Dearne.

TRINITY HOUSE, E.C., April 17.—For the supply of 24,000 gallons of pure refined paraffine or petroleum oil. R. Allen, Secretary.

WHITWELL MAIN COLLIERY, April 15.—For the erection and completion of twenty-six houses near the Whitwell Main Colliery. William Watson, Architect, Barstow-square, Wakefield.

WAR DEPARTMENT CONTRACTS, April 16.—For the purchase, taking down, and removal of houses, in Hardens-street, near Woolwich Dockyard. Major P. H. Scratchley, R.E., Works Department, Woolwich Arsenal.

WEST DRAYTON.—For the erection of an engineer's factory. Messrs. Rotheroe and Bastin, 48, King William-street, E.C.

WORTHING, April 21.—For the erection of two schools, each to accommodate 200 children. Mr. Melvill Green, Solicitor, Worthing.

BANKRUPTS.

(To Surrender in London.)

James Charles Ekens, Burgoyne-road, Stockwell-green builder, April 18, at 11.

(To Surrender in the Country.)

Joseph Busst, Walsall, ironfounder, April 23, at Walsall.—John Dawson, Lees, builder, April 17, at Ashton-under-Lyne.—James Richardson, Hutton Rudby, timber merchant, April 18, at Stockton-on-Tees.

DECLARATION OF DIVIDEND.

J. Greser, York, painter and paperhanger, div. 2s. 3d.

PARTNERSHIPS DISSOLVED.

Sutton and Clarkson, Great Grimsby: wheelwrights and joiners.—Williams and Jones, Landrindrod, builders and contractors.—T. M. and C. E. Houghton, Birmingham, patentees of an instrument for plumbing, levelling, and indicating angles.—Whitehead and Bamford, Rochdale, land and mining surveyors.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

(From the Public Ledger.)

LEAD.			
Fig—Foreign	per ton	£22 12 6	£22 15 0
" English W.B.	"	23 15 6	24 10 0
" Lead Co.	"	23 10 0	0 0 0
" Other brands	"	23 0 0	23 10 0
Sheet Milled	"	24 10 0	0 0 0
Shot, Patent	"	26 10 0	26 15 0
Red or minium	"	25 0 0	0 0 0
White Dry	"	29 10 0	0 0 0
" Refined ingot	"	0 0 0	0 0 0
" Yellow metal	per lb.	0 0 9	0 0 9½
COPPER.			
British—Cake & Ingot	per ton	£97 0 0	£98 0 0
Best selected	"	99 0 0	100 0 0
Sheet	"	99 0 0	105 0 0
Bottoms	"	103 0 0	108 0 0
Australian cake	"	98 0 0	99 0 0
Spanish cake	"	95 0 0	0 0 0
Chili Bars, cash	"	91 0 0	93 0 0
" Refined ingot	"	0 0 0	0 0 0
" Yellow metal	per lb.	0 0 9	0 0 9½

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 18, 1873.

THE FREE CITY LIBRARY AND MUSEUM.

IT is hardly possible to exaggerate the value of the boon conferred upon the citizens of the Metropolis by the throwing open for their free use of the new library and museum of the Corporation of London. This collection is not merely valuable; it is priceless and perfectly unique. It contains some treasures of at least equal interest and importance to any in the British Museum, of which monster *bibliothèque* it may claim to be the parent. Comparatively few persons, however, are aware that such is the case, because until now the Guildhall Library, though always free to the public, has been among the most hidden of the many treasures the City can boast of. Stored away, like so much useless rubbish, in a narrow corridor as dark as a prison dungeon, and about as badly ventilated, how many knew even of the existence of the collection, at least previous to 1869, when Dr. Sedgwick Saunders commenced his laudable agitation which has now resulted in the unearthing, as it were, of so many jewels, and placing them in a worthy casket? It is stated as a fact that, prior to the date mentioned, even some eminent City men had never heard of, much less seen, the "Lybrarye atte Gyldehalle," notwithstanding that is one of the very earliest of our public institutions. There is no trustworthy evidence extant, as Mr. Saunders informs us, as to its existence earlier than the beginning of the fifteenth century, although something of the kind was established long anterior to that date, and probably consisted, he thinks, in part at least, of manuscripts of the eleventh, twelfth, thirteenth, and fourteenth centuries. It is beyond doubt, however, that the renowned Sir Richard Whittington gave many valuable books in manuscript to the library, and also bequeathed the very considerable sum of £400 for the erection of a suitable place for their preservation. Among its other benefactors were William Bury and his executor John Carpenter, founder of the City of London School, the latter of whom, in his will, proved May 12, 1442, directs "that if any good or rare books shall be found amongst the residue of my goods which, by the discretion of Master William Tichfield and Reginald Pecok may seem necessary to the common library at Guildhall for the profit of the students there, and those discoursing to the common people, then I will and bequeath that those books be placed by my executors and chained in that library, in such form that the visitors and students thereof may be the sooner admonished to pray for my soul." Stow, in his day (1552), speaks of "a fayre and large librarie furnished with bookes pertaining to the Guildhall and the Colledge," which books, he tells us, were, in the reign of Edward VI., sent for by Lord Protector Somerset, who promised to return them shortly—a promise, however, which he forgot to fulfil, and the books were never returned. And, by the way, that is not the only instance of literary pilfering recorded in the history of the library. It is charged against Sir Robert Bruce Cotton, the celebrated antiquary and founder of the famous Cottonian library in the British Museum, that having obtained the loan of a number of the City records from the collection, he was loath to give them up again, and only did so after a considerable amount of pressure. Among these records was the valuable *Liber Custumarum*, several folios of which (it was discovered no further back than 1861) had been abstracted, and further research brought to light that they had been very generously bequeathed, along with the Cottonian manu-

scripts, to the British Museum. They cannot now be restored to the Corporation, their rightful owners—the plea of the Trustees of Great Russell-street being, it appears, that they have no power to give up any bequests made to the Museum.

What books may have remained in the library after Somerset had conveyed away his three cartloadsful were consumed in the great fire of 1666, and the City had no library until the year 1824, when the present collection was formed by grants of money from the Corporation funds and donations from wealthy citizens. Five years later the idea of forming a civic museum suggested itself, and both departments have been growing apace ever since. The library now contains nearly 40,000 volumes, and is especially rich in works referring to the history and traditions of London, while it is not too much to say, as regards the Museum, composed, as it is, of many hundreds of relics of the Roman and Mediæval eras—all of them dug up in the course of excavations in the heart of the City—that nothing like it exists anywhere else. But these treasures were, for the reason already stated, comparatively a sealed book to the public until Dr. Saunders, little more than three years ago, brought before the Court of Common Council the urgent claims of the institution to their consideration, and obtained the appointment of a special committee, of which he was elected the chairman, with full powers to procure plans and estimates for a new building. As our readers are aware, the edifice, though only now opened to all and sundry, was formally inaugurated in the beginning of November last with no little ceremony, and in the presence of nearly 3,000 persons, by the Lord Chancellor, the Lord Mayor and most of the civic dignitaries assisting. No expense has been grudged by the Corporation, no time and trouble spared by the committee in this matter. Visits were made, we believe, to the principal libraries at home and abroad, but more particularly to the Colleges of Oxford and Cambridge, for the purpose of observing the merits and defects of existing structures, and the result of the investigations having been laid before Mr. Horace Jones, the City architect, that gentleman proceeded to prepare plans. He has, with the able assistance of Mr. Charles Baily, given us a library certainly worthy of the City of London. The style of architecture adopted is Perpendicular Gothic, in accordance with that of Guildhall, at the east end of which the new buildings are situated, and occupy the site of some dilapidated houses formerly fronting Basinghall-street, and extending back to the Guildhall. The entrance from this street is by a porch having wrought-iron gates, but it will, as we learn from official information, be used only on State occasions, the ordinary entrance being from the porch of the Guildhall through a corridor 100 feet in length occupying the site of the old library. The structure, which has a total frontage to Basinghall-street of 150ft., the depth being upwards of 100ft., consists mainly of two halls placed one over the other, with reading, committee, and muniment rooms surrounding them. The lower hall, or museum, is 83ft. long by 64ft. wide, and has a clear height of 20ft. It is divided into nave and aisles, the floor being level with the ancient crypt of the Guildhall, with which it directly communicates, and is somewhat below the level of Basinghall-street. On this floor are the large fire-proof muniment rooms, the construction of which has received much attention at the hands of the committee, since here will be deposited the enormous mass of charters, title-deeds, wills, and other sacred documents—the accumulation of eight centuries. The library above is a larger room than the museum, being 100ft. in length, 65ft. wide, and 50ft. in height. It is also divided into nave and aisles, the latter being fitted up with handsome oak book-cases forming twelve bays, into which the furniture can be moved when the nave is required on State occasions as a reception hall. One of the principal fea-

tures in the whole design of the library is its adaptability to State ceremonial purposes in addition to the more immediate and legitimate wants of the library pure and simple. To carry out this effectively it has been necessary, we are told, in some places to sacrifice architectural propriety. The ceiling of the museum is mentioned as an example, where, but for the necessity of utilising the nave for occasional municipal festive gatherings, a system of groining in accordance with the style of the building would have been adopted. It is only right to say, however, that for this anomaly the architect is in no way responsible. In the library the oak roof, the arched ribs of which are supported by the arms of the twelve great City Companies, with the addition of those of the Leathersellers', and Broderers', and also the Royal and City arms, has its several timbers richly moulded, and its spandrels filled in with tracery, and contains three large louvres for lighting the roof and thoroughly ventilating the hall. The aisle roofs, the timbers of which are also richly wrought, have louvres over each bay, and the hall at night is lighted by means of sun-burners suspended from each of these louvres, together with those of the nave. Each of the spandrels of the arcade has, next to the nave, a sculptured head, representing, History, Poetry, Printing, Painting, Architecture, Sculpture, Philosophy, Law, Medicine, Music, Astronomy, Geography, Natural History, and Botany. The several personages chosen to illustrate these subjects are Stow and Camden, Shakespere and Milton, Guttenberg and Caxton, Holbein and Hogarth, William of Wykeham and Wren, Michael Angelo and Flaxman, Bacon and Locke, Coke and Blackstone, Harvey and Sydenham, Purcell and Handel, Galileo and Newton, Columbus and Raleigh, Linnaeus and Cuvier, Ray and Gerard. The hall is admirably lighted. Considering the purpose of the building, the stained glass in it required special treatment, so as to admit as much light as possible consistent with a decorative effect. Consequently a large amount of white glass has been introduced, and the colour concentrated. The principal window at the north end of the library, of seven lights, divided by a transom, has two major subjects in rich colours, and eight single figures. The subject of the three upper centre lights is the introduction of printing into England, and represents Caxton and his printing-press in the Almonry at Westminster, the centre figure being the printer showing his works to Edward IV. and the Abbot of Westminster. Wynkyn de Worde is engaged pulling a proof, and in the background a boy is engaged mulling the ink. The four side figures are Guttenberg, Wynkyn de Worde, Pynson—one of Caxton's workmen, afterwards the King's printer—and Bishop Coverdale, the translator of the Bible. In the three lower centre lights we have Richard de Bury, Bishop of Durham, in the act of purchasing the library of the Abbot of St. Albans for fifty pounds' weight of silver. Whittington and Gresham, with Stow and Milton, are also represented. The four side figures, like the upper ones, are in grisaille, on a silver quarry ground. Below the subject is a representation of the old Alders-gate, the window being the gift of some of the inhabitants of that Ward. The clerestory contains twenty-eight windows, having two lights each, in which are represented the symbols of the planets, also Night and Day, also upon a grisaille quarry ground. The aisles are lighted by fourteen windows of three lights each, having the signs of the Zodiac, with labels running across bearing aphorisms taken from Shakespere. In this hall there are three fireplaces. One at the north end, executed in D'Aubigny stone, is very elaborate in detail, the frieze consisting of a panel of painted tiles (executed by Messrs. Gibbs and Moore), the subject being an architectural design of a procession of the Arts and Sciences, with the City of London in the middle, emblematised by an enlarged representation of the ancient seal, to wit, S. Paul and some

mediaeval buildings, with a river in the foreground. The quatrefoil panels on either side have sculptured heads of Carpenter, before mentioned, and Chaucer. These were the work of Mr. J. W. Seale, by whom most of the stone-carving has been done. Two chimney-pieces at the south end are also carved and foliated with the words "Anno Domini MDCCCLXXII." on the frieze of one, and "Domine Dirige Nos," the City motto, on the other, surmounted in both instances with the Royal, City, Middlesex, Westminster, and Southwark shields of arms. The screens in front of these fireplaces are executed in oak, the panels being inlaid with coloured foreign woods, and the bases of the screens forming dwarf book-cases, which are fitted to receive large folio books. The whole of the furniture throughout the building, including even the umbrella-stands and the coal-scuttles, has been executed by Messrs. Cooper and Holt. On the east side of the library is the Committee-room, noteworthy for a very richly-moulded waggon-headed roof, the principal ribs of which are supported on stone corbels, bearing the shields of arms of several members of the Building Committee. The Reading-room, at the south end, is 50ft. in length by 24ft. wide, and is lighted by a window at the west end which has for its subject the "School of Philosophy," taken from Raphael's celebrated mural painting. This, the first public reading-room in the City, is liberally furnished with maps, atlases, dictionaries, directories, and commercial and legal works, for reference by merchants, clerks, and others who may need them. It ought also to be mentioned that provision has been made for ladies in the library, one of the bays having been set apart for their exclusive use, to which is appended a retiring-room. The building is warmed by means of hot-water pipes, with open gratings in the floor. The contractors for this part of the work were Messrs. Haden and Son; the painted windows were supplied by Messrs. Ward and Hughes; and the contractors for the building were Messrs. George Trollope and Sons. The work was commenced in 1870, and the total amount expended upon the building by the Corporation will, it is said, be upwards of £50,000, exclusive of the land. This sum, however, includes the whole of the furniture and fittings.

It would require a separate article to describe even a tithe of the contents of the City Library, and we must refer our readers to the catalogue. They will find here a rich source of hidden wealth lying enshrined in ancient documents, in which lie the real materials for the yet unwritten history of our country. They will find interesting autograph letters from all sorts of celebrities, including Queen Elizabeth and Queen Victoria, Oliver Cromwell and Napoleon III., Sir Christopher Wren and Dr. Johnson, and, most precious relic of all, here may be seen one of the best of the five genuine autographs of Shakespere, affixed to a deed of bargain and sale, with the seals attached, of a house in Blackfriars, purchased by the immortal bard from Henry Walker, and dated 10th March, 1612. Of the remaining four signatures, three are attached to Shakespere's Will in Doctor's Commons, and one to a mortgage deed of the 11th March, 1612, which was purchased by the British Museum in 1858 for £315. The one in the Guildhall cost the Corporation only £145. To say nothing of collections of medals and engravings, the museum possesses the famous Runie stone found in S. Paul's Churchyard in 1852 at a depth of 20ft. below the surface, and the Roman tessellated pavement found more recently in Bucklersbury 19ft. from the level of the roadway. Of other Roman and mediaeval relics, such as coffins, altars, personal ornaments worn, and domestic articles used, by our earliest invaders, there is no end. The library contains, among its other rarities, many first editions which would require a fortune to purchase them, a complete set of the *London Gazettes* from 1665 (for which the Corporation gave 250 guineas), and

hundreds of volumes of Hebrew and Rabbinical literature literally worth their weight in gold. Every person is free to partake of this intellectual feast. There are no conditions, beyond the condition of respectability; and if the public fail to appreciate it, the fault will certainly not be the Corporation's. They have spread the feast with a liberality worthy of the City which they represent, and to one and all they say, "Come, without money and without price."

QUANTITIES.—XIII.

MASON.

PROBABLY there is no trade about which so much difference of opinion exists in the method of measuring as is to be found in connection with the Mason. And who shall say which method is right? Each surveyor holds to his own idea as the correct one; and if we refer to the really practical men—the masons themselves—I venture to state we shall get just as many conflicting opinions as are to be found amongst those who study simply the theory. Happily, however, the differences that do exist are principally confined to the descriptions of the labours expended upon the stonework; and this arises in some degree from a want of knowledge on the part of the surveyor as to how it is intended the stone should be worked, or what preparatory labour should be taken on stonework in cases of elaborate detail; consequently matters of doubt are apt to be expressed incorrectly. It should always be observed that the labour upon stonework is to be measured and described according to the nature of its execution, and should at the same time be measured in the order in which the labours are worked, the inferior work generally being done first and the superior faces last. In proceeding to the measurement of stonework, there will of necessity be many who differ with the methods I advocate, and which I have adopted in my own practice. To such I say, Consider your own method and that advocated by me, and compare them. Where differences exist, ascertain why one surveyor should take certain works differently to another. If some such course as this be pursued, we shall ultimately arrive at a time when a uniformity of measurement will be adopted, and all such differences shall cease to exist. It is a well-known fact that many surveyors take out the labour on stonework somewhat excessively, so as to cover any omission in quantity or error of description which through their incapacity might arise. It is also well known that the more elaborately the work is measured the greater will be the builder's estimate. Still, this should not deter men from pursuing a course which is manifestly correct. We frequently see surveyors, in small jobs especially, omitting to measure labour at all, trusting to descriptions and sketches—thus avoiding what they consider unnecessary trouble. And I venture to observe that very few surveyors or builders could estimate, unless it be approximately, what would be the value of it at a glance; and in the case of where such works are to be carried out to any extent, half-a-dozen builders would tender as widely different as those that are so constantly brought before our gaze weekly in the professional papers; and who shall say that these very cases do not arise from some such cause? In small jobs, such works as string-courses, copings, plinths, &c., might be measured in this way; but even then, I think, this method is to be deprecated, and I would recommend that the ordinary or more professional mode be adhered to.

There is one description of stonework, however, which requires very little practical knowledge in ascertaining the way of measurement, and as this is the simplest, and of a much less expensive nature, I will treat of it first. I refer to stone-rubble walling, and although there are so many descriptions of this class of stonework, they are all measured

in one uniform way, which way, however, depends upon the standards adopted in the several localities in which the stone abounds. In neighbourhoods within the vicinity of the stone quarries, and where stonework is cheaper than brickwork, it is frequently—I may say generally—the case for houses, &c., to be built of the stone in what I may term its natural state—that is, unworked; and as I have just stated that in such cases the method of measurement depends upon the locality, and as various localities have different methods, it is always advisable, where a surveyor has to deal with this description, that he should obtain from some one in the neighbourhood what is the local standard of measurement. That which I have found to be the most usual rule in such cases is to take it by the yard superficial, and state the thickness of the wall and the description of the work, whether coursed or uncoursed, or as the case may be. The description of this class of work having been enlarged upon in your columns quite recently, it will be unnecessary for me to dwell thereon. In some districts, again, this kind of stonework is measured by the perch of 18 superficial feet of an uniform thickness of 24in—all thicknesses of walls being reduced to this standard, after the same manner that brickwork is reduced to the rod of 272ft. super. of 1½ brick thick. And another method is to measure it by the cubic yard. In either of the latter cases, all labour applied to the face of the work would have to be taken and described separately, such as scabbling, &c., which in the first case—viz., where measured by the yard superficial and the thicknesses stated, would be obviated. Where the labour is taken separately, measure it by the foot superficial. Window and other arches, where executed in this description of material, would be measured in with the ordinary walling, and a second dimension taken of the arch, which would be described as "Extra to rough hammer-dressed arches, 16in. high, with radiating joints," or as the case may be. This is measured by the foot run. "Extra labour to forming small openings" are better numbered. Quoins, where executed of different material to the walling, must be taken separately; and where laid in regular blocks, the labour must be taken out in the manner hereafter to be explained. Where, however, it is of the same material as the wall, it should be measured in with it, and any extra labour in working and setting should be measured separately. Where the quoins are of brickwork, it is customary to measure them by the foot run; and as all descriptions of rubble-wallings should be provided with an internal lining to prevent osmotic action, brickwork not being so susceptible to the wet as stone (a subject upon which I have enlarged in a former paper on "Building Stones"), and it also presenting a better surface to plaster against, it is usual in such cases to measure the brickwork at the same time as the stonework, and this description of brickwork would be reduced to the rod in the ordinary manner, but be described separately from the other as "brickwork in lining to rubble stone-wallings."

I may observe, in concluding this description of stonework, that is only customary to deduct other descriptions of stonework and other material where it is over four inches in thickness.

Proceeding then to the measurement of wrought stonework, or stonework upon which a much greater degree of labour is expended in the working of the faces, beds, and joints, we arrive at that portion of our subject which requires more experience and a greater amount of care.

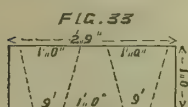
Each stone must be taken separately, the cubical contents being ascertained firstly and the labours taken lastly. Ashlar work, however, is usually taken, including all labours in beds and joints, either by the foot superficial, stating the average thickness, or by the foot cubic; but in the latter case the face will

have to be measured separately and described as worked, whether rubbed or otherwise, whereas in the former this is obviated by including it in the description.

In measuring block-stone, take the full dimensions of the stonework as it comes to the banker. In cases of irregular pieces of stonework, the dimensions must be taken of the smallest rectangular block out of which the said stone can be cut; consequently it is evident that were every such piece of stone cut in this way there would be considerable waste. This, however, is not always the case, as a clever mason will consider before cutting the stone how he can economise it by sawing two or three irregular pieces out of one stone, and this is easily perceived in the case of arch stones, where the several stones would be measured the full size, and the oblique surfaces taken as sunk work, as will be hereafter explained. Take the example shown in Fig. 33: here we have three arch stones, which, taking the largest dimensions for the measurement of each stone, would be, presuming the thickness to be 12in.,

3	1.0		
	1.6		
	1.0	4.6	Cube stone

But looking at the sketch, it is evident that



the three stones could be cut out of a single block 2ft. 9in. long,

2.9			
1.6			
1.0	4.2	Cube stone	

and that a saving would be effected by the mason to the extent of over 4in. Still, however, the former is the method which is always carried out, and it would not be wise for me at present, perhaps, to advocate any other course.

The following are the descriptions of the various labours executed on stonework:—

Plain work consists of the removal of the irregularities of the stone with the least waste of material and labour, so as to obtain what the term implies—a plain face, or even surface.

Sunk work is formed by working below the flat surface, as in rebates, weatherings, sinkings, &c., and it may be either straight or circular, but when circular it should be kept separate from the straight, and described as

Sunk work circular.—Fig. 34 is a sketch of the latter.

Circular work comprises the labour to concave and convex surfaces, such as to circular soffits, shafts of columns and the like.

Circular sunk work consists of the labour required to form circular sinkings as distinguished from straight sinkings.

Circular circular work, or spherical work, as it is sometimes called, comprises the labour in forming niche heads, domes, and the like, being circular on plan and in elevation.

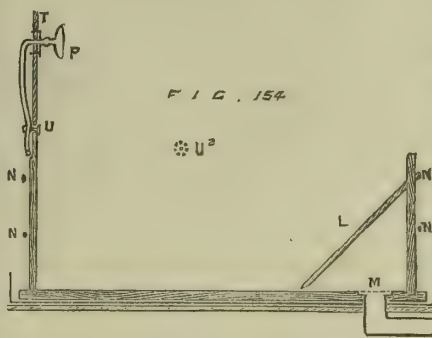
Moulded work comprises the labour in forming mouldings in stonework, and may be either straight or circular; where the latter, as to bases to columns and over arches, it must be kept separate from the straight.

I have thought it necessary to give the foregoing definitions for the benefit of those of my readers whose experience of the subject has been insufficient for them to find them out practically, and I propose showing the method of measuring them by a series of examples; such being, I think, of greater advantage to the student than simply by my defining certain rules, and leaving him to carry them into practice. Next week we shall treat of this portion of the subject.

B. F.

PLUMBING.—NO. XIV.

IN continuation of my remarks about hot-water fittings and baths, at pp. 206-209, I go on to speak of marble baths. These are generally put together as follows:—The piece which forms bottom is about 6in. longer and broader over all than the inside size of bath; this allows a check to be cut in it 1½in. broad and about ¾in. deep all round, besides leaving an outside margin of 1½in., as shown by Fig. 154,



which shows longitudinal section. The marble used is supposed to be all 1½in. thick, except the bevel piece L (Fig. 154) which is only about ¾in. thick. The pipes, cranes, and valve for Fig. 154 may be fitted up in the style shown by Fig. 142, but instead of the outlet on top of waste-pipe being seen as at O (Fig. 142) it may be concealed by being put in at back of bevelled piece L, viz., at M (Fig. 154).

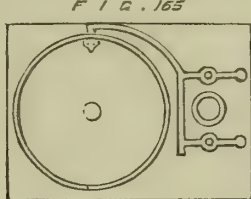
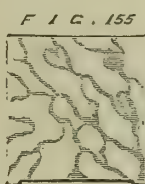
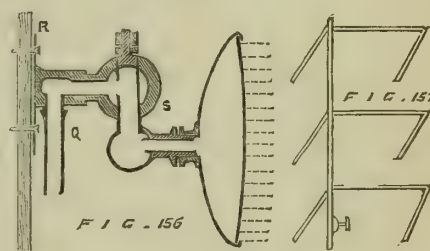


Fig. 155 is face of bevelled piece L (Fig. 154); it is about 2ft. square, and has the bottom cut out to a height of about ¾in., as shown, so as to allow the water to flow out underneath it. The small projections, about 2in. broad, left at each side, are let into bottom of bath a little, in order to keep the bevelled piece L in its place, and prevent it slipping down. This bevelled piece of marble L (Fig. 154) is merely put in for appearance sake, and is movable at pleasure, and, being so, the portion of bath at back of it can be washed at pleasure.

If the inside length of marble bath is to be 6ft., then the three pieces of marble which form bottom and sides are each about 6ft. 6in. long, and as for the end pieces, they are grooved into the sides as per Fig. 131, p. 6. Two long brass or iron (the former is best) bolts are also passed through each end of bath as at N N N N (Fig. 154), with jamb-nuts to keep sides of bath together. Underneath marble bath a lead safe is placed, with waste-pipe, as per Fig. 142. For the joints of marble baths some use whitelead, but while it makes a good joint, the oil in it has the effect of discolouring the marble near the joints. Stucco, therefore, is used by some, while others use Portland cement; that, however, pertains to the marble-cutter's work. We need hardly say more about plunge-baths, as the plumber who can fit up those already mentioned will have no difficulty with slate or stoneware ones, only I may here observe that I consider it would be well to give the siphon-trap of the bath rather more "drown" than it generally gets, so that instead of there being only 1in. depth of water for water-lock, there might be 3in. or more. This would allow some margin for evaporation, &c., in case the bath were disused for some time. The other day I came across a case of bad smell in a house, caused by the water in syphon-trap of bath having

dried up so far as to allow the passage of bad air from soil-pipe through it; the bath had not been used for some time.

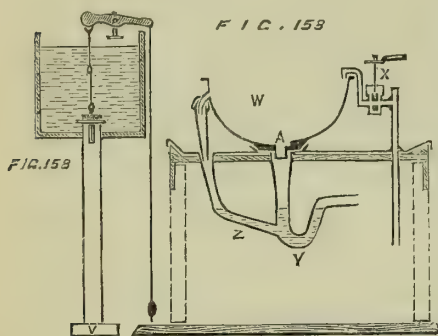
I must now say a word about spray-baths. These are fitted up in various styles, such as the rose, tube, and case sprays, either of which may be fitted up at end of the plunge-baths, above referred to, as at P (Fig. 154), which shows section of rose-spray, supplied by water through one or two stop-crane, according as there may be only cold supply to it, or both hot and cold. The sort of crane to be used may be either one with ground brass key or a screw-down one, just as may be most suitable for the pressure, &c. The diameter of front or face of rose-spray may be about 6in., or more if wished, the sheet-brass (or it may be cast) of which the perforated portion is made being pierced all over with holes so small as only to admit the point of a needle. This perforated portion or face of rose-spray ought not to be much rounded outwards, because if so the water is apt to spread out and scatter too much. A projection of about ½in. in the centre will serve, and the number of small holes in a rose-spray 6in. in diameter may be from 150 to 200. The rose-spray being jointed at back, the water from it may be made to flow out in the desired direction, higher or lower, as wished. Fig. 156 shows sectional view, cut



horizontally, of a rose-spray, with the supply coming in at Q (of ½in. or ¾in. bore, according to pressure), and being outside the brass flange R, by which the rose-spray is fixed to wood lining above end of bath; whereas the supply for spray-bath P (Fig. 154) comes in through lining to back of flange. The diameter of flange R (Fig. 156) may be about 4in. The joint at S (Fig. 156), which allows spray to be moved up and down, is a common ground one, made so as to suit the purpose—but, instead, some use a ball-and-socket joint. In fact, the roof-plate, including ball and socket, of a gaselier, if larger and stronger than ordinary, and with an extra large drop-screw (straight or knee'd, as most suitable), might serve, and might be that used at T (Fig. 154). It is better, however, and the proper way, to have joint specially made for the purpose; and, for my own part, I like the style of joint shown at S (Fig. 156) best. In Fig. 154 the water-crane at U for working spray is shown a little below it; but, instead, it may be more handy to place it to one side of plunge-bath, and two or three feet back from spray-bath, as may be thought most convenient (as per U², Fig. 154).

The tube-spray can be made by placing a 1in. or a ¾in. copper, brass, or strong block-tin tube, or even a piece of ¾in. 8lb. lead pipe, about 2ft. or 2½ft. long, up one corner of the bath—or up centre of end of bath—with three or more ¾in. tubes branching off each side of it, as shown by Fig. 157, where the height of lowest horizontal tube may be from 6in. to above top of plunge bath. The horizontal tubes have a number of small holes bored in front of them. The supply is regulated by either one or two cranes, as necessary. The case spray is set up on top of end of plunge bath, and stands up, say 2ft. or 2½ft. or so. It may stand up not only across end of bath, but also come round each side about 18in. or 2ft. It is formed by taking a sheet of strong zinc, No. 16 or upwards, say 5ft. long by 2ft. broad, which, being bent round to fit end of bath, above which it is to stand, is then bored full of holes to suit position of ribs put on at

back. These ribs are small half tubes soldered on to back of zinc sheet, and all branching off from a large central "backbone," or main tube of (say) 1½ in. diameter. The spray bath is a great favourite with many who are afraid of the regular shower bath, as the water comes out as gently or more strongly as wished, and where there is both hot and cold supply to it, the temperature of spray can be made to suit. In the case of the wave bath, the water which comes out horizontally does so with much force, deluging the body in a moment. The amount of water and its force can of course be regulated by the size of pipe, valve or crane, and mouthpiece used. The mouthpiece may be either (say) 6 in. by 1 in., or it may be 1 ft. by ½ in., and if wished, a regulator to enlarge or contract mouth may be put on. Fig. 158

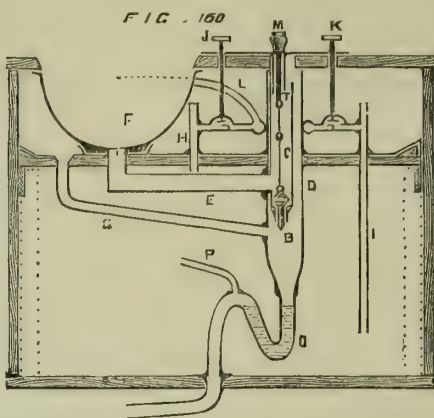


shows wave supplied from cistern above it with 4 in. valve and lever; but instead, a crane or cranes may be used, leading water to a tinned copper mouthpiece of any desired size or shape. In many cases the wave bath is fitted up with but one mouthpiece; in other cases there are two mouthpieces, in which latter case the water strikes the body on both sides at once.

I come now to wash-hand-basins; these may be fitted up in many styles, from the simple plug and socket one shown in Fig. 159, to the most elaborately fitted-up cabinet stands. In Fig. 159 W is wash-hand-basin, X is ½ in. pillared stop-crane, Y is 2 in. lead siphon-trap, Z is safe-pipe with overflow of basin led into A. A is brass socket-grating with brass plug. This brass plug has brass chain attached, and is taken out and put in with the hand. Fig. 159 shows sectional view of wash-hand-basin W, set and bedded with putty upon the top of wooden wash-hand-basin stool. The top of this stool (which is supported by four legs, one at each corner) is covered with lead, say 4 lb. to the square foot, and the top of siphon-trap Y, being carried up through hole cut for it in top of stool, is soldered to lead safe. The supply pipe to water crane X, where it passes up through stool, is also soldered to lead safe, thereby helping to keep water crane in its place. The general height from floor to top of basin is about 2 ft. 5 in.; but if put in so as to be most suitable for either short or young people, the height may be a good deal less. This simple style of fitting in wash-hand-basin corresponds with that of bath, as shown in Fig. 130, page 6, Jan. 3rd; but when so fitted up it is generally done to save expense, as, where the customer can afford it, the plug in bottom of basin, as per A, Fig. 159, is dispensed with, and instead, the valve B, Fig. 160, with its different and more elaborate arrangement of pipes, is adopted.

In Fig. 160 B is ground brass valve, the diameter of which or rather of its socket over all, is about 1½ in., C is 2 in. lead valve-pipe, made of 6 or 7 lb. sheet lead, it is placed inside the 3 in. lead rod-pipe D. By keeping two-thirds of the circumference of the top of the valve-pipe C about 2 in. lower than the top of rod-pipe D, the valve-pipe C thereby acts as its own overflow and as the overflow of basin F, for as the water rises in basin F by the law of fluids it also rises to a corresponding height in valve-pipe C; but as top of

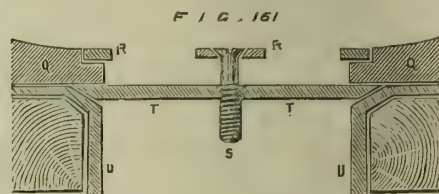
valve-pipe C is 2 in. below top of rod-pipe D, which latter is level with top of basin, it follows that whenever the water begins to rise up in basin higher than 2 in. from its top, it—the



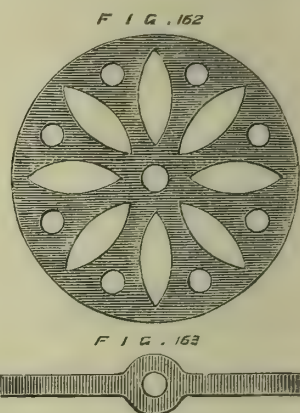
water—immediately begins to flow away over top of valve-pipe C, which thus acts as a safety pipe, at least so long as the communication is left free between basin and valve-pipe. E is waste-pipe from basin; the soldered joint at end of E next rod-pipe unites E C and D together as shown. F is the wash-hand-basin, which may be either a plain white one or one with gold and colours, according to taste. A very effective and chaste basin is one with three gold lines, each about ¼ in. broad, round it; one round top, one half way down, and the third circle about 3 in. in diameter, round brass grating in bottom. G is 1½ in. lead safety pipe for carrying away any water which may fall into lead safe. H and I are the hot and cold supply pipes of ½ in. bore, and if of lead, either 6 lb. or 7 lb. per yard, according to pressure. If the pressure on both hot and cold pipes is the same, the hot one is put in a pound per yard heavier than the cold pipe. J and K are the hot and cold pillared screw-down stop-cocks; size ½ in., with round ebony or brass handles. L is the supply-pipe leading water to basin, with small brass tube soldered to end of it, so that said brass tube bends over edge of basin. M is the knob, brass or otherwise, with lifter attached underneath to work the waste-valve at B. N is wood or marble top of wash-hand-basin, and it will be observed that underneath waste-knob M a hole is cut in it large enough to allow the waste-valve to be drawn up through it, so that the valve can be easily taken out to be examined or cleansed; this hole is not seen when the brass plate is put on. This brass plate, in this case, may be about 14 in. long by 3½ in. broad, but if cranes were placed (as in Fig. 165) across rod-pipe instead of end on to it (as in Fig. 160), then the two pillars of cranes being much nearer each other, the plate would be much shorter, say 9 in. long in place of 14 in. It is understood that the pillars of the two cranes pass up through holes in brass plate just large enough to allow them to do so. The two cranes J and K at their outlets are joined together by a piece of lead pipe bent round rod-pipe, out of which goes the pipe L (Fig. 160) carrying water-supply to basin. O (Fig. 160) is a 2 in. or a 2½ in. lead siphon-trap, and if the waste-pipe discharges into soil-pipe, the ventilating-pipe P may also be put in. Anent ventilation, see page 392 of the BUILDING NEWS for May 17th, 1872. For a good job, and especially where the inmates go from home for months together, the siphon-trap O of wash-hand-basin should be so made as to hold a good depth of water. Were that depth in all about 8 in.—thereby giving about 6 in. of water-lock—due provision would be made for evaporation, and loss of water-lock prevented. Instead of adopting this simple, yet effective course, I lately saw a proprietor going to the expense of putting on large 2 in. brass stop-cocks, which cocks were to be shut

when the family went from home. Now not to speak of the probable difficulty of turning these large cocks after a time, there was the danger of water being poured into basins when cocks were shut, and as it could not get away a flooding might take place.

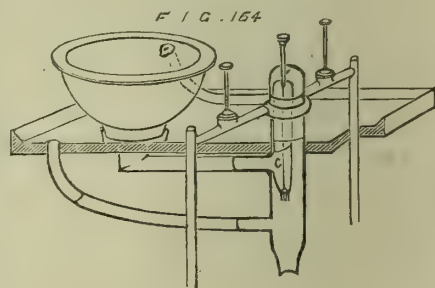
Inside of bottom of wash-hand-basin F, Fig. 160, there is a round brass grating, about 2½ in. in diameter. This grating is held in its place by a brass screw, which passes down through its centre and goes into a small brass bar which passes across the top of waste-pipe, and is soldered at each end to top of waste-pipe. Fig. 161 shows section of this brass



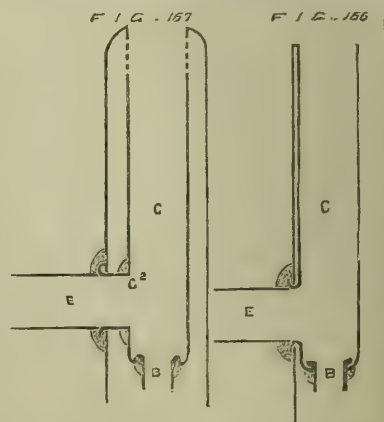
grating-bar and nail *in situ*, Q Q being bottom of basin; R R is bottom of grating (of which Fig. 162 gives top view); S is brass-screwed



nail, and T T brass bar about ½ in. thick (Fig. 163 gives top view of brass bar); U U



is top of the lead waste-pipe, E, Fig. 160. Outside and around bottom of basin a strip of



lead about 2 in. broad, or broader if wished, is soldered to safe, and being made to fit round

bottom of basin it thereby helps to keep basin in its place when set. Fig. 164 shows cranes and rod-pipe arranged alongside of wash-hand basin, from back to front, in place of end on to basin, as in Fig. 160. The water in this case enters basin by mouth of lion's head, there being a horn at back of lion's head on outside of basin for supply-pipe to be attached to. The cranes need not necessarily be always put on as shown in Fig. 164, for by placing them as in Fig. 165, the pillars are brought nearer each other, while the arrangement is still kept up of the cranes and rod-pipe being alongside the basin. In regard to the 2in. valve-pipes C C (Figs. 160 and 164), there are two ways of fitting them in rod-pipes: Figs. 166 and 167 show these two ways. Fig. 166 is an enlarged view of that in Fig. 160. In Fig. 166 the valve-pipe C is put in close to that side of rod-pipe to which the waste-pipe E from wash-hand-basin is joined. In Fig. 167 the valve-pipe C is placed in centre of rod-pipe, and at C² a short piece of pipe is soldered on sufficient to pass out through side of rod-pipe and be flanged back about $\frac{1}{2}$ in. B B (Figs. 166, 167) are the brass sockets of the two waste-valves soldered to bottom of valve-pipes. Further verbal explanation is unnecessary, as the two drawings explain themselves. In my next I intend to speak of cabinet-stands, and different ways of fitting-up from the above.

ERRATA.—At p. 208, first column, second line from top, for "two-pillared" read "two pillared." On thirty-first line, for "covering of roof" read "covering of cistern." On third column, same page, and third line from bottom, for "is almost about $\frac{1}{2}$ in." read "is about $\frac{1}{2}$ in."

(To be continued.)

HISTORIC ART STUDIES.

By DR. G. G. ZERFFI.

OCEANIC AND MEXICAN ART.

(With Illustrations.)

WHATEVER Mr. Darwin's theory may be with regard to the "Origin of Species," his hypothesis of a gradual development with reference to art stands as firm as a rock—as correct as the right solution of a mathematical problem. Art has developed out of two form-elements—the straight line and the curved line. The progress of art consists in the variegated use and skilful combination of these two elements. Under certain influences here and there a cessation takes place in the progressive development, or a sudden electric storm breaks out, hurrying humanity on the path of progress, and apparently exhausting the energies of mankind for centuries; then we have moments of total stagnation as precursors of a still greater artistic activity. These wave-like movements on the sea of conflicting concrete forms and abstract ideas constitute the periods in Art-History. Whether we study Art in the so-called Old or in the New World, we trace everywhere the powerful influences of nature, religious conceptions, and the ethnological elements under which it arose, progressed, and decayed. Savages have often a correct appreciation of ornamental art. They use the most primitive geometrical figures, rarely attain the power of drawing animals correctly, and altogether fail when they attempt the human figure, as may be seen in Figs. 1-3, representing idols from the Sandwich Islands. These grotesque-looking sculptures vary from 3ft. to 8ft. in height, and are generally placed on stone pillars to ornament the Morais (Meru, Meroe, Morai, Moriah—meaning in India, Egypt, Greece, Israel, and in the Sandwich Islands, "sacred places of worship"). This philological analogy is not less mysterious than the form of the big helmets of Greek and Roman shape which these short-legged figures wear on their monstrous heads, and which undoubtedly took their origin in masks, as a

development of the savage art of tattooing. To ornament the body is a custom practised and cherished during the first dawn of awakening consciousness in humanity. Scarcely has man formed his flint instruments, when he begins to make incisions on his body, to make himself look terribly beautiful, and as little like a human creature as possible. This first stage of this kind of ornamental art we call the *Manka process*. At a later period the decorating incisions are improved by colours, we attain a higher degree of art, *tattooing proper*, and lastly masks are substituted for the painful operation. Unconsciously man wishes to be dressed. Not yet acquainted with textile art, he cuts and paints himself a mask for the face and a dress for the body. A savage chief once asked by a traveller "Why he tattooed himself," answered, "You would not like me to sit naked in respectable society;" and in this answer we have a solution for the development of this art. In an advanced state of civilisation the savage uses helmets and masks to terrify his enemies or to overawe his inferiors.

In these oceanic idols we find connecting links between Egyptian, Archaic, and Etruscan sculpture and the arts of the great Western continent. Whether America was ever united to Europe, Asia, and Africa, or whether there was ever a connection between the nations of the eastern and western hemispheres, are questions which it must be most difficult for the general historian to answer. They are, however, less difficult for the archaeologist and the student of comparative philology, mythology, and art. In the sculptures of Central America we can trace the three principal groups of humanity. We have types of the Negro, the Mongol (or Turanian), and the white man (or Aryan). Every one will see in the face in relief (Fig. 5), the Assyrian type; the two heads (Fig. 6) bear unmistakable signs of an excellent treatment of the right-angled Aryan face. The pyramidal, the square, and the oval-headed men left their artistic imprints on the soil of America from time immemorial. The Aryan introduced his language, architecture, sculpture, mythology, customs, astronomy, and ideography into Mexico and Peru, and did this at a time when all these branches of his own civilisation were in a yet undeveloped state.

We find in America, firstly, the Karaibs, or the Karinas, or Kalinas; scarcely more than 80,000 souls, on a territory not larger than France, divided, according to Humboldt, into not less than 200 different nations. In this subdivision we recognise the Turanian element of individualisation to be observed in the innumerable tribes of Central Asia. High cheekbones, broad shoulders, and short legs are their distinguishing characteristics. They are nomadic, warlike, and active. The colour of their skin is yellowish, and they are, in fact, the Mongols of America. We have, secondly, the so-called North American aborigines, scattered over a territory of 120,000 square miles. M. Aspach puts them down as the direct descendants of the Normans. They have regular Aryan features; their children are born white, and they live in independent clans, reminding us of the Rajahs of India, the city organisations of Greece, the nomes of Egypt, and the tribes of Israel. Lastly, we have the black aborigines of South America. We thus find all the three elements of the East in the artistic products of the distant West. In the north of America, tumuli and mounds abound, resembling those which are spread over Asia, Europe, and certain parts of Africa. In the centre we have truncated pyramids and rock-hewn temples, and in the south, palaces, high roads, and aqueducts, most excellently finished. The temples are constructed on the plan of those of India and Egypt, as though the architects of America had been article to some Egyptian hierophant, to learn how to build their "teokalli." Compare θεος (God), and καλῖα (a wooden house, or shrine). No less striking is the resemblance

in the pottery, as in Fig. 4, which has the pre-historic form of Denmark, Ireland, France, Germany, Etruria, Egypt, and Greece, and (Fig. 7) the high relief ornamentation of which is of an excellent Chinese pattern. We can also not fail to observe in Figs. 8 and 9, representing ornaments from Xochicalco a remarkable resemblance to the Assyrian sun ornamentation and the Gothic quatrefoil. The backs of these stones are left rough, to be used as ornaments in coffers or "cassettes." In Fig. 10 we have reliefs from the portal of a temple at Tiaguanaco. The grotesque architectural and linear treatment of the human figure is very striking. Fig. 10 (a) represents the sun ("Baal" Osiris) with broad rays around his head, holding a sceptre terminating with a crowned eagle's head, in each hand. Seven mystically combined double-headed serpents, with bird's heads, are to be seen on a kind of pedestal, towards which stride with pompous gravity 58 figures in three rows. In the upper and lower rows are winged kings, with their crowns and sceptres, of which we give one specimen (Fig. 10, b), whilst in the middle row we have winged figures with condor heads (specimen of one Fig. 10, c), reminding us of the eagle-headed masked priests on Assyrian slabs, which have been mistaken by archaeologists for sacrificing divinities. That the priests used to approach the sacrificial sanctuaries in India, Egypt, Greece and America, wearing masks, cannot be doubted. In General Cesnola's collection there was a figure of a priest with a bull's head as a mask, which could be taken off. In Fig. 10 (d) we have an ornamental band dividing the three rows of sun-worshippers, and we cannot help admiring the eurythmical arrangement of the pattern, representing a human head surrounded by a halo. The use of straight lines terminating at both ends with small birds' heads for a decorative purpose is most characteristic. Figs. 11, 12, 13 and 14 represent Aztec idols, which force us to seek for analogies elsewhere, and enable us to connect Mexico with India and Egypt. Their god Teotl (Diaus, θεος, Deus) was like Brahma and Amn, the supreme, perfect, invisible divine being, to whom they built no temple and offered no sacrifice. Tezcatlipoca (the shining mirror—the glassy waters) the Vishnu of India, the Egyptian Num, Nu, Kneph, or Chnubis, was the soul of the world, the creator of heaven and earth, Brahma or Zeus. He rewarded the good and punished the wicked. Tonatli or Tonatiuh, and Meztli were sun and moon (Osiris and Isis, Apollo and Diana). Quetzalcoatl (the winged serpent) was the teacher of good and evil. He introduced metallurgy and stone-cutting; and gave wise laws to mankind. During his residence on earth, wheat grew to such a size that one man could scarcely carry a single ear. Cucumbers were much taller than men; and to save men the trouble of dyeing the cotton, it grew on the trees in different colours. Huitzilopochtli (Vitzliputzli) was the Mexican Mars, the god of war. He was represented in a colossal form with blue stripes on his arms and legs. Like the hero Bhima in the Ramayana, he also uprooted pine-trees, and killed with them his surrounding enemies. His face was covered with a golden mask, he sat on a blue bench, the four corners of which were encircled by four huge serpents; round his neck he had a frill of ten human hearts; in his right hand a huge blue club, in the left a shield, to which five feather balls were attached in the form of a cross; his body was surrounded by an immense serpent. This god was unquestionably a combination of Vishnu and S'iva. Fig. 13 is a representation of Centeotl, the goddess of earth and flowers. The head-dress of the idol must remind us of capitals of the columns of Denderah and the mysterious "calantica" on the heads of Isis, the great Sphinx, Antinous, and many other Egyptian statues. Fig. 14

is the Sun-god in a crouching position. On his head is a diadem, often found in this form in German, Irish, and Scandinavian mounds. The sculptures are in a very primitive artistic state, like those of the early Indians, from whom they apparently borrowed the pearl ornament, bracelets, anklets, and the head-dress (see Fig. 13, from a colossal stucco from the temple of Palenque). The grouping of the two figures is lively and full of realism; it is evident that a message of great importance has been delivered by the standing figure; whilst in the other figure amazement is clearly expressed in the reclining head and the widely opened mouth. With the exception of sculptured idols and statues, the figures on the reliefs are generally in profile. This mode of treating the human figure marks a special period in the development of art. We may call it "the evolution period of profiles." The stuccos and reliefs of India, Egypt, Assyria, Mexico, and Etruria, bear out this suggestion, as we may collect miles and miles of figures in profile from Assyrian slabs, Indian and Egyptian walls, Etruscan tombs, and Mexican temples.

Fig. 15 is a stone on which captives or criminals were sacrificed to the mighty war-god Huitzilopochtli. The excellent geometrically arranged solar decoration is very much like the Irish and Scandinavian ornaments on discs and shields. The stone is 9ft. in diameter and 3ft. thick; its front was decorated with groups, of which we give one (Fig. 16), representing a warrior holding a captive by the feather-ornament of his head-dress. The stereotype figures, of which there are fifteen, representatives of conquered provinces, stand in humble positions before the king, and remind us forcibly of the Assyrian slabs of Khorsabad and Nineveh.

The group Fig. 17 is taken from the pyramid of Xochicalco, which is ornamented with reliefs cut in porous porphyry. It is undoubtedly less ornamented, and shows a greater appreciation of life-like simplicity. The sitting position of the figures is that of the Indian divinities, whilst the cap (Pshent) of the figure on the left is adorned with a uræus (*oupaos*), pointing to some Egyptian influence, whilst the rabbit (Kakatu), the Zodiacal sign of spring, is taken from the Chinese Zodiac, this animal being also often seen on Etruscan lamps and urns. In general, the sculptures and reliefs are all disproportioned: the heads are too big and long, the foreheads depressed, the noses protruding, and the necks are too thin. The feet and hands, however, are often executed with great care and delicacy. The dresses, partly of Indian and partly of Egyptian pattern, are overloaded with pearls, feathers, laces, and other ornaments. The groups are framed in by borders representing variegated arabesques, in which the artists rarely observed the law of Eurythmy. On the contrary, a wild irregularity and a fantastic grotesqueness characterise all their works. In the north of America we have chiefly mounds of huge construction; here and there we can trace Kyklopean walls. In the south we have aqueducts, viaducts, palaces, and temples, especially round Lake Titicaca. The rocky plateau into which Lake Umayo is sunk is adorned with a group of ancient square burial towers, known as Chulpas (Stupas, Tupas, Topes, Tops!), reminding us of Irish and Norman towers. In the centre we have an overcrowded ornamentation without law and guiding principle. This confusion of forms is even more visible in their drawings and paintings (see Fig. 19), which are nothing but a flat filling-in of bright primary colours in confused outlines.

The causes of the Mexican "symmetriophobia" in works of art is to be looked for in the fauna and flora of the tropics of America. In the same ratio as the fauna are dwarfed in America, the tapir representing the elephant, the jaguar the lion, the lama the camel, and the alligator the crocodile, are the products of art smaller than those of Asia and Africa,

from which countries the settlers in America borrowed forms at a period when fair Atlanta had not yet been lost. The exuberant flora of America filled the minds of the artists with such a profusion of forms, and terrified them to such an extent, that they were incapable of disentangling their minds from the winding and creeping flora, from the howling animals and the trembling mountains. To the gorgeous grandeur of nature we must ascribe the confused incapacity of the Central Asiatic artist of old to produce other than his peculiar forms of art.

FARRINGTON MARKET.

A PROPOSAL to reconstruct Farringdon Market was a fruitful theme of discussion at a recent meeting of the Court of Common Council. The members seemed to agree as to the necessity of the proposal, and the only question was, "Where shall the market be rebuilt?" This is a matter which deserves all the consideration that can be given to it, and it was well that the Markets Committee were invited to reconsider this branch of the subject. At the meeting of the Court much stress was laid upon the value of the site of the present market, and its value was urged as a reason why the market should be reconstructed on a site abutting on Charterhouse-street, and in close contiguity with the new meat and poultry markets. There can be no doubt as to the site of the present market being more valuable than one in the vicinity of Charterhouse-street; but as has been said, it is not quite so clear that because this is so, the old market must be demolished to admit of the ground being more advantageously dealt with. If the old site is the best one for the market, there it should be reconstructed, for the Corporation, as the *City Press* justly says, is not a necessitous body, and can afford to appropriate sites, however valuable, to purposes to which they may be singularly suitable. If the Court of Common Council had power to remove the market, it would by no means be safe to do so upon the arguments which have, so far, been advanced in favour of the step. The removal of a market is a hazardous thing at any time, and those who propose the removal of the market to another site can give no guarantee that the tenants would go there, and even if such a guarantee could be given, it is by no means certain that the accustomed purchasers would go there also. Again, by removing the market to a site so near to the meat and poultry markets, some difficulty would, we apprehend, be experienced in finding standing room for the vehicles bringing and taking away produce. All the available room is now fully occupied by the butchers' carts, and these leave little or no room for those of the greengrocers and fruiterers. If the market is retained on its present site, however, there is ample standing room for vehicles. These are considerations which must be weighed, and the Corporation must not, with the experience of Columbia Market before them, act hastily in the matter. It is said there would be no insuperable difficulty in carrying on the business of the old market during its reconstruction.

AVANTURINE AND MOSAIC GLASS.—In a lecture on "Decorative Glass," delivered at a meeting of the Royal Scottish Society of Arts at Edinburgh, on Monday, Professor Archer gave some interesting information on the manufacture of Avantine and Mosaic glass. To the Venetians was due the discovery of the imitation in glass of Avantine, a beautiful mineral having the appearance of specks of gold scattered through it. Many of the objects made by this process, first discovered in 1772, had scarcely the appearance of glass. There were, the Professor said, two great manufactories of mosaics in the world, one in the Vatican at Rome, and the other the Imperial manufactory in St. Petersburg, Russia. To such perfection had the art been brought, that in the Vatican it was said they had no less than 23,000 shades of colour in glass, while in St. Petersburg they had discovered between 13,000 and 14,000 shades. These shades were procured by mixing in the most skilful and delicate manner certain proportions of differently-coloured glass in a molten state. By means of the manifold shades of colour they were able to re-produce in imperishable material all the celebrated pictures of great artists, and that in such a wonderful manner as to render it impossible at a short distance to distinguish between the original picture and the mosaic.

THE THEORY OF THE FLITCH GIRDER.

THE flitch girder does not seem a very interesting subject for investigation. It is a comparatively humble member of the great army of constructive expedients, with none of the brilliant capabilities of its more complex relatives, yet wanting in that sweet simplicity which renders its immediate progenitor, the simple wooden beam, such an attractive and never-failing theme for the rudimentary treatise. The consequence is, that, while nearly every form of every species of structure has been theorised on and experimented on, written about and lectured about, and made the subject of rule and formula, the flitch girder seems neglected, or is only recognised as the subject of some empirical formulae of doubtful reality. The subject, however, involves questions of some interest and importance, and a few observations on the principles involved in a girder still so commonly used may not be altogether uninteresting or unprofitable.

When a straight homogeneous beam supported at both ends is loaded at its centre or throughout its length, a certain alteration of figure takes place. The beam is deflected and assumes a curved form, the convex side being downwards. The amount of this deflection will depend on a variety of circumstances of form, size, and material, but, in the same beam or beams of the same materials and dimensions, and for loads within the limit of the safe working load, it will be proportional to the load imposed. It follows from this that, if we ascertain the deflection of a beam under a given load, we shall be in position to tell what will be its deflection under any other load not exceeding the safe working load. But it will further appear that, even as the load imposed determines the deflection, so the deflection is an index of the load supported: that, just as the deflection can be calculated from the load, so from the ascertained deflection (allowing for the difficulty of accurately observing small quantities) the load supported may be arrived at. Thus, if a beam under a certain known load has been observed to show a certain deflection, and if that same beam under an unknown load is observed to have exactly one-half its former deflection, we are justified in inferring that the load it supports is one-half the former load—neither less nor more. Such is the intimate connection between deflection and load that, assuming the means of accurate observation to be available, the deflection of any beam might be made the means of ascertaining the load supported by that beam—as a beam: and it is necessary to apply some such process as this to the flitch girder, if we are to ascertain what proportion of the load in any case is borne by any one of the several component parts of the beam.

That this method of reasoning from the deflection to the load is a reliable one will be still further apparent if we consider what it is which supports a load when placed on the centre of a beam. We do not refer to the ultimate support of wall and foundation, but to the immediate support at the point where the load is applied. That point is kept in equilibrium by two equal and opposite forces—one the action of the load, the other the reaction of the beam. This reaction is due to the elastic force of the beam, that force with which it resists further change of form and tends to recover its original figure, a force which, within the limits of the proof strain, is directly proportional to the deviation from that normal figure, that is, to the deflection. If any case appear to contradict this principle, and a beam seem to support a greater load than the deflection accounts for, it will probably be found on investigation that the surplus load is somehow transferred to some other support without taxing the transverse strength of the beam.

Now, in a flitch beam, independent rectangular beams of dissimilar materials, which would, acting independently and each under its safe load, attain very different deflections, are so united as to form a compound beam, and their alteration of figure under the action of a load is so constrained that each of these component parts of the beam is deflected to the same extent. The immediate consequence of this is, that the flexibility of the less flexible material determines the deflection of the beam, the more flexible material is so confined by its association with the other that it cannot react on the load to the extent it otherwise would, and a large proportion of its strength is thus rendered ineffective.

It might at first sight appear that, even when the flitches and plate are of the same depth, their

breadths might be so varied as to make their independent deflections approximately the same, in which case no appreciable proportion of their strength would become ineffective when they were united, as uniform deflection would, in that case, only indicate that each separate element in the beam was bearing the same proportion of its safe working load.

A little consideration will show that no alteration of relative breadths will have this effect, because, though a beam increases in stiffness exactly as it increases in breadth, it also increases in strength in the same proportion. The result is, that, although when a beam, its load remaining unchanged, increases in breadth, the deflection is correspondingly diminished, yet the load must be increased in the same proportion as the breadth, if it is still to represent the maximum safe working load of the beam. Thus the increase in working load cancels, so far as our present inquiry is concerned, the increased stiffness, and the deflection under the working load or a given proportion of it remains unchanged: a fact expressed in the rule that the ultimate deflection is independent of the breadth.

Having thus ascertained that by no manipulation of the breadth, of the several pieces can we avoid that loss of a certain proportion of the strength of the wood which is due to its union with a less flexible material, the next step to a more complete understanding of the subject is to ascertain what proportion of strength is thus lost. In order to this we must ascertain what are the relative deflections of rectangular beams of iron and wood under their safe working loads. These we shall call their *maximum working deflections*, it being understood that we use this term for want of a better, to avoid circumlocution, and that by it we mean simply the deflection under the maximum safe working load, and have no reference whatever to limits of deflection fixed by convenience, and not affecting our present inquiry.

The strength of a rectangular beam varies as its breadth, and as the square of its depth and inversely as its length, and, taking A to represent a modulus of working strength for any given material, the maximum working load for any beam is $= \frac{A b d^2}{l}$. The deflection of a rectangular

beam under any load varies as the load, as the cube of the length of the beam, and inversely as its breadth and the cube of its depth. Taking B to represent a modulus of pliability for any given material, the deflection of a beam under any

weight will be $= \frac{B W l^3}{b d^3}$. To obtain from this an expression for maximum working deflection, we substitute for any load (W) the value for maximum working load given above $\left(\frac{A b d^2}{l} \right)$ and the resulting equation is:—

$$\begin{aligned} \text{Maximum working de-} \\ \text{flection of any beam} \end{aligned} \left. \begin{aligned} &= \frac{B l^3}{b d^3} \times \frac{A b d^2}{l} \\ &= A B \frac{l^2}{d} \end{aligned} \right\}$$

So that, for rectangular beams, the maximum working deflection or any given constant proportion of it varies as the modulus of strength and modulus of pliability of the material, as the square of the length of the beam, and inversely as its depth. In the case we are now considering, the beams are of different materials, but of the same depth and length; we have therefore only to compare the moduli of strength and pliability for iron, and, say, yellow fir. The following values represent these moduli, being the actual strength in pounds of unit pieces 1 in. square and 1 ft. span, and the actual deflection in inches of such pieces under 1 lb. as the unit weight.

For wrought-iron—average,

$$\begin{aligned} A &= \frac{47,000}{18 \times f} \\ B &= \frac{144 \times 3}{29,000,000} \end{aligned}$$

For yellow fir—average,

$$\begin{aligned} A &= \frac{8,320}{18 \times f} \\ B &= \frac{144 \times 3}{1,680,000} \end{aligned}$$

The figures in these values for A represent moduli of ultimate strength; and the symbol f

represents the factor of safety, or ratio in which the breaking load should exceed the working load. If this factor be taken the same for both materials—

Maximum working deflection of wrought iron is to maximum working deflection of yellow fir—

$$\begin{aligned} \text{as } & \frac{47,000}{18 \times f} \times \frac{144 \times 3}{29,000,000} \\ \text{is to } & \frac{8,320}{18 \times f} \times \frac{144 \times 3}{1,680,000} \\ &= 33 : 100 \end{aligned}$$

So that, in this case, the maximum working deflection of a wrought iron beam of the same length and depth of a timber beam is only one-third of the maximum working deflection of that timber beam. But this is an extreme case, because it would probably never be expedient to load timber with that proportion of its breaking load which wrought-iron might safely bear. If we assume that, for good materials, the factor of safety should be 4 for wrought iron, and 6 for timber, the above ratio becomes

$$\begin{aligned} & \frac{33}{4} : \frac{100}{6} \\ &= 49.5 : 100, \end{aligned}$$

or the maximum working deflection of the wrought iron plate is one-half the maximum working deflection of wooden flitches of the same length and depth.

It would thus appear that, in a beam of this sort, and even under favourable conditions, about one-half the strength of the wood is sacrificed by its union with the less flexible material. No part of the strength which is thus rendered ineffective can be brought into play without overloading the iron. Such is the result of this ill-assorted union that, in every case in which the iron plate and the wooden flitches are of the same depth, either the iron must be overloaded and in danger of rupture, or the timber must be underloaded and a large proportion of its strength ineffective. If the iron plate be supporting one-fourth of its breaking load, the load on the timber will be only one-twelfth of its breaking load, while, on the other hand, if the timber be loaded to the otherwise safe extent of one-sixth of its breaking load, the iron will be loaded to the very dangerous extent of one-half that load which would produce immediate fracture.

These considerations, while they show the very questionable economy of such an arrangement, enable us also to fix a minimum thickness for the iron plate. As the introduction of this iron plate causes a loss of one-half of the available strength of the timber, unless the beam is to be actually weakened by the process, the plate must add to the strength of the beam at least as much as it thus takes away: i.e., it must, considered as an independent beam, be at least as strong as one of the wooden flitches.

If the views enunciated above be correct, the insertion of a plate thus proportioned, and of the same depth as the flitches, will leave the strength of the beam unchanged, but will double its stiffness, a thinner plate thus inserted will lessen the strength of the beam, but double its stiffness within this narrow limit; while a plate thicker than the proportion mentioned above will increase both the strength and stiffness of the girder.

As the depth and length of the pieces are the same, the plate will be of the same strength as one flitch, if the breadths of the plate of flitch are inversely as the moduli of working strength of wrought iron and timber. These moduli will vary with the quality of the iron and timber, but taking those values already used as a fair average, we have

$$\frac{\text{breadth of plate}}{\text{breadth of flitch}} = \frac{8,320}{\frac{18 \times 6}{47,000}} = \frac{2}{17} \text{ nearly.}$$

Applying this to a representative case, it appears that, if a firm beam, say 12 in. wide, be divided, and a wrought-iron plate introduced, that plate should be $\frac{1}{17}$ in. thick, unless the strength of the beam is actually to suffer by its insertion; and further that the insertion of a plate of this thickness, though it will double the stiffness of the beam, and consequently reduce its deflection

to one-half, will not at all increase its strength, any increase of which must be obtained by employing a still thicker plate.

These conclusions certainly differ much from the generally received opinions on this subject. The insertion of such a plate as we have just considered would be expected to add considerably to the strength of the beam, but the reasons already adduced show that the only gain would be in increased stiffness. This increase of stiffness over that of the wooden beam, would, no doubt, in some cases, be so much of a desideratum as to justify the expenditure involved, but where extra strength also is required, it seems tolerably obvious that some less wasteful plan of applying materials might be adopted with advantage.

Some may consider it doubtful if anything so paradoxical can be established as that the insertion of say a $\frac{1}{17}$ in. plate of wrought-iron in a fir beam 12 in. broad should weaken it. Yet the steps in the proof are perfectly clear. 1. The insertion of the plate limits the free action of the timber to such an extent that, unless the safe load on the iron plate be exceeded, not more than one-half the strength of the wood remains effective. 2. The strength thus lost the iron plate must replace; and (3) we have seen that in this particular case a plate $\frac{1}{17}$ in. thick is required to do so. If, then, a $\frac{1}{17}$ in. plate be used, it will safely bear only two-thirds of the necessary load; clearly, in such a case, the strength of the girder is diminished by one-sixth (one-third of a half). In such a case, when five-sixths of the original load is imposed, the iron will be loaded to the extent of its safe load, and the wood to one-half of its safe load. If the remaining one-sixth of the original load be added, it will be borne jointly by the iron and wood and the safe load on the iron will be exceeded. If it be said that the margin of safety is always taken so large that some excess on the safe load may always be permitted, we answer that this remark, if true, applies to the case of the simple wooden beam, as well as to the case of the flitch girder, and leaves the comparison quite unaltered. The absolute factors of safety adopted have but little to do with this matter. We have taken four for wrought iron, and six for timber, as usual, and suitable factors; but the comparison would be the same if two and three or any factors bearing the same ratio to each other were adopted. Neither can the ratio be objected to, as it assumes that, of iron and wooden beams of equal ultimate strength, the iron beams may be safely loaded with one-half more than the wooden one—an assumption evidently in favour of the flitch beam.

It may be urged that the strength of the wood is not destroyed, but only rendered temporarily inoperative, and that, even if the strength of the iron plate were so far over-taxed as to cause fracture under some unfavourable contingency, this surplus strength of the wood is so much reserve which would then come into play. But it is evident that the same load which may be borne with perfect safety when imposed by little and little, and allowed to remain perfectly quiescent, may produce very serious results when suddenly applied, as by the fracture of the iron plate, and accompanied by the vibration consequent on the sudden descent to the increased deflection of the unassisted wood. So that in no case could it be even reasonably expected that the wood would prevent utter failure following the fracture of the plate.

We have till now considered the iron plate and flitches to be the same depth. We can, however, vary the depth of the plate, and, as the maximum working deflection of a beam varies inversely as its depth, if we make the iron plate one-half the depth of the flitches, their deflections under their several safe loads will be sensibly equal, and no part of the strength of the wood will be lost by associating it with the iron. On the other hand, by thus limiting the depth of the plate, we obviously apply the iron at a great disadvantage, and, on a careful investigation it will be found that this method presents no advantage, either in respect of strength or stiffness, sufficient to warrant its adoption. If the first method, that with plate and flitches of equal depth, departs from sound principles in rendering a large proportion of the strength of the wood ineffective, this method of reducing the depth of the plate does so no less in rendering the iron subordinate to the wood, and hampering the application of the former to suit the exigencies of the weaker and less valuable material.

W. W. R.

OUR LITHOGRAPHIC ILLUSTRATIONS.

S. PETER'S ORPHAN HOME, ISLE OF THANET.—
JOHN P. SEDDON, ARCHITECT.

This orphanage has been recently built in a prominent position on the road from Broadstairs to Margate, in the Isle of Thanet, upon a site given, on his own estate, by the Archbishop of Canterbury, from funds raised by subscription by Mrs. Tait.

It is intended for orphan girls from London and from the Diocese of Canterbury, and its foundation is due to the following circumstances:—

In the year 1866, during the visitation of cholera, a home was opened at Fulham, under the immediate direction of Mrs. Tait, for orphan girls left destitute in the East of London, where the ravages of the epidemic were most serious. In 1867, after the translation of the present Archbishop from the See of London to that of Canterbury, he determined to allow Mrs. Tait to raise funds for an institution of a more permanent character, and appropriated, for the purpose of erecting thereon a substantial building, a piece of ground situated on his private property at Stonehouse, in the Isle of Thanet, a position, by reason of its great salubrity, eminently suited to the object in view.

In the present building, which has recently been completed from the designs and under the superintendence of Mr. J. P. Seddon, as architect, about one hundred orphans can be accommodated. It is intended that the principal portions of these shall be orphan girls from London and from the Diocese of Canterbury, but that a certain part of the building shall be devoted to convalescent children requiring care and sea-air, but not hospital treatment. The building, furniture, and fittings will, as far as represented in our lithographic illustration, and as far as hitherto accomplished, cost about £16,000. Provision has, however, been made to allow of extensive additions hereafter, by carrying backward a block of building from the central projection in which the staircase is situated. The plan of the building is very simple, consisting of a centre with two wings; a broad corridor is at the back, giving access to all the rooms, and is entered by a covered porch to protect it from the winds, which, in so exposed a position, are often boisterous. A common room for the superintending sisters, and matron's room, occupy the left-hand wing on the ground-floor, and a school and work-room the right-hand wing. A large general dining-room, waiting-room, and class-room occupy the central block on the ground-floor, with the staircase at the back. On the first-floor are two large dormitories, with sister superintendents' room attached to each; and the chapel is in the right-hand wing, which is carried up two stories, and which it is intended to fit up and decorate hereafter in a very complete manner. A small vestry-room is attached to the chapel. On the top (2nd) floor are two large dormitories and two superintendents' rooms. On the basement-floor are the kitchen, scullery, and offices, servants' sleeping-room, laundry department, and girls' play-room.

The entire building is most substantially constructed with walls which have a hollow space between an inner and outer casing. The facing is of split flint work and the dressings of Douling stone and carefully selected brickwork, treated in the manner which is so characteristic of the old buildings of the locality. The roofs are covered with green slates, and have parapets throughout. The general contractor was Mr. Thomas Williams, of Cardiff. The warming was executed by Messrs. Nelson, of Leeds, from an arrangement by Mr. John Barber, engineer, of that town; the gas-fitting by Mr. Hammond, of Chandos-street; and the furniture, which is all from the special designs of the architect, by Mr. Collmann, of George-street, Portman-square. The grounds have been all tastefully arranged and planted under the directions of Lucius Spooner, Esq. Subscriptions are still needed to defray a portion of the expense that has been already incurred, and to bring the whole work to a completion, and may be sent to Mrs. Tait, to whom the entire project is due.

HILL SIDE, WARGRAVE.—COLE A. ADAMS,
ARCHITECT.

The perspective, as shown, gives the north-west view of large additions now in course of erection to a house at Wargrave, Berks—for William Smith, Esq. With the exception of one room,

retained as a study, the whole of the old house is arranged for servants, the family apartments being accommodated in the additions. The materials used for these are Cooper's red bricks and chocolate-coloured tiles for the roofs, red tiles for vertical hangings, with ornamental bands of various shaped tiles, and tile finials. Flint obtained from the site has been used for the plinth, as a band under first-floor windows, and in heads of chimneys, &c. All timber framing and external timber work is of fir, left rough, and this will have two coats of Stockholm doors; the plaster filling-in is to have indented ornament. Inside, parquet borders to all best sitting-rooms and hall—the latter, together with dining-room, will have deal dados. The hall, staircase, lantern, and first-floor ceilings to have wood-work showing, stained and varnished throughout. Mr. Cole A. Adams, of 11, Holden-terrace, Grosvenor-gardens, is the architect; Mr. R. Barnicoat, of Reading, the builder.

FRENCH POSTAL-TELEGRAPH OFFICE AT GRANVILLE (MANCHE).

The postal-telegraph offices constructed in France to meet their special requirements are very rare, but will probably increase in number in view of the possible combination of the two services, as in this country.

The postal-telegraph office at Granville, which we illustrate, was erected more especially for the convenience of the telegraphic department, and comprises a public office, with a private residence for the principal officer. The ground-plan and that of the first floor are given, and the references thereto. The material used is granite and local stone, and but little ornament is introduced.

WROUGHT IRON COFFER.

One of our lithographic illustrations this week represents a coffer in wrought-iron, the product of the sixteenth century in France. We have reproduced the engraving from *Art pour Tout*, a well-known popular art-work published in Paris.

WORCESTER DIOCESAN ARCHITECTURAL SOCIETY.

THE nineteenth annual meeting of this Society was held on the 29th ult. The annual report, after noticing the loss which the Society has sustained by the deaths of two of its original Vice-Presidents—Sir T. E. Winnington, Bart., and C. Holt Bracebridge, Esq.—proceeds to give an account of the previous annual meeting of the Society, which took place on April 20, 1872. The first excursion of the year took place on June 19, when the beautiful monastic ruins of Much Wenlock and Buildwas were visited. The Society's second excursion for the year took place on September 5 last, and was devoted to the churches and other objects of interest in the town of Stratford-upon-Avon, including Shakespeare's birthplace, &c. The report states that the works at Worcester Cathedral have been steadily progressing during the past year, and include the fixing of the wrought-iron grilles at the backs of the stalls, the erection of the carved oak screens in the bays eastward of the latter, and the completion of the choir pavement. The organ case is now in course of erection, as is likewise the screen between the nave and choir. The floor of the nave had been prepared with concrete, and the squares of slate and stone were ready for laying, when the Earl of Dudley liberally undertook to defray the cost of substituting black and white marble for the inferior materials. The latter will now be used for the floor of the cloisters. Lord Dudley will also bear the expense of filling the great west window with stained glass. The vaulted ceilings of the Lady Chapel, the eastern transepts, and the choir aisles, are to be decorated with colour, and it is hoped that this long-continued, extensive, and important restoration will be shortly completed, so as to allow the formal reopening to take place in the course of the ensuing summer. The new carillon machine, the gift of Mr. Alderman J. W. Lea, is now in operation at the Cathedral tower. It was manufactured by Messrs. Gillett and Bland, of Croydon. The report then proceeds to deal at some length with various new buildings and restorations in the diocese. The parish church of Birlingham has been rebuilt, all but the tower, in the Geometrical Middle Pointed style, from the designs of Mr. Benjamin Ferrey, F.S.A. Bengeworth Church, after undergoing various partial restorations, most of them

very destructive of the original character of the building, was still in an unsatisfactory state when, about ten years ago, Mr. Preedy was consulted as to the enlargement and thorough restoration of the old fabric. It being subsequently decided to build an entirely new church, a suitable site was presented to the parish by Lord Northwick, and the new church has been built in accordance with a design (subsequently amended) furnished gratuitously by Mr. T. D. Barry, of Liverpool. Extensive works have been carried out at King's Norton Church, under the direction (with one or two exceptions) of Mr. Hopkins. They include a thorough reparation of the fine tower and spire; placing figures of our Saviour, the Blessed Virgin, and S. John in the vacant niches of its south front; the rebuilding of the north aisle and arcade; and the substitution of an open-timbered roof for the plastered ceiling over the nave. Another instalment towards the complete restoration of the important church of S. Mary, Kidderminster has been successfully carried out under Mr. Hopkins's superintendence. It includes the removal of the heavy galleries in the aisles, and the modern organ loft in the tower. Rushock Church, a miserable-looking structure of the year 1758, has been remodelled, as regards its interior, by the erection of an open-timbered roof. Mr. Baker, of Kidderminster, was the architect employed. Having noticed several other small works in the diocese, the report concludes by stating that the last financial statement of the Treasurer showed a small balance in favour of the Society, but that the annual income is little more than sufficient to defray the ordinary expenses, which, during the last few years, have been unusually small.

BUILDING STONES OF INDIA.

WE take the following from one of an interesting course of three lectures on "India and Indian engineering," delivered before the students of the Royal Engineer Institute, Chatham, by Lieut.-Col. Medley, R.E.

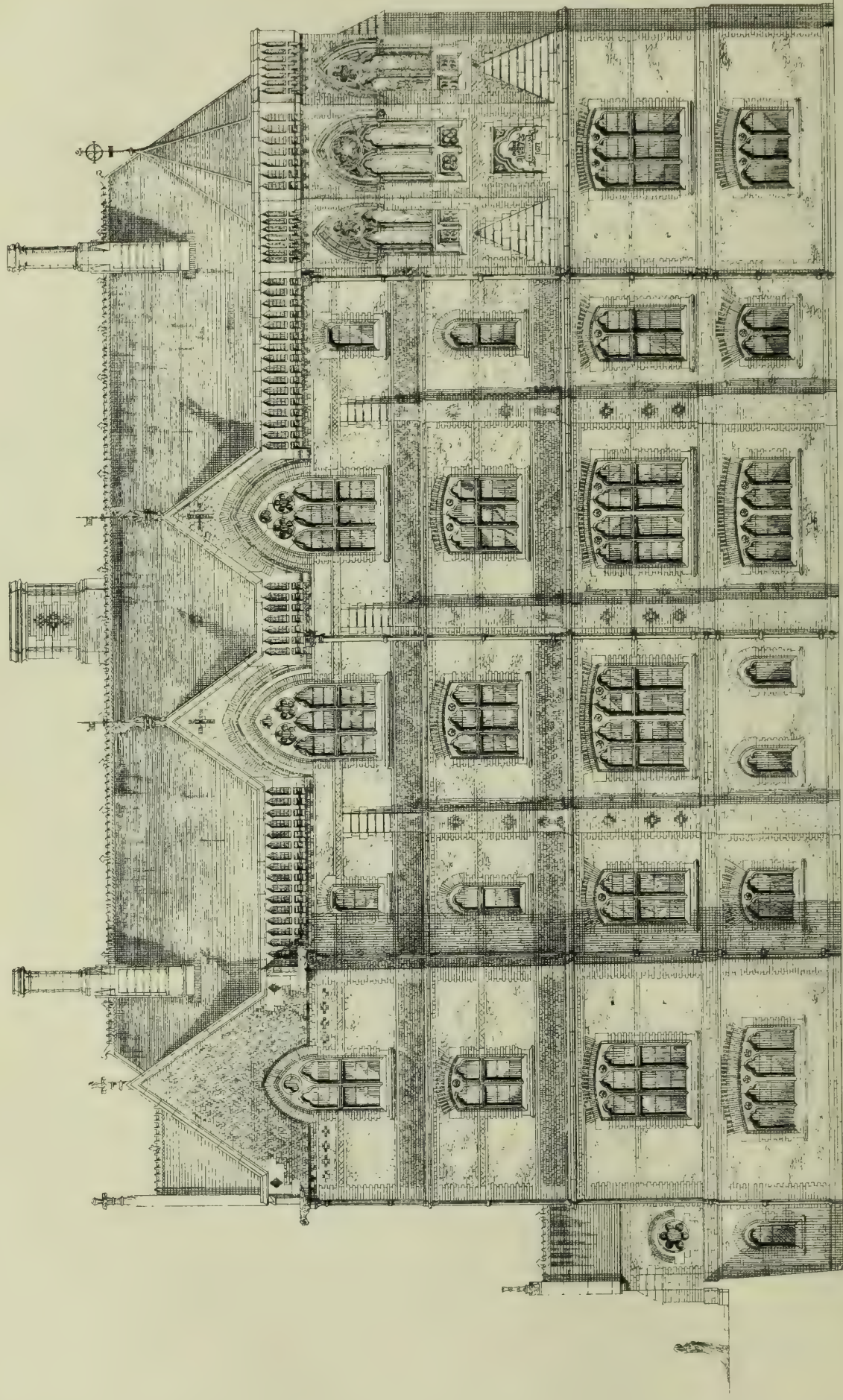
There are many varieties of stone in different parts of India, and it is employed in the various forms of ashlar, rubble, &c., very much as it is in Europe. Granites, limestones, and sandstones are extensively used in the localities where they occur, but the cost of carriage over bad roads to distant places necessarily restricts the employment of this material. In Southern India, laterite, a clay-stone, is extensively used, being easily worked, and becoming hard by exposure to the air. In Upper India, Delhi and Agra are famous for their red sandstone, and Jyepore for its white marble, of which the Taj and other famous buildings are constructed. Bombay has also many varieties of stone, notably the Poree-bunder limestone. Allahabad has some fine quarries of sandstone, of which the new government buildings have been constructed. Slate is generally scarce and inferior, but some fine quarries have lately been opened out at Dalhousie, and in the Khuttuk Hills, in the Punjab.

There is a kind of soft stone called moorum, found in Central and Western India, which, though almost useless as a building material, is extensively employed for road-metalling. Kun-kur, too, is quite an Indian speciality, though it is almost entirely confined to the North-Western Provinces. It is a peculiar kind of oolitic limestone, found in beds just below the surface, and is of two kinds: one adapted for building purposes, in which it strongly resembles artificial concrete; the other answering admirably for road metalling, for which purpose it is broken into lumps about the size of an egg, drenched with water, and then rammed until perfectly smooth, after which it is allowed to dry before the traffic comes on it.

The manufacture of artificial stone by Ransome's process has been tried at Bombay on a small scale, but not with success in an economical point of view.

THE FAIRFORD WINDOWS.—A correspondent of the *Guardian* writes:—"A few weeks ago I went over to Fairford to see the windows: I will not say that new glass has been substituted for the old in the window in the south aisle mentioned by Mr. Fowler; I am not perhaps qualified to pronounce an opinion. I will only say, therefore, that if simple 'cleaning' produces such abominations as the two figures in question, I trust that the other windows will remain uncleaned."





Front Elevation.

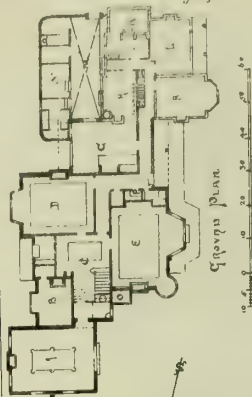
ST. PETER'S ORPHANAGE. BROOKLYN. N. Y. SEDGWICK ARCHITECT.

6

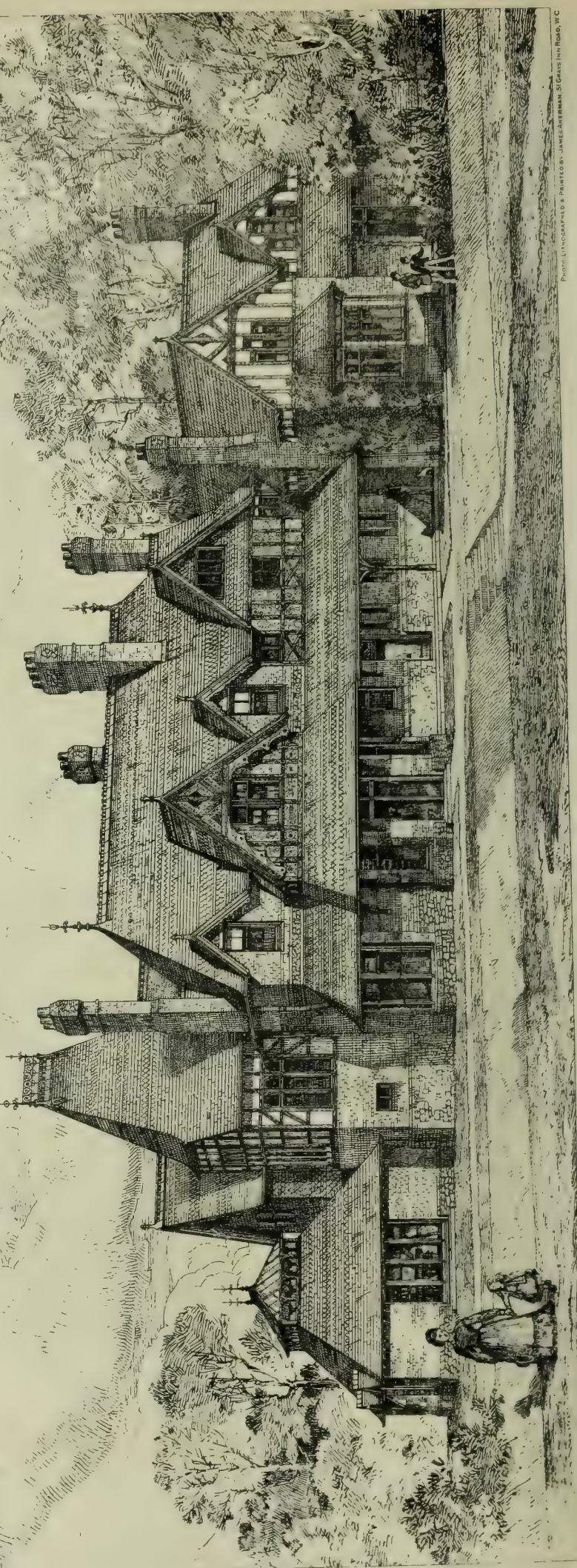
Ref

THE BUILDING NEWS. APR. 18. 1873.

• RAILSIDE WAREHOUSE •
• GOREHAM'S •
• WAREHOUSE •



- General Plan
- A. Hall
 - B. Room
 - C. Kitchen
 - D. Dining Room
 - E. Study
 - F. Library
 - G. Billiard Room
 - H. Parlor
 - I. Drawing Room
 - J. Music Room
 - K. Bed Room
 - L. Bath
 - M. Dressing Room
 - N. Store Room
 - O. Cellar
 - P. Stable
 - Q. Coach House
 - R. New Work



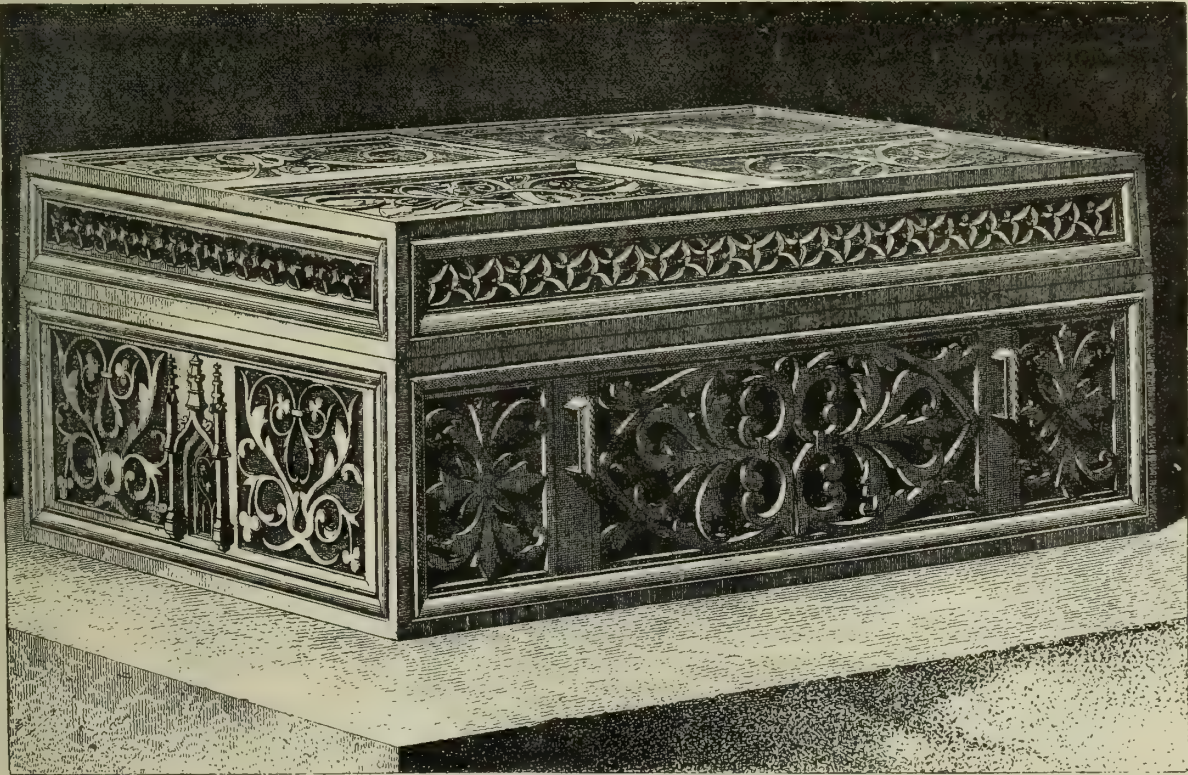
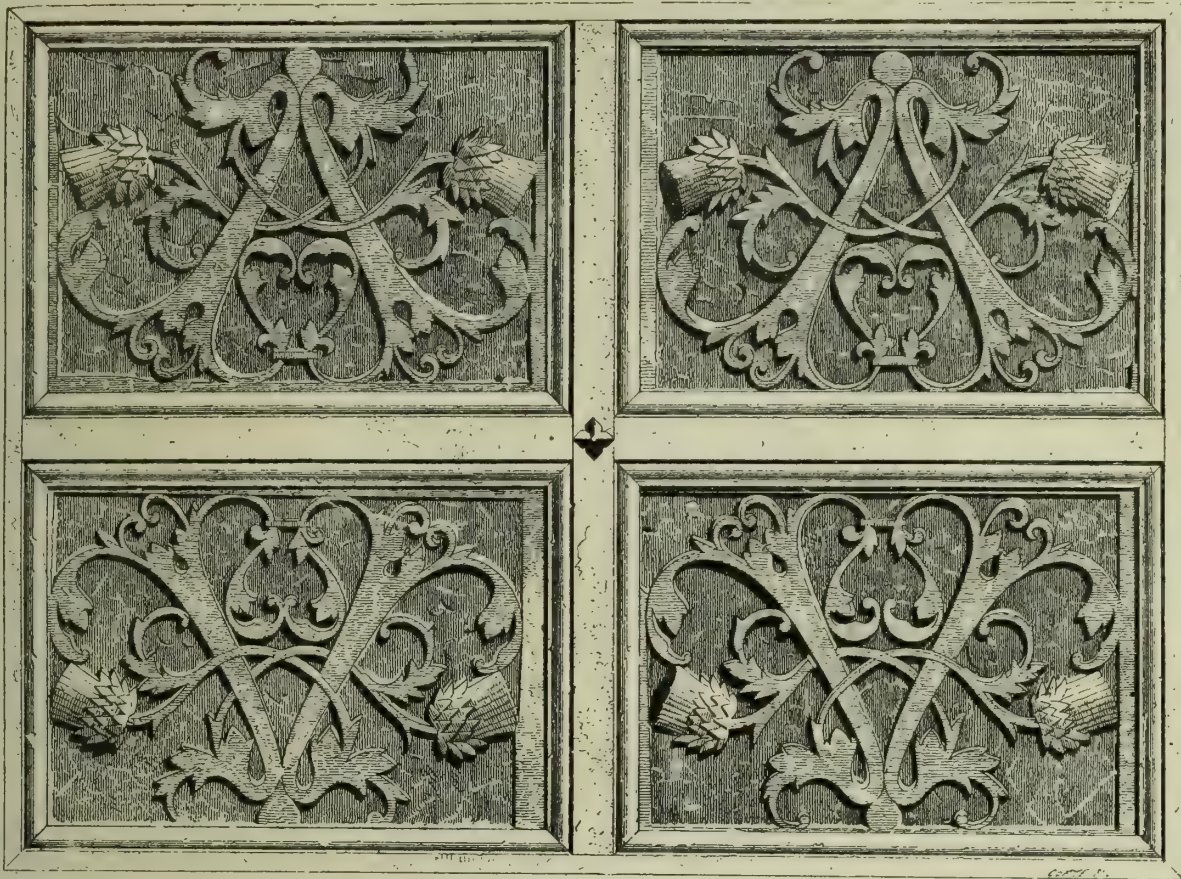
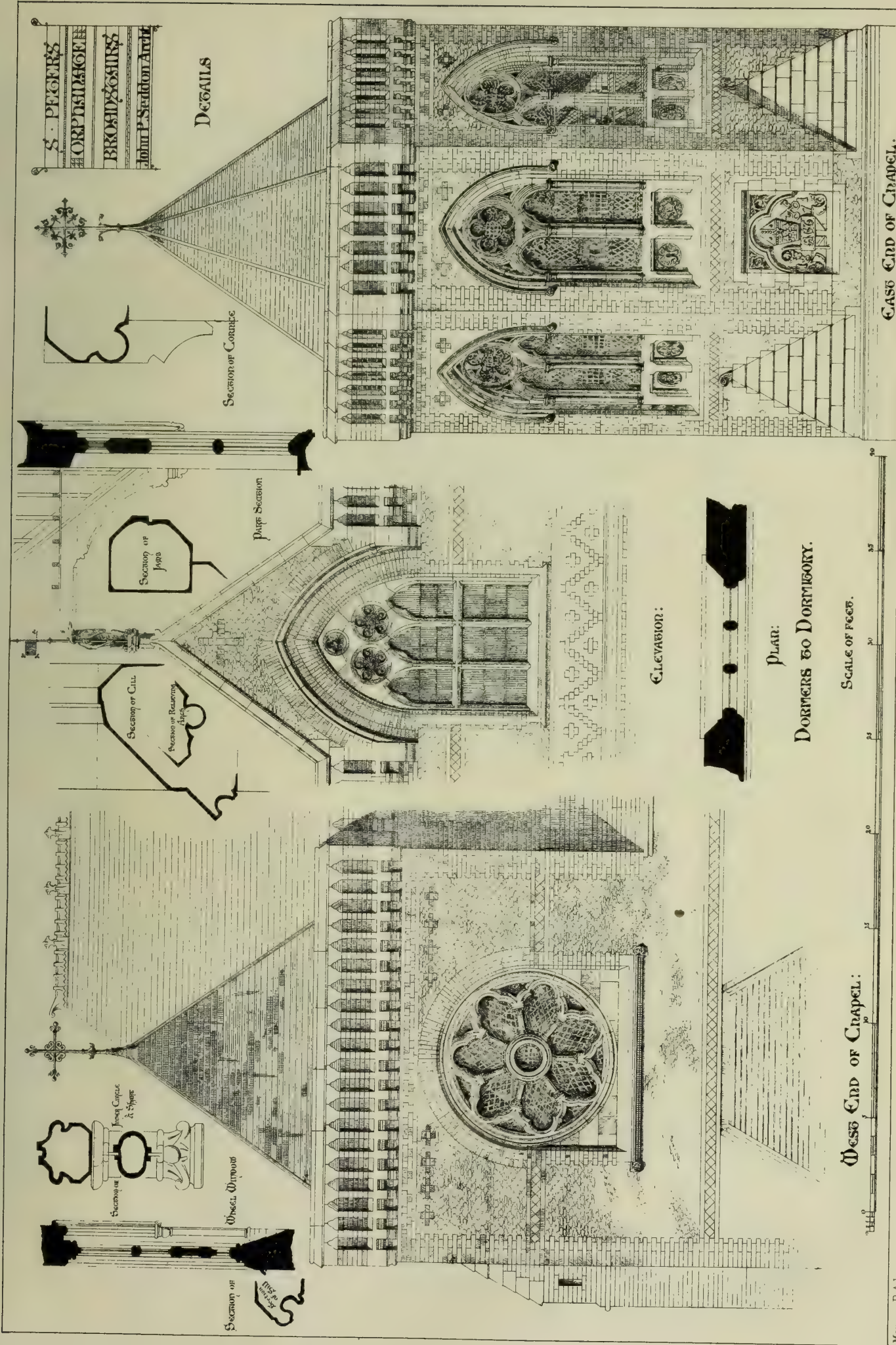
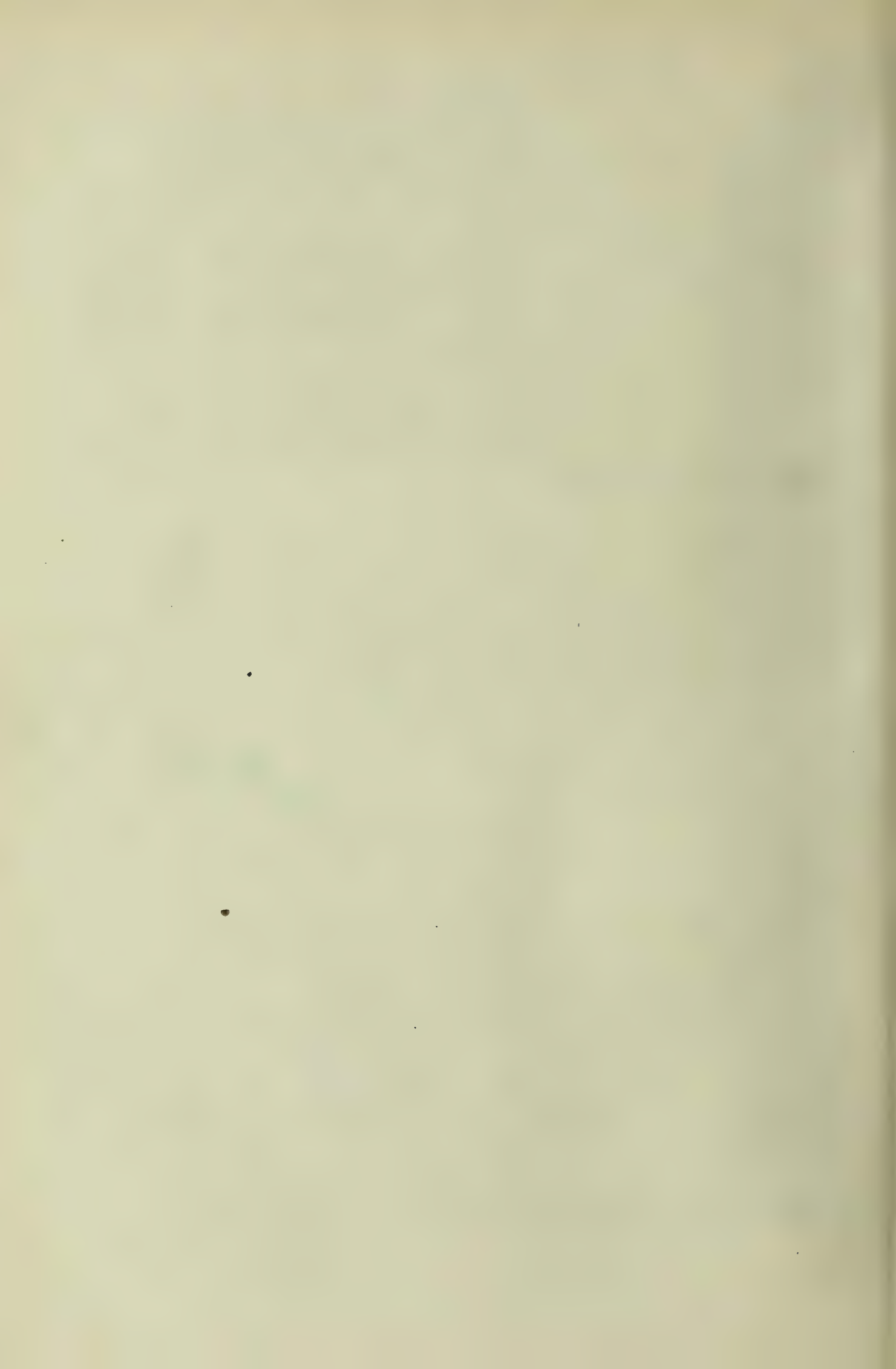
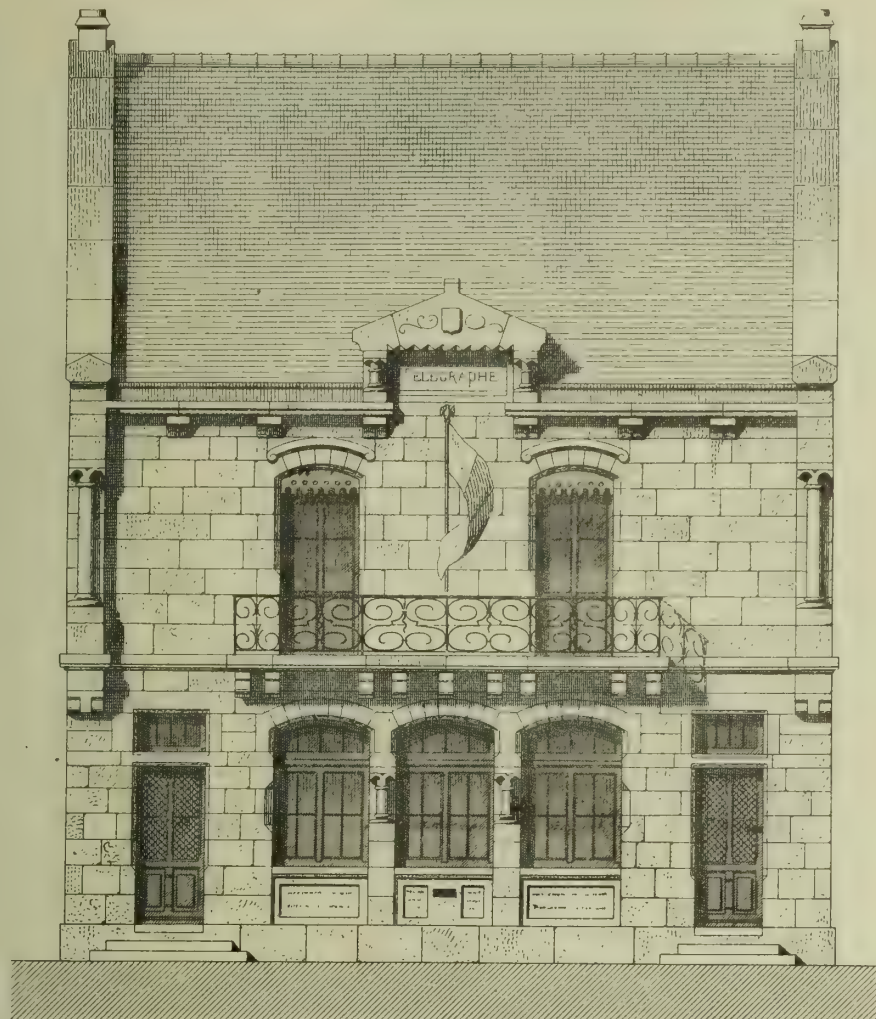


PHOTO LITHOGRAPHED & PRINTED BY JAMES AKERMAN, 51 GRAYS INN ROAD, W.C.

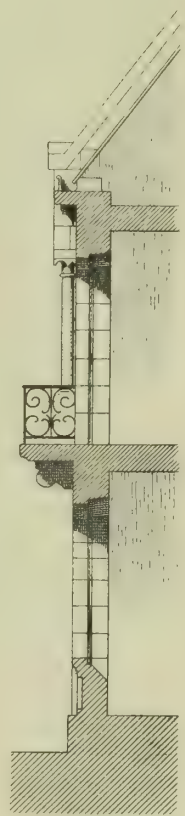
COFFER IN FORGED IRON. (16TH CENTURY.)







ELEVATION PRINCIPALE



COUPE

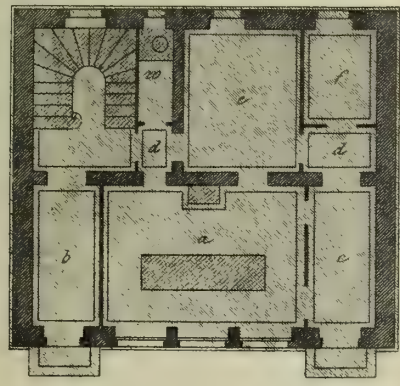
Rez-de-Chaussée

- a Salle des manipulations
- b Entrée particulière du directeur
- c Salle d'attente du public
- d Dépassements
- e Vestibule
- f Salle des piles

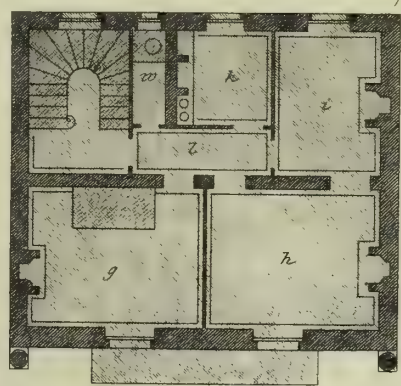
LEGENDE

Logement du directeur

- g Chambre à coucher
- h Salon
- i Salle à manger
- k Cuisine
- l Dépassement
- m Puits



PLAN DU REZ-DE-CHAUSSEE



PLAN DU 1^{ER} ETAGE

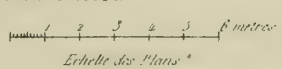
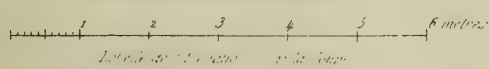


PHOTO-LITHOGRAPHED & PRINTED BY JAMES AKERMAN, 51 GRAY INN ROAD, W.C.

THE AVENUE AND THE CENTRAL HALL IN CHURCH DESIGN.

(Continued from page 383.)

THESE two great types of arrangement—that which disposes the parts of a building along a horizontal axis, and that which groups them around a vertical axis—have tended to ally themselves with the cross vaults and the dome respectively: and hence, to enumerate the principal examples of the latter class is to go over much of the ground surveyed by Sir G. G. Scott in his recent lecture. To advocate the central hall or vertical axis system of design, is, in fact, to prepare the way for the introduction of the dome into modern Gothic practice: to make it a necessity, or, at all events, a highly desirable acquisition. The planning of churches for congregations may be expected to lead to the adoption of the central axis type, and this type may with equal probability be expected to introduce the dome. As a matter of fact, indeed, a very large proportion of those ancient churches which have most suggestiveness for modern purposes are domed, and not vaulted or roofed with timber. The reason seems to be partly that a large dome—supposing, of course, that it is not weighted, like those of the Renaissance, with a cupola—is a much easier and safer thing to construct than a large cross-vault; and partly, that when constructed it is much more beautiful. There is no cause, however, why the two systems of construction should not be used together. They exist in combination, amongst other places, at S. Sophia, Constantinople, where the dome alone is used for the greater spans, while domes and cross-vaults alike are found in the smaller ones. Of course the sort of vault, and, indeed, the sort of detail generally, which will harmonise with the dome must be severe and simple: unless, indeed, the dome itself is made to harmonise with later detail by covering it with ribs, and so sacrificing all its breadth and repose. It would then differ very little from a polygonal vault, like that in the octagon at Ely: but beautiful as that example is, it may be questioned whether its beauty has not been gained at the expense of much higher qualities.

The management of the central space, in buildings designed on the principle of a vertical axis, admits of great variety. It may vary in plan, in the mode of lighting (which has more influence on the design than might at first be anticipated), or in the system of covering or roofing it. The most familiar of its plans is, perhaps, that at the crossing of an ordinary cruciform church, in which the central space is square or oblong. Many cruciform churches, it is true, show no trace of having a vertical axis: they merely consist of two intersecting avenues, with nothing to mark out their intersection as the grand idea of the whole design. It is only when this intersection comes to be treated in a way that gives it importance, when it acquires the mastery over surrounding features, and binds them all together by its pre-eminent impressiveness, that the building really conforms to the vertical axis type. Such pre-eminence, of course, results instantly where there is a lantern tower, but in a greater or less degree, it may be produced by other means. The mere introduction at this point of a dome, circular or polygonal, will do much to effect it, as may be seen in many Romanesque churches, both French and German. To throw a flood of light down from this dome will do much more; and this, at different times and places, was contrived in three or four principal ways. The first was to pierce the haunches of the dome with windows, as at S. Sophia, at the mosque of Ahmed, and other buildings at Constantinople, and as in some of the French Byzantine churches, such as Solignac. The second was to elevate the dome on a circular drum, and, by piercing the drum, to get a range of windows below it. This was done in a great many of the Eastern churches

—such as S. Irene, and the Theotocos, Constantinople; S. Sophia, Trebizond; S. Bardias, Thessalonica; and the metropolitan and other churches at Athens; and also in the mosque of Hassan and other mosques at Cairo. The third was to alter the dome into a polygonal cross vault, and to put a window under each arch of the wall-rib—a system which, though it found favour wherever the Gothic style extended, was worked out, perhaps, most magnificently in the great cathedrals of Spain. There remains one other mode of lighting—that through an eye at the top of the dome, which was used both by the Romans, the mediæval and modern Persians, and the architects of the Renaissance. The Pantheon is a familiar example of the first, and Wren's church of S. Stephen's, Walbrook, of the last of these adaptations; but it is in the East, apparently, that this particular type has been most appreciated and carried furthest towards perfection.

Of these four ways of lighting the central area, the second and third naturally result in some sort of tower, conspicuous on the outside; the other two allow the dome to be kept lower, though it will usually rise to some extent above the roofs of the adjacent arms of the cross. A central tower is so fine a feature that in ordinary cases a system is recommended, rather than otherwise, by the fact that it inevitably leads to it. If, therefore, there were no cause for ever planning a central area wider than an ordinary vaulted nave, we might be well content with that mode of fenestration which, in such cases, the Mediæval builders made peculiarly their own. But there are strong reasons, under certain circumstances, for availing ourselves of the peculiar merits of the dome—that is, for going beyond the simple cruciform church plan, and for adopting a larger or a differently-shaped central space from that which it affords. It then becomes a question whether the mode of lighting that is perfectly satisfactory with a span of twenty or thirty feet is at all practicable or desirable with one, perhaps, of double the size. In other words, if there is a large central dome, must there always be a large central tower as the external result of it? It is here that the difficulty lies of working out in a Gothic shape such places as those of Santa Fosca, the church at Daphne, and the other analogous ones of which the late Mr. Petit first remarked the suggestiveness for modern purposes. If their domes are raised high, so as to show externally—and especially if these domes are then inclosed, for protection and abutment, in a surrounding tower—they become so large as to dwarf, in an outside view, every other feature of the church. Such, at least, is the result if the treatment of the rest of the church is what we are accustomed to on the stereotyped nave-and-aisles plan. There seem to be two ways out of the difficulty: one is to light the central area in such a way that the dome does not issue externally in a tower; the other is to adopt, with this new feature, some new mode of dealing with the outside of the nave and transepts, so as to make them more of a match for the otherwise overwhelming central mass. There can be no defence for such a sham as the upper part of the aisle walls at S. Paul's, but there may be an explanation of it; and in all probability the explanation is that Wren felt that the nave of his church needed to appear a great deal larger than it really was, unless it was to be utterly dwarfed and crushed by the enormous dome. He wanted the clerestory for internal effect, but he found it objectionable outside, because it cut up the breadth of the nave, and lessened its importance; whereas, with so vast a central feature, it needed all the importance he could give it. The easiest way of giving this importance was to hide the clerestory, and so double the apparent width at a stroke; and in this way we come by the great screen walls on the top of the aisles.

The central area, where it is modified or enlarged from the mere crossing of a nave

and transepts, admits of much variety in design. It may be a rectangular space, but larger than that of the adjoining avenues, as at S. Paul's, S. Stephen's Walbrook, and Sta. Fosca, Torcello, in each of which examples its width is equal to that of the nave and aisles together. It may be octagonal, with a diameter equal to that of the nave and aisles, as at Ely, or with a diameter still greater, as at Florence. It may be a combination of octagon and quatrefoil, as at S. Lorenzo, Milan; or a hexagon, as at Sienna; or a circle, as at the Temple Church, at Aix-la-Chapelle, and elsewhere; or a circle with semicircular recesses, as at S. Vitale, Ravenna, and some Oriental buildings; or a compound of circle and cross, as in the so-called Baths of Agrippa. It might even be an oblong, or an oblong with splayed corners, like the great domed hall at Kacham, illustrated in Coste's "Persia," though such irregular figures of course require some ingenuity in doming them over. In any case, however, there is as much, or perhaps more opportunity for thought and invention in the design of churches on the central area, or vertical axis principle, as there ever was for those on the avenue, or horizontal axis, or basilican type. The latter was thoroughly worked out by the European architects of the Middle Ages, who left little or nothing to be accomplished with regard to it by their successors. It is open to us, indeed, to copy their works, complacently forgetting that they attained their greatness by relying on themselves, and refusing to copy their predecessors. It is a singular way of honouring them to take up a practice so diametrically opposite to theirs; but it is by no means unprecedented. Every man, and every set of men who have risen to distinction by originality, have found a set of disciples who have hoped to reach the same distinction by the very want of originality; who say to themselves, not "These artists were original, therefore let us be original"; but "They were original, therefore let us copy everything they did."

JAMES CUBITT.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

IN our last impression we gave the substance of Mr. George Ledwell Taylor's paper on Roman Architecture, read at the Institute on the 7th inst., the following notes of the discussion, although in type, having to be left over for want of space.

The PRESIDENT, in inviting discussion, expressed regret that Mr. Taylor was not present. Besides his claims on the profession as an author, Mr. Taylor had another special claim in the fact that he was one of the founders of the Institute, and was an early member of the Council. The paper was very interesting, although it lost much by the enforced absence of Mr. Taylor. It was hoped that next session a paper would be read at the Institute on the recent discoveries in Rome.

Mr. SEDDON, Fellow, said that as he had never been to Rome, he should not speak on the subject of the paper, but he had known Mr. Taylor for many years, and it was a great delight to him to have seen Mr. Taylor engaged in making with his own hands the drawings and plans which illustrated the lecture. Mr. Taylor well deserved the name of an artistic architect, for his power as an artist was so great that he might be said to be a painter as well as an architect.

Mr. L'ANSON (Fellow) remarked that it was a wonderful and gratifying thing to find a gentleman of the great age of Mr. Taylor still giving his mind to a subject so interesting to all architects. He had known Mr. Taylor for many years, and for some time sat at the same board as a fellow commissioner with him. He (Mr. L'Anson) had been to Rome, and had derived much instruction from what he saw there, although he had never attempted to be either an archæologist or an antiquarian—he had simply endeavoured to be, to the best of his ability, an architect. He knew of no city among the great cities of architectural Europe, not even Athens, which so impressed the mind with the grandeur of architecture as Rome. The most magnificent buildings or fragments of buildings were crowded together in a way which must have been very impressive when

they were uninjured by time or the hand of man; they were impressive even in ruins. The architecture of Rome was, of course, not so refined or delicate as that of Greece, nor was it, in constructive skill, so wonderful as that of Mediaeval times. When he was a young man, the architecture of Rome was the source whence most young men drew their inspiration. We had, however, now taken a wider range, and, he thought, with great success. Still, we must always look to Roman architecture for some kind of teaching, and must always reverence such men as Mr. Taylor, who, as an octogenarian, was still a devoted admirer and expounder of Classic art. He most cordially proposed a vote of thanks to Mr. Taylor for his paper and drawings.

Mr. HEBB, Associate, after giving some reminiscences of the time he spent in Rome with Mr. Taylor, said that, after all, although the fashion of Classic art was to a great extent passed away, there was a perennial interest in the study of it, and it could never become altogether obsolete, although just now another style of art was popular. Debased as Roman art became, there could be no doubt that there was a great deal in it, not of mere adaptation, but of suggestion, of composition, refinement, and pose, which belonged to itself, and could not be found elsewhere. Nowadays Classic mouldings were considered almost obsolete, but it would be well, while admitting the advantages which had been derived from Mediaeval architecture, to bear in mind that there was a style which was perfect, as far as the style could go, in Rome, as there had been one before in Greece. In any adaptation of the Roman style to modern requirements, the details should be carefully studied, and then we should not see the repetition of the extraordinary details which were perpetrated now under the guise of "eclecticism in art."

Mr. C. F. HAYWARD, Fellow, in seconding the vote of thanks, said, it struck him that it would be a great mistake to estimate Roman architecture particularly with reference alone to its decorations—such as architraves, friezes, and cornices, and other features which were considered so essential to Roman architecture. What struck the architectural visitor to Rome was not so much such details as were illustrated in Chambers's Architecture, as the enormous mass of the Roman buildings which had no architraves, no friezes, and no cornices; such great masses as the Basilica of Constantine—the immense extent of the vaults and arches, and the great extent of ground covered by such buildings as the Baths of Caracalla, &c. He trusted that the paper read would act as an incentive to younger men to study the architecture of Rome.

Mr. EASTLAKE, Secretary, observed that Mr. Taylor was at Rome when he was there, and while he (Mr. Eastlake) was spending his mornings in the cloisters of S. John Lateran, Mr. Taylor was hard at work in laying down plans of buildings on a very large scale. His enthusiasm was great, and his industry indefatigable.

Mr. THOMAS MORRIS, Associate, said that Mr. Taylor was one of the original members of the Council of the Institute, and was colleague of Professor Donaldson and Mr. Charles Fowler. Mr. Taylor was a man of the most versatile talents, and while with regard to what might be called the poetry of the profession he had proved himself to be an apt writer upon and illustrator of Classic architecture, he was no less a practical architect, as would be found by perusing the early volumes of the "Transactions" of the Institute. He carried out with very great skill the underpinning of some heavy warehouses at Chatham Dockyard—a kind of work for which Sir Robert Smirke was so celebrated. His work on "The Stones of Etruria" testified to his learning as an antiquary. It was impossible to estimate the services which Mr. Taylor had rendered to the profession and the community in general in the course of his long and useful life. With regard to the drawings and plans illustrating the present paper, they recalled the illustrations which accompanied the papers read at an early period of the Institute's existence, when the room used to be surrounded by splendid illustrations and drawings to a large scale, a point which had somewhat been lost sight of latterly.

Professor KERR said that although he had not been to Rome, yet it was possible to know something of Roman architecture without having been there. Everybody who had studied Roman architecture must acknowledge to having been profoundly impressed by its grandeur. It struck

him as a very remarkable thing, and as one that would bear reflecting upon, that at the present time it should have been possible for a short paper on the ruins of Rome to have been laid before the Institute with all the charms of novelty. What infatuation possessed the members of the profession whereby such a circumstance was possible! In his younger days Roman architecture was studied with considerable care, but his first recollections of Roman architecture turned upon its becoming somewhat unpopular. The researches into the Greek remains had at that time been carried so far as to throw the Roman detail into the shade, and he was taught to understand that although Roman architecture deserved admiration to a certain extent, on account of its magnificence, yet, as a matter of art, it was to a great extent unworthy of attention on account of its artistic impurity. Now, however, that the young men of that time had lived longer and seen more of the various styles of architecture and of the various eccentricities of study, it might be concluded that such teaching was practically a mistake, because the study of Roman architecture was almost the selfsame thing as the study of Greek architecture. Roman architecture was merely Greek architecture pursued under that law of intellectual development which prevented the possibility of the human race ever being intellectually oppressed. Therefore it would be impossible to give to the Greeks, as Greeks, supremacy as compared with the Romans. The Romans did their best under somewhat indifferent circumstances, and in accordance with the circumstances in which they found themselves placed, did they faithfully, intelligibly, and intellectually carry out the great Classic principle. It seemed to be one of the most remarkable considerations involved in the contemplation of ancient Rome to account for the raising of the funds for the erection of such enormous buildings. Where did the money come from? We read, it was true, that this and that Emperor impoverished the treasury in the building of great structures, and we read that certain ambitious individuals impoverished themselves in the erection of great works. But by what sort of financial calculation did the Romans arrive at the state of mind which admitted of the laying out of their money on such structures? This, to the Englishman of the nineteenth century, must seem amazing. The only parallel, in Europe, at all events, to the vast expenditure on Roman buildings, was the enormous expenditure on the cathedrals of Mediaeval Christianity, but there the conditions were entirely different, because such cathedrals were raised without calculating the cost, and erected piecemeal by the contributions of the faithful, expended as they came in. Moreover, the clergy of that day had a particularly ingenious way of applying the screw upon the consciences of the people, whereby funds were raised in a manner which at the present day would scarcely be considered fair. But we read of nothing in the history of the Romans which did not lead to the belief that the cost of their buildings was defrayed by a straightforward expenditure of the public money for what was considered to be the public interest. Why did we English exhibit such excessive stinginess—to use plain speech—in respect of our public buildings? We heard a good deal about the pockets of the ratepayers, and of the circumstance of every penny having to be squeezed out of the interests of the poor, but he always suspected such arguments to be scarcely disinterested, and he thought that if political economists were to go fairly and practically into the question, they would tell us that if we were to do in some measure as the Romans did in regard to their public buildings, it would be a profitable investment of money. (Hear, hear.) He contended that the expenditure of a large sum of money judiciously in the erection of public buildings was a profitable investment, for what were all investments but merely the expenditure of the surplus cash of the nation or the individual upon that which should produce profit in one form or another? There must be something more than simple utilitarianism involved in the investment of public money, and the Romans, in laying out their money on their buildings as they did, must have done so deliberately, and with the conviction that they were making profitable investments. Such a principle was one worthy of being extended, and it was a principle which might, and ought, to be enlarged upon, when opportunity offered, before the public of this country. The English people were not

devoid of common sense, especially in money matters. They were not disposed as a nation to hold the purse-strings too tightly when it was a question of expenditure upon armour-plated ships or fortresses, especially if they saw reasonable prospect of benefit from expenditure. If architects would only dare to lay it down as an economical principle that it was desirable to expend the public money liberally upon public buildings, it was possible that after a time the principle would become recognised. He had never heard this principle fairly enunciated, but, on the other hand, the opposite view had been dwelt upon *ad nauseam*. We had always been told that expenditure upon public buildings was to be considered as a dead loss. Although there was a great difference between the Augustan age of Rome and the Victorian age of England, yet if gentlemen who understood the subject would only reflect upon it, he believed they would find that there was true political economy in what he had said, and that there was a possibility of getting the public of England to understand—as it was understood in France—that the erection of magnificent public buildings was a judicious expenditure of public money.

Mr. HAYWARD and Mr. NEWTON having made a few remarks, the thanks of the meeting were unanimously accorded to Mr. Taylor for his paper, and Mr. Taylor's son having said a few words in acknowledgment, the meeting terminated.

THE ORGAN, ARCHITECTURALLY CONSIDERED.

ON the 28th February last we gave the substance of Mr. H. H. Statham's lecture at the Royal Institute of British Architects on "Architecture Practically Considered in Reference to Music," and said that possibly we might give his remarks as to the best positions and surroundings for organs on a future occasion. Mr. Statham remarked that there is one instrument which is the means of bringing architecture and music into more direct and immediate relation than any other. The organ, which really is not so much an instrument as a second orchestra in itself, not only demands great practical care as to its position and surroundings, but forms in itself so important and permanent a feature in a building—an edifice within an edifice—that its design and architectural treatment become a matter of some moment. The architects of the Classic revival, from Wren to Elmes, seem to have had a special spite against the organ, and to have regarded it generally as a nuisance interfering with their architectural compositions. The architects of the Gothic revival profess often a great interest in the organ; but the unfortunate instrument, or its representative, the organist, might well exclaim, "Save me from my friends!" The greatest ingenuity could devise nothing more cruel, more absolutely ruinous to the effect of the instrument, than those receptacles in churches, called "organ-chambers," in which it has become the almost universal practice to confine the instrument—placed under a low roof, and its sound only allowed to escape through arches on two sides (or sometimes only on one side), all possibility of anything like grandeur of effect is removed, and the result is, a great noise in the immediate vicinity of the instrument, and a muffled and unsatisfactory effect further off; all the harsher tones are exaggerated, instead of the whole being blended into one volume of sound. The position is bad in other ways: it is commonly against two outside walls, subjecting the instrument to changes of temperature to which it is extremely sensitive, and cramping it up into too small a space, which not only increases the chances of disarrangement of the mechanism, but the difficulty also of keeping it in proper repair. The ideas of architects generally about the space required for an organ are far too limited, and the consequence is that the organs have to be squeezed into too small a space, at the expense both of musical effect and mechanical construction. There ought to be room for all the pipes without crowding, and for every part of the instrument to be got at without disturbing any other part. This is scarcely ever the case in the conventional organ chambers. If, from ritual considerations, it is a fixed condition that the choir are to be at the east end, the organ must be near them, but need not be in a cage; it should be provided for in an open transept near the choir, and the same height as the rest of the church, or nearly so. If, from any circumstances, the archi-

fect is compelled by pressure from without to adhere to the organ chambers, the floor of this should be made lower than that of the church (proper provision being made against damp); the bellows and other parts of the mechanism will then go below the floor, and the pipes may have a chance of being sufficiently low to sound fairly through the arches. But, taking the question on musical grounds alone, there can be no doubt whatever that the west end of a church is the place for the organ, even if it has to be placed in a gallery in order to clear a west doorway, though it is of course better nearer the floor, and merely on a raised platform. In cathedrals, by far the finest position for the organ, in regard to effect, is the time-honoured place on the choir screen, and Mr. Statham said he could not quite share the feeling which regards it as necessarily an architectural eyesore there. At all events, in endeavouring to dispose of it otherwise, it will never do to dismember the instrument in the way which has been proposed on some occasions. In the architect's report as to the re-arrangement of Salisbury Cathedral, it was proposed, after a lament over the increased size of modern organs, to "draft off all the cumbersome parts of the organ to the back of the stalls in the first arches right and left in the choir aisles, where they would be very much concealed, or possibly, if found practicable, into the triforium." Such a cutting-up of the instrument into bits would be very injurious to the musical effect, however it might be for the architectural. The difficulty of the increased size of organs might be met in such a case by placing the largest pipes lower down in the choir screen on each side of the entry into the choir, where they would either be sunk partly below the floor level, or (if the safety of the piers might be affected by this) the pipes can be placed horizontally, as the larger pipes—the wooden ones in particular, which occupy the most room—can be placed so, with little, if any, loss of effect. Another plan would be, if the architect were very desirous to keep the vista unimpeded, to place the organ sideways just under the north or south transept arch, or it might be placed on each side in this way with good effect, as it might then be divided into two instruments of equal power, capable of being used together or separately by the same player. But to cut up an organ into bits, and to put one bit here and another there, is, musically speaking, absurd. In regard to the position of organs in concert-halls, it may be remarked that, considering what a very large and important object a great organ is in a hall, almost a piece of architecture by itself, it is not generally sufficiently considered in reference to the general design of the building. In almost all our concert-rooms the organ looks like an after-thought, put there with no relation to the general design of the room. In S. James's Hall the organ is balanced on the top of some long posts. In the Albert Hall the organ is a gigantic excrescence, and the case, if case it can be called, has positively no relation whatever in point of design either to its position or to anything else in the building. So it is, more or less, in most instances. This might be

avoided. It is generally possible to ascertain at the outset, when a large concert-hall is being built, the intended size and position of the organ, and Mr. Statham said he should like to see this made a portion of the design from the first—the basis, at all events, on which the organ stands being connected with the architecture of the room in a permanent manner. In using the larger pipes as a part of the design (and nothing could be more suitable) it should be remembered that in the construction of an organ the largest pipes are always arranged on the two sides, and the smaller ones in the middle; the natural arrangement of the design, therefore, is with large wings and a low centre; an organ-case with the principal feature in the centre is a contradiction of the intended arrangement, besides being an inconvenience to the builder, as it takes the larger pipes further from their proper position. In the manner of designing organ-cases at present, there seems to be too much of what may be called a studied simplicity, but which amounts to bareness. A row of pipes of different heights, with a band across, seems often to be considered quite enough to constitute a design. Mr. Statham does not think the new plan of leaving the tops of the pipes totally displayed, without any finish, is any advantage to their sound, and the result, in many cases, is anything but beautiful or ornamental. In this respect there is certainly room for improvement in the prevalent manner of designing organ-cases, and it can hardly be disputed that, in regard to smaller instruments especially, many of the organ-cases made one hundred or one hundred and fifty years ago are, in regard to general artistic treatment, far superior to those which are frequently put in modern churches.

ROYAL NORTHERN AGRICULTURAL SOCIETY.

THE following is the final report by the Committee, and award pronounced by them in the competition for plans of cottages for agricultural labourers. The premiums offered by the Society consist of four premiums of £5 for each of the two best sets in the following classes of dwellings, viz.:—Class I.—Separate cottages, on one floor or on two floors. Class II.—Blocks of two or more cottages, on one floor or on two floors. And ten premiums of £1 for each of the best sets of plans exhibiting any merit. The following principles have been adopted by the Society for the guidance of the Committee in making their awards:—That the cost of a single cottage, or of one of a block, on the lowest scale, should not if possible exceed £100, and that the accommodation should be equal to that prescribed by the Inclosure Commissioners for a three-room cottage; but it has not been thought expedient to tie the Committee down absolutely either to that scale of cost or of accommodation. In making their awards, the Committee have, in the first place, been guided by the figures of merit attached to the several plans after a laborious examination of the whole, pursued on a system which reduced the effect of the partialities or prejudices of the individual members to a minimum. Next, by the cost of the several plans approaching nearest to each other in figures of merit, as ascertained by reference to a professional measurer who was instructed to apply the schedule of prices to the several plans with perfect uniformity. And thirdly, by the superficial area of the apartments and cubic contents of the building considered with reference to the cost. The award of the Committee is as follows:—

I.—£5 PREMIUMS FOR SINGLE COTTAGES.

NAME AND ADDRESS OF COMPETITOR.	Figures of Merit.	Cost.	Area.	Cubic Contents.
		£ s. d.	Feet.	Feet.
1. John Allan, Architect, 49, Port-street, Stirling	4303	104 17 9	465½	4148
2. John Smith, Architect, 148, King-street, Aberdeen	3883	94 13 6	432	3288

II.—£5 PREMIUMS FOR DOUBLE COTTAGES

NAME AND ADDRESS OF COMPETITOR.	Figures of Merit.	Cost.	Area.	Cubic Contents.
		£ s. d.	Feet.	Feet.
1. Alfred Carden, 65, Gloucester-road, Brighton	4808	208 14 9	522½	4009
2. James Anderson, Mason, 6, Old-road, Huntly	4400	206 17 2	607½	4282

III.—£1 PREMIUMS FOR MERIT, &c.

NAME AND ADDRESS OF COMPETITOR.	Figures of Merit.	Cost.	Area.	Cubic Contents.	
		£ s. d.	Feet.	Feet.	
1. James Coutts, Wright, Learney, Torphins	4380	260 0 0	637	4513	Double.
2. Samuel Rigg, 16, Serpentine-terrace, Kendal	4245	263 0 0	580	4860	Double.
3. J. C. Walker, Cargreen House, Cargreen-road, South Norwood, London, S.E..	4118	111 6 0	413	4512	Single.
4. William Duguid and Sons, Builders, Ballater	4074	137 8 6	505	4025	Single.
5. R. Chamberlain, 27, Lichfield-street, Walsall	4310	131 16 0	593½	4855	Single.
6. G. B. Mayo, 4, Smyrren-grove, Bird-in-Bush-road, Peckham, London, S.E.	3626	112 19 10	470½	5012	Single.
7. James Anderson, Mason, 6, Old-road, Huntly	3298	199 3 11	419½	3338	Double
8. William Duguid and Sons, Builders, Ballater	3208	172 10 0	483½	3469	Double
9. John Clarke, Mersey Bank, New Ferry, Cheshire	3435	287 0 0	446½	4449	Double.
10. George Spark, Faburn, Lumphanan	2893	200 17 9	575½	5182	Double.

ABERDEEN, 24th March, 1873.

THOS. ZNNES, Conyener.

BOOKS RECEIVED.

Street's Indian and Colonial Mercantile Directory for 1873 (London: G. Street, 30, Cornhill) is a most useful publication of its class. First issued in 1870, it has, like all other directories, been considerably enlarged since then, and care appears to have been taken to revise all the information given, and where possible, to add new features of interest. The trade returns, tariffs, population, &c., of each place are given, and full particulars, with rates and times of transit, of the means of communication therewith; the average time of transit by sailing vessels is also given. All the London agents to each of the banks are named, and full particulars given as to the principal products and articles of trade peculiar to each place.—*A Treatise on the Strength of Bridges and Roofs*, by Samuel Shreave, A.M., C.E. (New York: D. Van Nostrand), is just what the title implies. The author has applied the simpler processes of Algebra to the discussion of the subject of strains in single span trusses, obtaining many formulæ for practical application without having recourse to processes involving the use of the higher mathematics. Uniformly-distributed loads have alone been considered. A second volume is promised, in which the subject will be further considered. *Weale's Dictionary of Terms*, edited by Robert Hunt, F.R.S. (London: Lockwood and Co.), has reached a fourth edition. A more systematic arrangement has made room for a large number of new terms without increasing the size of the volume.—*A Technological Dictionary in French, English, and German*, by A. Tolhausen (Leipzig: B. Tauchnitz), is the first part of a vocabulary of technical terms in the three languages.—*The Cicerone; or Art Guide to Painting in Italy* (London: John Murray), is a translation, by Mrs. A. H. Clough, of Dr. Jacob Burckhardt's work, so far as it relates to painting. It has been revised by Dr. A. Von Zahn, of Dresden. It contains an historical account, up to the close of the seventeenth century, of the rise and course of the various schools represented in Italy, pointing out their various characteristics, and especially describing their founders and principal masters, and enumerating the most remarkable and characteristic works of each. An index of places is added, giving the names of the works to be found in each town, enabling the traveller to study all the paintings collected in any town. *Metropolitan Rating*, by Edward Ryde (London: Lockwood and Co.), contains a summary of the appeals heard before the first Court of General Assessment Sessions in 1871 under the Valuation Act of 1869. The great variety of cases which came before this court—limited as they were to the metropolis—will afford some idea of the vast extent and diversity of interests which may be expected to require attention if an Act is passed extending similar powers to the whole country.

ON THE DOME.*

(Concluded from page 416.)

THE Cathedral at Florence had been carried out during the fourteenth century—all but its *cupola*—from the design of Arnolfo and his successors. A dome equal in space to that now existing was prepared for, but various causes delayed for a century its actual erection, so that, when it was at length undertaken, the prevailing style had changed. It is probable that Arnolfo intended to have sprung his dome at a far lower level, and to have made it like that of the adjoining baptistery; perhaps not exhibiting externally its domical form. Brunelleschi raised the drum to a considerable height,—exhibited his dome as a vast external feature,—and crowned it with a culminating lantern, thus giving us at once the leading features,—and that on a scale never since exceeded, of what I have called the *modern* type of dome. Had he made its details more accurately to harmonise with those of Arnolfo's structure, his work would have been perfect. Not only is his dome erected on Gothic walls and arches, but its section is a pointed arch, so that in all but its decorative features—and in these in some degree—it is essentially a Gothic dome. It is not, however, pendentive, nor is it circular in plan, and though opening by arches into the arms of the cross, it is after all merely the covering of an octagonal chamber, so that its claims rest more on its size, its height, and its external beauty, than any novelty of development.

Of its successors the name is legion. It would be useless for me to attempt to enumerate even the most successful of them. I will, therefore, content myself with a brief description of the two most typical—those of S. Peter's at Rome, (Fig. 19) and of our own S. Paul's.

I am not aware of any dome of great scale erected in the interval between Brunelleschi's dome at Florence, and that of Michael Angelo at Rome. The latter, however, was the crowning result of the efforts of successive architects, especially of Bramante and Sangallo. In one sense it does, and the other it does not, show evidence of this lengthened period of development. Its unity of design would bespeak it as the work of one master-mind, while its perfection may mark it as the result of oft-repeated trials.

Though founded in idea on the dome at Florence, that of S. Peter's differs from it in many most important and essential particulars. In the first place,—while that at Florence is supported from the very floor upon an octagonal wall merely pierced by comparatively narrow arches, that at S. Peter's is essentially a *pendentive* dome, rising from four colossal piers which give it a square base, and united with the four arms of the church by arches, or rather *vaults* of vast span. These arches, it is true, are not so wide as to reduce the pendentives which rise from between them to triangular forms, but are set so far apart as to leave a portion of the ideal circle between them, and to give the pendentives a horizontal base.

This was necessary to give strength to the piers for the support of so gigantic a structure, but in no degree interferes with the pendentive character of the dome.

Again, at Florence the octagonal wall rises to the very base of the dome, while at Rome the drum, from the pendentives upwards, is circular. At Florence it is pierced only by rather ungainly circular windows, while at Rome it is colonnaded within and without, and beautifully decorated within. At Florence the dome is of that doubtful kind which has straight sides, carrying up the octagonal form to the very top, while at Rome the dome is circular and perfect. Both are in some degree alike in construction, being *double*, with a space between, not two domes, as at our S. Paul's, but one dome formed of two shells partially connected; a mode of construction well suited to the support of the crowning lantern.

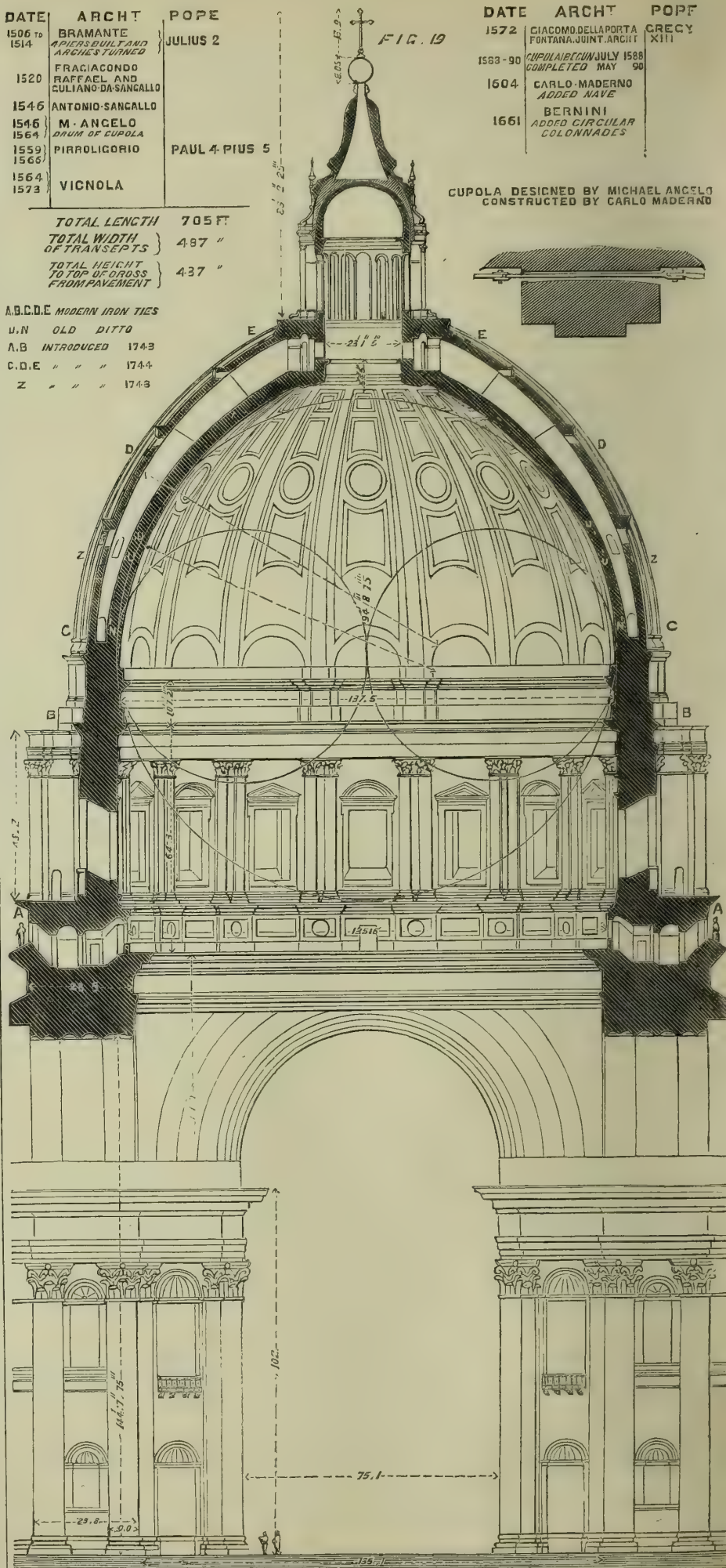
Both domes are founded in their section on the pointed arch. Their internal span is nearly the same, but their proportions differ greatly; for while that at Florence is internally only two of its diameters in height, that at Rome is two and a half: and while the former is externally one and three quarters of its diameter in height, the latter is two diameters—each irrespective of the lantern. Strangely enough, however, the great

DATE	ARCHT	POPE
1506 to 1514	BRAMANTE PIERS BUILT AND ARCHES FINISHED	JULIUS 2
1520	FRACIACONDO RAFFAEL AND CULIANO-DASANGALLO	
1546	ANTONIO-SANGALLO	
1546	M. ANGELO DRUM OF CUPOLA	
1559	PIRRO-LIGORIO	PAUL 4-PIUS 5
1566		
1564	VICOLA	
1573		

TOTAL LENGTH 705 FT
TOTAL WIDTH OF TRANSEPTS 487 "
TOTAL HEIGHT TO TOP OF CROSS FROM PAVEMENT 437 "

A.B.C.D.E. MODERN IRON TIES

U.N	OLD	DITTO
A.B	INTRODUCED	1743
C.D.E	"	1744
Z	"	1743



DATE	ARCHT	POPE
1572	GIACOMO DELLA PORTA FONTANA JOINT ARCHT	GRECY XIII
1583-90	CUPOLA BUILT UNJULY 1588 COMPLETED MAY 90	
1604	CARLO-MADERNO ADDED NAVE	
1661	BERNINI ADDED CIRCULAR COLONNADES	

CUPOLA DESIGNED BY MICHAEL ANGELO
CONSTRUCTED BY CARLO MADERNO

* Second lecture delivered at the Royal Academy by Sir G. G. SCOTT, R.A.

external defect of the dome of S. Peter's is its want of height. It is so encumbered by the surrounding building, that its height, from near points of view, is greatly lost. Like the mountain—which seems to be its prototype—though towering nobly in the distant view, it becomes as you approach it entangled among the nearer though smaller heights. This is obviated at Florence—at least from the eastern points of view—by the more favourable distribution of the subordinate buildings.

The boast attributed to Michael Angelo—that he would raise the Pantheon upon the top of the Temple of Peace—has more meaning than at first appears. The Temple of Peace (so called), now known to have been the Basilica of Maxentius, consists of a vast nave with aisles. The nave is divided into three square bays of between 80 and 90 ft. in width, and these bays are groined. Had the pendentive dome been then known, each bay might have been covered by such a dome as that which spans the central bay of S. Sophia, and in such a case the dome of the Pantheon might, in loose language, have been said to be placed upon four piers and four arches of the Temple of Peace. But Michael Angelo aimed at much more than this. It was not the dome only, but the whole structure of the Pantheon, which (in a figure of speech) he thus intended to raise upon a square substructure open on all sides to view from other parts of the interior. Thus he raised upon his pendentives what he compared to the circular wall of the Pantheon, and on that he raised its dome. This was not, however, the whole of his task, for over the eye of the dome (as of the Pantheon) he erected again another structure—a domed rotunda—into which the eye reaches from below, and through whose windows the light penetrates into the dome. And, more than all this, instead of allowing his dome, as in the Pantheon, to be half buried within the walls of the building, he made it rise boldly from their upper surface, and gave it such a proportion as to render it an august and beautiful object from every point from which it is visible.

The task was indeed one of which the greatest genius might fairly boast!

Nearly every subsequent dome of any magnitude seems to have been founded, more or less, upon S. Peter's; and, so far as I can judge, our own S. Paul's is the noblest of them all.

The dome of S. Paul's is clearly founded on that of S. Peter's, though subject to extensive changes. The object of these changes seems to have been threefold: 1st, to render it more conspicuous externally, especially from near points of view; 2ndly, to avoid disproportionate internal height, which was the more desirable from the smaller size of the openings through which the interior is viewed; and 3rdly, a desire to substitute eight arches and pendentives for the four at S. Peter's. The two former motives acting together led to the greatest peculiarity which this dome possesses, viz., it being in fact, two domes, one to be seen internally, and the other externally, with the consequent necessity for providing some independent means for the support of the culminating lantern. In this case, the proportions of the interior and exterior are alike, each having two of its own diameters from the base to the top of the dome. The external height is consequently equal in proportion to that of S. Peter's, while its internal height is half a diameter less.

We have seen at Florence and S. Peter's that the domes consist of a double shell, connected at intervals by ribs—a very excellent method of supporting a lantern when necessity demands so difficult a piece of construction as its direct support by the dome itself. The space, however, which Sir Christopher Wren left between his external and internal domes rendered this constructional effort needless. He accordingly provided for the load on the apex by a mere cone of brick intervening between his domes, giving it a threefold structure—a dome proper within forming the covering of the church below; a cone of brick above this, carrying the lantern; and a dome of timber over that, to give comeliness to the exterior, and to serve as its roof.

This expedient, certainly rather complicated, has been very differently dealt with by critics, some extolling it as an original effort of genius, while others have decried it as artificial and false. Neither party have, as I think, full justice on their side. In the first place, it is not original, the same principle having been, centuries before, acted on at S. Mark's, Venice. It

is true that, in that case, not the external dome alone, but the lantern, with its supports, are all of timber. This does not, however, alter the principle in the least; for we have the threefold structure,—the dome proper, the supports of the lantern, and the external dome, just as at S. Paul's, as a glance at the sections of the two will at once prove. In more recent structures iron supports for the lantern have been substituted for the brick cone, bringing it still more nearly to the type given by S. Mark's. In the second place, I hardly think, with this Mediæval precedent before us, we need be so squeamish about the expedient being artificial. We constantly find double coverings to our ancient churches,—the vault to be seen within and the roof without; and if we desire to place a *flèche* riding upon the roof, we support it by constructions concealed between the two. This is precisely what Wren has done. The only difference against him is, that his roof is domical, and suggests to the thoughtless observer that it is the same which he sees within—a mere peccadillo, after all—and amply atoned by the fact that you gain by it the power of giving due height both within and without, and avoid the difficulty and danger of supporting a massive structure of stone, as large as some church steeples, upon the apex of a dome. Anyhow, public opinion has decided in favour of the expedient, for a majority of subsequent domes are constructed on the same principle; while I almost defy an architect now designing a dome and experiencing these two difficulties—(1) The artistic difficulty of making the same dome look well from within and without; and (2) The constructive difficulty of balancing a steeple on the top of his dome,—to resist the temptation presented by this simple expedient; and the more so when conscious of having for it a Mediæval precedent.

The dome of S. Paul's is, externally, perhaps, more successful than any other. Internally, it is good from the supporting arches upwards, excepting that it is damaged by the unreasonable system on which its painted decorations have been designed.

The arches below are, however, an exception to its claims on our praise.

The scheme on which the plan of the dome and its accompaniments is set out in S. Paul's is totally different from that in S. Peter's. In the latter the space beneath the dome is penetrated by the nave and transept alone, irrespective of their aisles, which stop dead against the piers of the dome. In the former the same space is penetrated both by the nave and transept, and their aisles. To take another view. In S. Peter's, the square occupied by the dome and its piers is surrounded on all sides by an aisle low in the angles and lofty in the centres of the sides; or, in other words, the aisles failing to penetrate the dome, branch round its angles, while those of Sir Christopher Wren pierce directly through it.

S. Paul's has, externally, the advantage of the great corner piers rising from the ground, unencumbered by surrounding buildings; but internally, grandeur is sadly lost through the smaller span of the large supporting arches; the want of bold simplicity in the piers, by the meanness and irregularity of the smaller arches, and the confusion caused by the mode in which the portion above them is arranged.

Externally, however, the outline of this dome is perhaps unequalled; and, even internally, if you look at general effect, and close your eyes to defects in detail, the impression produced is grand in the extreme.

I have used up all the time at my disposal without having even reached one of the greatest classes of domical structures,—those of the different Mahomedan nations, from Morocco and Southern Spain, by Egypt and Turkey, to Persia and India.

I the less regret this because I leave it wholly untouched for some one better acquainted with it than myself to take up; I will only offer two remarks upon it. The first is, that it is wholly an offshoot of the Byzantine style which was first adopted, and then developed upon by the infidel conquerors. The second is, that it is throughout, or nearly so, carried out with the pointed arch, and most usually with corbels instead of pendentives, giving in these two directions an extension to the developments which took place in Western Europe. I may also mention that, in splendour of decoration, it is impossible to conceive anything to go beyond it; though it is a

style which seems alien to our Western and Christian prepossessions.

We have seen that the cupola—the noblest of all architectural features—has belonged by right to Roman architecture; was continued in the same style when it became Christian; was wonderfully developed in the Eastern and Christian Roman Empire; was continued in the Middle Ages in Italy, and transplanted into Germany and France; that it was taken up during the early days of the Renaissance from the unfinished Gothic cathedral at Florence and, through that semi-Mediæval, semi-Renaissance graft, was thoroughly adopted into the revived Classic styles. What I now want to press upon you is, that it should be equally welcomed into our revived Gothic architecture. That revival needs but such a welcoming of all that is good and noble to render it complete, and no feature possesses these qualities in a higher degree than the cupola. Let us, therefore, make it *our own*.

I have myself made some few attempts at this, which I venture to submit to you.

The dome, however, without its appropriate decorations, is but the body without the soul. It is the sister art of painting which breathes life into the otherwise breathless form. This painting must, however, be adapted to its position with skill, knowledge, and study. I have not time left to dilate on this subject, but commend it to the students of that art, only begging them to remember that, while exercising their art upon an object like the dome, which has an essential form on which its very stability, real or apparent, depends, they must keep it in such subordination as not to disturb that essential, but rather to bring out and emphasise it; otherwise, what I am urging will not prove a loving union, but a hostile collision, of the two sister arts.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

THE SAXON CHURCH AT BRADFORD-ON-AVON. —The Vicar of Bradford-on-Avon, a short time back, called attention to a local effort to recover what has been pronounced to be "the one perfect Saxon church in the country," which has been recently brought to light in this town. He has now every reason for hoping that, in a short time, possession of the whole church will be obtained. The chancel was purchased nine months ago. Help has been given, not only by the Society of Antiquaries, but also by several local Archaeological Societies. Among the subscribers are Sir Gilbert Scott, Dr. Edwin Guest, and Messrs. E. A. Freeman and J. H. Parker—all well qualified to give a reliable opinion as to the value of this unique relic of pre-Norman times.

PREHISTORIC EXPLORATIONS IN AUSTRIA.—A long account of some interesting explorations in a prehistoric mound near Pulkau, in Lower Austria, undertaken last summer by Dr. Woldrich, has been communicated to the Anthropological Society of Vienna. The author has found a large quantity of broken pottery, with ashes, implements in stone, bone, and horn, and a number of mammalian remains. He concludes that the site was used for sacrificial purposes during the bronze age, but at a time when stone tools were still in common use.

COMPETITIONS.

MARGATE.—A large number of architects are said to have expressed their intention to compete for the premiums of 100 and 50 guineas offered for the best designs for the erection of the new deaf and dumb asylum at Margate. The instructions to competing architects state that the buildings are to be executed in plain brickwork, without superfluous ornamentations.

DEVONPORT.—Twenty architects have submitted designs for a public competition for designs for school for Morris Town, Devonport, the school to accommodate 720 children.

The town of Derby has, through Mr. Bass, M.P., obtained possession of the oak panellings of what was once the Council Chamber of Prince Charles at Exeter-house, and intends to build an apartment in the Free Library for their reception. The Queen has expressed her pleasure at the preservation of the panelling, and presented to the town of Derby, through Lord Stanhope, an original letter of Prince Charles, taken from the Stuart papers, which, after various vicissitudes, are now preserved in Windsor Castle.

Building Intelligence.

CHURCHES AND CHAPELS.

BIRMINGHAM.—On Easter Monday, the foundation-stone was laid of a new nave about to be added to S. Cyprian's Church, Hay Mills, Birmingham. The additions to the church will consist of a new nave, north and south aisles, priest's vestry, choir vestry, childrens' gallery, porch, tower and spire. The whole of the seats will be placed in the nave, and the aisles will be used as passages. The total length of the church, from west wall to east end of the chancel, will be 98 feet. The width of the nave will be 25 feet. The height of the nave to the ridge of the roof will be 42 feet; to the top of the spire 100 feet. The materials used will be red brick with stone dressings, the roof being covered with red tiles. The style of architecture will be Mediæval of the date of the thirteenth century. The enlargement will cost upwards of £3,000.

BURTON-LE-COGGLES.—The interesting little church of St. Thomas à Becket is about to be restored to its pristine beauty. The rector has commissioned Mr. E. Welby Pugin to make the requisite drawings and to superintend the works. Following his advice, the modern king-post roof and patched-up east window are to be removed, and the walls strengthened by the addition of buttresses. Messrs. Rudd and Son, of Grantham, are the builders selected to execute the restorations.

DOWNE.—The parish church of S. Mary the Virgin, Downe, near Bromley, Kent, was reopened on Easter Day, after restoration. The church, which is built of flintstone, and has a tower with shingle spire, is of considerable antiquity, a yew tree in the churchyard being 700 years old. The high pews and the cumbersome western gallery, which hid the fine thirteenth century arch, have been removed, and a complete reparation effected, at a cost of nearly £1,500, under the superintendence of Joseph Clarke, Esq., F.S.A., the diocesan architect, the chancel being restored by the Ecclesiastical Commissioners. The opening of the oak roof, the restoration of the ancient south doorway, low open benches, the addition of a piscina and credence table, and the erection of an organ chamber and vestry at the north side of the chancel, together with encaustic tiles, choir stalls, lectern, stone pulpit, Litany desk, and suitable altar table, are among the improvements that have been made.

LONDON.—Great alterations have just been carried out at Falcon-square Independent Chapel, Aldersgate-street. The works just completed were necessitated by the expiration of the lease of the premises occupied as a Sunday-school in Jewin-street, and the high price asked for the freehold. It was felt that a school which was established so long ago as 1804, and which in 1871 contained more than 600 scholars, should not be broken up for want of proper accommodation, and after many unavailing efforts to obtain a site, it was determined to erect a suitable schoolroom under the chapel in Falcon-square. To do this the roof and floors of the old chapel have had to be raised. The work has been satisfactorily carried out by Messrs. Patman and Fotheringham, of Theobalds-road, Holborn, under the superintendence of Mr. M. M. Glover, architect, at a cost, including furniture, of about £3,880.

MOUNT CHARLES, S. AUSTELL.—The memorial stone of a new Wesleyan chapel for this village was laid last week. The building measures internally 40ft. by 30ft., and will be erected principally of granite, with white brick window dressings. The front entrance end, which faces the road, will be of white brick, relieved by red bands and dressings. The style chosen is Gothic, of the Early English period. Accommodation will be provided for about 280 persons, at a total cost of £600. The pews are to be open, of pitch pine, varnished, with inclined backs, grooved seats, book and footboards. The floor of the aisles, with that of the pews, will be gradually inclined from the entrances towards the rostrum end, to enable the congregation to obtain a clear uninterrupted view of the minister. The roof will be two-thirds open, of pitch-pine, varnished. The architect is Mr. Silvanus Trevail, of Carne, Par Station, and the builders are Messrs. T. J. Smith and N. Crocker, of S. Austell.

S. PANCRAS.—On Thursday, April 3rd, a new mission-house and chapel was opened in S. Pancras, in that part of the parish east of the church and south of the Midland Railway Station. It comprises on the basement story one large room and two smaller ones, which might be fitted up for a youths' institute or working men's club. On the ground-floor are two spacious rooms of unequal size, separated by a partition, but capable of being thrown into one; and in this all kinds of meetings and classes can be held. Above this is the mission chapel, approached by a handsome flight of steps: a lofty and capacious room, with a pitched roof, lighted from both sides by large windows, and seated to hold 200 people. The whole cost of the buildings has been £9,250, inclusive of the site. The architect is Mr. W. M. Toulon.

WESTMINSTER ABBEY.—The reredos of the altar of Westminster Abbey was re-opened to view on Easter Sunday. It will be remembered that in the place of the plaster screen erected by Bernasconi in 1824, Sir Gilbert Scott, the architect of the Abbey, planned the general design of a new reredos, under the superintendence of the Dean and Chapter, especially the Sub-Dean, Lord John Thynne, to whose management of a special fund for this purpose, chiefly created by the large influx of visitors during the great Exhibition of 1851, this restoration is mainly due. The design was, as far as possible, constructed after the model of the ancient screen of the 15th century, of which the other side, facing eastwards, is in a tolerable state of preservation. The frieze in the new screen facing westward represents the scenes in the Gospel history corresponding to those on the other side representing the scenes in the life of Edward the Confessor. The mosaic picture represents the Last Supper, from a design by Messrs. Clayton and Bell. The cedar table which replaced the former structure was carved by Messrs. Farmer and Brindley, of Lambeth, with Biblical subjects suggested by the present Bishop of Lincoln, then Canon of Westminster. This reredos was, in its main features, completed in 1867. Three years later the large vacant niches were filled under the direction of the present Dean, by Mr. Armstead, to whom the sculptures in the frieze are also due, by four statues representing Moses, Peter, Paul, and David. Since that time the decoration has been completed by the addition of frame-work and canopies, of wainscot richly gilt and inlaid with enamelled plaques of metal and plaques of flagstone and jewel-work. The general treatment of the space below the large picture is copied from the ancient retabulum discovered some twenty years ago, and now preserved in the south aisle of the Abbey. The vacant space underneath the picture has been filled with seven heads representing the holy women of the Bible, which were designed by Messrs. Clayton and Bell, who employed Mr. Rust, of Lambeth, to execute them in mosaic, and who also undertook the ornamental glasswork and the gilding. The whole of the woodwork has been executed by Messrs. Farmer and Brindley; the enamelled and jewelled plaques by Mr. Skidmore, of Coventry. The three large porphyry slabs in front of the altar were given by the present Lord Elgin, being taken from fragments of columns which his grandfather, when Ambassador at Constantinople, brought from the East to England, at the same time that he brought here the famous Elgin marbles.

WIDNES.—On Good Friday the foundation-stone of a new Congregational Church was laid at Simms' Cross, Widnes. The building will be Gothic in design, and is intended to accommodate 400 persons, with a provision for future extension. It will be built of red sandstone, with white stone facings, and will cost a sum of £2,500 exclusive of the land required, which will represent a further sum of £400. The architect is Mr. W. I. Mason, of Liverpool, and the contractors are Messrs. White & Son, Runcorn.

SCHOOLS.

ELMHAM.—The Prince of Wales on Monday laid the foundation stone of the New Norfolk County School at Elmhams. The style adopted is the Old English Domestic, the exterior being of flint, with red brick dressings. The architects are Messrs. John Giles and Gough, of Craven-street, Strand, London.

MANNINGHAM.—The Primitive Methodists of the Shipley Circuit have purchased, at Manningham, a site on which it is eventually proposed to

erect a chapel. A school has been commenced, the building being placed in the rear of the site. The design, prepared by Messrs. Kirk and Son, architects, Dewsbury, shows a plain two-storied edifice, measuring 42ft. long by 30ft. wide, and capable of accommodating about 500 people. On Saturday afternoon the memorial stone was laid. The total outlay is expected to be about £1,400, of which the school will cost £900.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.

To OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C. Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements 9d. per line.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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AN ASSISTANT.—Purely a matter of arrangement.

A BUILDER.—Would it not be wise of you to first write to the advertiser, and get all the information you can about the best means of using the silicate paint?

JOHN JOHNSON.—The drawings to hand.

J. S. BROWN.—The photograph to hand.

HUTTON and MURDOCK, Baltimore.—The drawing to hand.

E. H. T.—Please send.

ERRATUM.—The church mentioned in Dr. Zerffi's article a fortnight ago on "Early Christian Art" as over the grave of Christ at Bethlehem, ought to have read "the Church of the grave of Christ."

Correspondence.

PLUMBER WORK.

To the Editor of the BUILDING NEWS.

SIR,—In reference to Mr. Buchan's letter, whatever may be the Glasgow practice, Mr. Fletcher's is the usual London method of measuring zinc-work, viz., to allow for all zinc actually used, but without allowance for cutting or waste. To the net measurement of the flat there must be added for turns-up at rolls and against walls, for roll caps, welts, clips, and flashings, just as if all the zinc actually used were spread out flat and measured. Gutters to flats are taken with the flats, but gutters, where there are no flats, are measured in the same way with their flashings, and should be priced higher than flats. Eaves gutters per foot run.

—I am, Sir, &c.,

X.

ROOD SCREENS IN KENT.

SIR,—As I see you refer in last week's issue to the rood screen of East Church, Kent, and say that it is the "only one" in that county, I have an acquaintance with the following in addition, and believe there are several more:—

Wrotham, with the seven candlesticks remaining; a rare example.

Chalk, S. Mary, has the royal arms of Charles II. over the screen, and dated 1660.

Cliffe, S. Helen, finely carved, three arches.

Dartford, Holy Trinity, Decorated style.

Chislehurst, S. Nicholas. This one is a restoration, I believe, so can hardly be classed with the above; and the screens of Canterbury and Rochester Cathedrals being of stone, would hardly be described as similar to the one at East Church.—I am, Sir, &c.,

CHAS. J. D. GUY.

36, Hanover-square, Kennington, April 16.

Intercommunication.

QUESTIONS.

[2826].—Concrete Made from Burnt Ballast.—Will any of your readers inform me the best way of making or burning earth for the above, where the absence of gravel for concrete necessitates its use?—A PROVINCIAL BUILDER.

[2827].—Whitewash.—Will any of your readers inform me the best and quickest remedy to employ to clean whitewash off old masonry, in mouldings, quoins, and columns in church restoration?—A BUILDER.

[2828].—Books.—Can any reader of the BUILDING NEWS inform me of any good books upon "Church Spires" (wood and stone), with the publisher's and the author's name of same?—INQUIRER.

[2829].—Broken Ivory or Bone.—Could any one kindly let me know if there is any composition that can be safely relied upon for joining ivory or bone together when broken?—C.

REPLIES.

[2820].—Agreements, &c.—Your correspondent John S. Sloane has given a very incomplete reply, and I doubt very much whether the Excise officers have, as he says, any power to demand any such document and stamp it *par force* with a penalty stamp after fourteen days of first date. My reply is that no "agreement," or to speak more correctly, "memorandum of agreement," between a builder and an artificer for work to be done and paid for can be produced and put in as evidence in any court of law unless it is properly stamped, but it is quite competent for a plaintiff to prove the actual agreement arrived at between himself and the defendant by other means than the written "memorandum" of the said agreement. A memorandum of agreement of the nature referred to should be stamped with a sixpenny stamp, either by impressment within fourteen days of its execution and date, or an adhesive sixpenny agreement stamp may be used, but if used, it is to be cancelled by the person by whom the agreement is first executed, who is to write on or across the stamp his name or initials, or the name or initials of his firm, together with the true date of his so writing, so that the same may be effectually cancelled and rendered incapable of being used for any other instrument. If the document is required for use in evidence, and it has not been properly stamped in either of the above methods, it may be stamped by impressment on payment of the stamp charge of sixpence and a penalty of £10. An appraiser's license is not necessary to enable a person to charge for making an estimate of dilapidations where the estimate is not in any manner obligatory as between parties, either by agreement or operation of law, and is made for the information of one party only.—H.

[2821].—Limestone.—In reply to the question of your correspondent Wm. Kelly, I have no hesitation in saying that the finest limestone in England is the carboniferous limestone from the neighbourhood of Plymouth. A recent analysis of a number of specimens showed a percentage of 95 and 96 of carbonate of lime. I know the neighbourhood and stone well, and whether it be used for building or ornamental purposes, I believe it will be found superior to most, if not to all others. For the former purpose it is used for all buildings of importance there. The new town-hall and municipal offices at Bristol, now erecting at a cost of £40,000, are being constructed of it, a large portion of the ornamentation being effected by the judicious arrangement of the limestone of different shades, light and dark, which is a material saving in the expense of a large pile of buildings. The War Department selected this stone for the construction of the chain of Palmerston's forts which surround the three towns. Nearly two millions of tons have been used in the construction of the breakwater, in blocks of from three to forty tons; and more recently the fine large basin at the Keyham steam-factory at Devonport is of finely dressed ashlar. The hollow coigus for the gates of Leith docks and the Commercial Docks, London, are of limestone. With regard to the durability of this stone, if it will resist the notoriously "steamy" atmosphere of Plymouth, with its average of nearly 200 "rainy days" per annum, it certainly seems reasonable that it would stand equally well the less damp London atmosphere. I had an opportunity last week of closely inspecting the two churches of Plymouth, both composite structures of limestone and granite, the abutments of the towers being of the latter, and was much struck with its weathered and wasted condition as compared with the limestone. S. Andrew's tower bears date 1460, and S. Charles's about 1660. For ornamental purposes, I think there can be no two opinions as to the superiority, either of quality or beauty, of the Devonshire (Plymouth) marbles. If your correspondent is in London, he has only to visit the new Foreign Offices, where he will find about forty columns of various sizes up to 14ft. length.—F. J. W.

[2822].—The True Law or Rule of Apportionment.—If your correspondent refers to the metropolis, there is no other law of apportionment than that laid down in the 77th section, 25 and 26 Vic. cap. 102, which provides that the costs or expenses, or the estimated costs or expenses, of paving new streets, "including the costs of paving at the points of intersection of streets, and all other incidental costs or charges, shall be apportioned by the vestry or board." There appears to be no appeal from this apportionment. Different districts in the metropolis adopt different methods of apportionment, as they deem to be most appropriate to the circumstances of their locality. In one district with which I am acquainted the whole charge for making-up road, channelling, curbing, paving footways, and constructing drainage gullies (the sewer having generally been provided by the freeholder) is divided by the number of feet frontage, and so charged accordingly to each house; so that in that case the part marked B in "Alpha's" plan is paid for jointly by the owners of all the houses. This method is rather hard upon the owners of corner houses, as they have to pay their apportionment of the cost of making-up the side street upon which the flank wall of their houses and gardens abut as well as their part of the cost of the front street. In another district, where the houses are small,

and the plots of land on which they are built are comparatively long, this hardship is partially admitted, and provided for in this manner—viz., in arriving at the total number of frontage feet in each street, one-third is deducted from flank frontages. This has the effect of distributing the cost of making-up one-third of the portion of the street opposite flank frontages amongst all the owners; the owners of houses with frontages only abutting on the street paying in proportion to the length of those frontages, and the owners of houses at the corner of two new streets paying, in addition to their proportion of frontage to the front street, a proportion calculated according to two-thirds the length of their plot towards the cost of the side street. Surveyors in advising poor clients on the purchase of new houses should be extremely careful to ascertain what the liability for paving, &c., may amount to. I have known an instance in which a poor man having saved for many years for the purpose, at last purchased a narrow plot of land, and built himself a house, at a total cost of £230 for land and house, but who was nearly ruined by having to meet a claim quite unexpected by him of £95 for making-up roads and paving.—X.

[2822].—The True Law or Rule of Apportionment.—If "Alpha" is personally responsible for any advice on this subject, he must rely upon his own judgment in any particular case, so far as I know, not being a lawyer. I have often had to decide such questions, in the absence of any clearly written law on the subject, and it has always seemed to me that as the common use of ground implies a common responsibility, the community should contribute to the expenses, each in proportion to the advantages he derives from the thing to be made. Corner plots of ground are usually more valuable, per unit of area, than other plots in the same line of street; and I have thought it to be the fairest way to apportion the expenses of those portions of the streets named by "Alpha," according to the rateable value of the houses, and not, as suggested by him, according to the frontage.—C. S.

[2823].—Water-Tight Fountain Basin.—"The following ingredients, melted and mixed together, and applied whilst in a hot state to the surface of the stone, will prevent damp from entering into it, and also vegetable substances from growing upon it:—1½lb. rosin, 1lb. Russian tallow, 1 quart linseed oil. This applied, two coats, to a basin formed of porous stone caused it to hold water." The above is copied from a contemporary—whether a reply to "H. L." or not I do not know. He asks for the best method of constructing. This, it appears, will cause it to be waterproof.—TRO.

[2823].—Water-Tight Fountain Basin.—In answer to "L. H." the best water-tight fountain basin he could have is a terra-cotta one, but as they are rather expensive, I should advise him to make a good foundation, and then build it up in stock bricks and Portland cement, and when it has stood a few days give it a good coat of Portland cement and sharp, clean sand, and I think he will get what he wants. Care must be taken to empty it if it is outdoors in the winter, or the frost will split it.—E. B.

[2825].—Cement for Aquarium.—"J. R. H." will find nothing better than the red-lead cement and gold-size, providing he thoroughly cleans and dries the glass before using it; but I think "J. R. H." will not find that it is the fault of the cement, as I expect it is the same thing that made one I have leak some years ago—viz., the weight of water, which evil I got over by strengthening the bottom, and fixing two extra supports tight under the bottom from the floor, and since which time I have have had no trouble with mine, though much larger than "J. R. H.'s."—E. B.

Our Office Table.

AN HISTORIC OAK.—In 1810 (says the *Anti-quary*) an oak was felled near Newport, in Monmouthshire, measuring 28½ft. in circumference. It was supposed to be 400 years, old from the number of rings in the grain; and it was stated at the time that the timber sold for £670, and the bark for £200. The "Parliament Oak" in Clipstone Park is, according to tradition, one under which Edward I. held a parliament, and is supposed to be 1,500 years old. At Welbeck Abbey an oak, called "The Duke's Walking-stick," is 112ft. high. The "Greendale Oak" covers a space of 700 square yards, and has a coach road cut through it. The "Two Porters" are 100ft. high; the "Seven Sisters" has seven stems 90ft. in height. There are some other extraordinary oaks at Welbeck Abbey. The largest oak in England is said to be at Calthorpe, in Yorkshire; it measures 78ft. in circumference where it meets the ground.

FINE ART AT UNIVERSITY COLLEGE.—The report lately issued by the Council of University College gives a gratifying account of the success of the Fine Art Department or School, established in accordance with the will of the late Felix Slade, Esq. There are at present 120 students of both sexes in the schools, and Professor Poynter finds some difficulty in arranging the classes so as to secure sufficient accommodation for that number. This rapid growth proves that the school has met a real want, and that the system of instruction commends itself to those who require opportunities for study under able teachers. The Council hopes to be able to provide additional space. The two first Slade scholarships

were awarded at the end of last session to Miss E. M. Wild and Miss B. A. R. Spencer. Six prizes were given. The competition was keen, and the quality of the works sent in showed that satisfactory progress has been achieved. Several important additions have been made to the means of instruction provided during the session, including lectures on Anatomy, by Mr. Thane; these lectures will be repeated during the summer term. Professor Henrici has lectured on Perspective, and Professor T. Hayter Lewis will, during the summer term, lecture on Classical Archaeology. A Fine Art Library has been established, and Mr. A. W. Franks has made over a valuable collection of drawings and diagrams illustrative of the history of art and classical archeology.

LONDON PARKS.—The Registrar-General gives the following statement of the area of the public parks in and about London as ascertained by the Ordnance Survey Department:—S. James's-park, 58.5 acres; the Green-park, 60.3 acres; Hyde-park, 386 acres; Kensington-gardens, 245.5 acres; the Regent's-park, 406.2 acres; Victoria-park, 223.8 acres; Southwark-park, 63 acres; Kennington-park, 19.7 acres; Battersea-park, 199.4 acres; Greenwich-park, 190.4 acres. These ten parks, together containing 1,852.8 acres, are all within the registration division designated "London," which comprises 78,080 acres, including 2,718 acres of the Thames. Beyond these limits, but still within the district served by the Metropolitan Police, there is also Richmond-park, with 2,015.5 acres; Kew-gardens, &c., with 322.8 acres; Old Deer-park, with 357.2 acres; Bushey-park, 993.9 acres; and Hampton-court-park, 576.7 acres. These last five parks contain together 4,266.1 acres, which, added to the area of the ten parks first above-named, make a total of 6,118.9 acres of public park in or about London.

NEW GRAVING DOCK AT LIMERICK.—The Lord-Lieutenant of Ireland has accepted the invitation of the Mayor and Harbour Commissioners of Limerick to formally open the gravings dock just completed by Mr. John Long. The dock has been cut out of the solid rock—the side steps and bottom being dressed without masonry. The amount granted for its construction by the Treasury Loan Commissioners was £20,000, on the certificate of Sir John Coode, who certified for a dock of 350ft.; but in consequence of the bottom and most of the side steps having been cut from the bed of the rock, Mr. Long has been enabled to increase the length to 420ft. It is close to the wet dock, from which it is entered.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—The following are the names on the balloting list for the election of President, Vice-President, and Council of the Institute. The list has been sent to all Fellows of the Institute, and the election will take place on May 5, when the annual general meeting of the Institute will be held. Those marked thus (*) are new names, the others are members of the present Council, eligible for re-election. President: Sir George Gilbert Scott, R.A.* Vice-Presidents: Messrs. John Gibson, Horace Jones, and George Vulliamy.* Ordinary members of Council (fifteen names to be returned): Messrs. G. Aitchison, T. Talbot Bury, T. Chatfield Clarke, H. Dawson, E. H. Martineau, Harry Oliver, Wyatt Papworth, R. J. Withers, W. M. Fawcett (Cambridge), E. Salomons* (Manchester), E. G. Paley* (Lancaster), J. Belcher,* C. H. Cooke,* E. A. Gruning,* and W. M. Teulon.* Hon. Sec. for Foreign Correspondence: Mr. F. P. Cockerell. Secretary for home duties: Mr. C. L. Eastlake. Treasurer: Sir W. R. Farquhar, Bart. Honorary Solicitor: Mr. F. Ouvry. Auditors (two names to be returned). Names substituted for any of the foregoing are to be written on the balloting lists, in the blank spaces opposite those they are intended to supersede. Any list containing a greater number of names than specified will be informal, and the votes will in consequence be lost. At the ordinary general meeting on Monday evening next, Mr. H. W. Brewer will read a paper "On the Churches of Brittany (North Coast)."

At a meeting of the Court of Common Council, on Thursday week, a report was brought up from the Markets Committee, recommending an expenditure of £100,000 upon the improvement of Farringdon Market. This was met by an amendment instructing the committee to consider and report upon the most eligible site for a new vegetable and fruit market, and this, after some discussion, was carried by 58 votes to 42.

CHIPS.

Mr. John Shaw, architect, Leeds, has been successful in the recent competition for cemetery chapels at Wetherby.

The water supplied to the city of Munich contains nitrate of potash. Professor A. Wagner states that the amount of water used in the city in one year, by the ordinary water pipes, contains saltpetre sufficient to make 18,106 cwt. of gunpowder.

A prospectus has been issued of the Floating Swimming Baths Company (Limited), with a capital of £100,000 in 50,000 shares of £2 each, to secure to the public facilities for bathing and swimming in the Thames.

On Monday the Conservatives at Boston laid the foundation-stone of a new Conservative Hall. The estimated cost is between £6,000 and £7,000, the architects being G. G. Scott, Jun., Esq., and J. O. Scott, Esq.

At East Orchard, in the parish of Iwerne Minster, Dorset, the church, which has been rebuilt, with the exception of the tower, was opened on Lady-Day. The cost of the chancel, which has been lengthened four feet, was undertaken by the Ecclesiastical Commissioners, Mr. Christian being the architect.

The Kent Waterworks Company have given notice that on and after the 1st of June next it is their intention to give a constant supply of water to about 1,000 houses in their district, situated in the parish of S. Mary's, Rotherhithe, and SS. Paul and Nicholas, Deptford.

Trinity Congregational Chapel, Reading, was reopened on Tuesday week, after restoration, under the superintendence of Mr. Ford Poulton.

The Metropolitan Board of Works resolved last week to increase the salary of Captain Shaw, chief officer of the Metropolitan Fire Brigade, from £850 to £1,000 per annum.

The Metropolitan Board of Works had before them on Wednesday week a memorial from the residents in Great Coram-street, praying that the thoroughfare might be re-named, in consequence of the depreciation of the property caused by the recent murder, which had the effect of spoiling the letting of houses. The board refused to grant the request.

S. Andrew's Episcopal Church, Edinburgh, is to be enlarged, under the direction of Mr. David Bryce. Mr. Bryce proposes to remove the south wall to a point still further south, to erect a new transept and gallery, running north and south, capable of accommodating above 278 additional sitters, and to construct an apse, similar to the present chancel, for the organ, choir, and school children. The cost of this addition will be £1,400.

A public elementary school has been recently erected at Pentewan, S. Austell, by the S. Austell School Board, to accommodate 100 children, from the designs, and under the superintendence of Mr. Silvanus Trevail, of Carne, Par Station.

The Waterford Town Council intend applying to the Treasury for a loan of £50,000 for the construction of waterworks.

Efforts are being made to erect, by public subscription, a building for the School of Science and Art in Inverness, conjoined with which will be a public museum.

The Dublin Exhibition and Loan Museum of Art Treasures will be opened on May 14th. Sir Richard Wallace has promised to furnish some valuable objects of art to the Loan Museum.

Colonel Andrew Clarke, R.E., late Chief Commissioner of Crown lands in Victoria, now Director of Works at the Admiralty, has been created a Knight Commander of the Order of S. Michael and S. George.

A contemporary hears from Rome that Storey, the American sculptor, will not send his statue of "Jerusalem Fallen" to London, being dissatisfied with the manner in which sculpture is exhibited at the Royal Academy.

The vestry of S. George's, Hanover-square, has declined to pay for the gas supplied for the street lamps, on account of its inferior quality.

The freehold of No. 91, Leadenhall-street, was sold by Messrs. Debenham, Tewson, and Farmer last week for £1,360.

Mr. Horsley has been engaged for some time past upon a large altar-piece, which is to be presented by Sir William Tite to the Chapel of S. Thomas's Hospital.

Finchley parish church, which has been restored and enlarged, will be consecrated on Wednesday next by the Bishop of London.

At a meeting last week of the shareholders of the East Cornwall Fireclay and Brick Company (Limited), Mr. F. F. Buffen was appointed liquidator to wind up the Company voluntarily.

Mr. H. W. Davis, C.E., in retiring from the position of Engineer-in-Chief to the Great Eastern Railway, to which company he had been professionally attached for twenty-five years, has been presented with a massive service of plate by his brother officers and upwards of 1,500 employees of the Company.

An International Exhibition of pictures of ancient schools is to be held shortly at Brussels.

Under the auspices of the Society for Improving the Condition of the Labouring Classes, three tenements in Seven Dials have been reopened after having been thoroughly repaired.

Among the new improvements projected in the City of London, the Commissioners of Sewers specially recommend the widening of Jewin-street, Aldersgate, with a view to forming a better approach to the Metropolitan Meat Market.

The Paris *Salon* will be opened on May 5th, and on the same day our own Royal Academy Exhibition will open. The *Salon* will be closed on the 25th June.

The foundation-stone of a new Independent Chapel was laid last week at Blackburn. The style is mixed Gothic, and the cost will be £12,000. Mr. Tarring is the architect.

On Wednesday week a new Methodist Chapel was opened at Pudsey. Messrs. C. S. and A. J. Nelson, of Leeds, were the architects.

A New York Press despatch states that the number of new buildings under contract this spring is much under the average, owing, it is said, to the indisposition of capitalists to venture on new engagements while another strike is in contemplation. This places a great many journeymen masons, plasterers, &c., at a disadvantage, and compels them to fall back upon the unions for support.

The new chancel which has been added to Christ Church, Tunbridge Wells, was opened on Palm Sunday.

The new theatre in Park-street, Regent's Park, is to be called the Royal Alexandra Theatre, instead of the Regent's Park Theatre, as originally intended.

The Prince of Wales is to open the new Town Hall at Bolton (which has been erected at a cost of about £150,000) in July next.

Trade News.

WAGES MOVEMENT.

BIRMINGHAM.—The award of the arbitrator appointed to settle the claims of the masters and men in the Birmingham building trades was read on Saturday. The men claimed an advance of wages from 7½d. to 8½d. per hour; the arbitrator awarded to the carpenters and bricklayers an advance of ½d., making their wages 7½d. per hour. The hours of working and other regulations stand as before. The award has given satisfaction.

BLACKBURN.—On the 1st of November the operative masons of Blackburn gave their masters six months' notice of their intention to demand an advance of wages. In pursuance of that notice a conference of masters and men was recently held. The men asked 38s. per week in summer, instead of 30s. at present, and 30s. per week in winter, instead of 27s. at present. They would, however, abolish the half-hour for breakfast, in winter, or they would work for the present rate of wages if the eight hours' scale was granted. Some advances were offered to take effect in twelve months. The offer was submitted to the assembled operatives and rejected. Ultimately the men offered to meet the masters half-way, but in the event of a refusal they said a strike would ensue.

LEAMINGTON.—The operatives on strike in the building trade at Leamington have taken a bold experimental step. They have united to carry out co-operation in building; and on Tuesday issued a prospectus of the Leamington United Trades' Building Company, inviting public patronage and support. They state that they are prepared to undertake every description of building, and execute work in every branch of the trade, and assert that they have the choice of the most skilled artisans in every branch. The strike has now continued a fortnight, and the masters show no sign of yielding. Many artisans have migrated to other towns.

LIVERPOOL.—On Wednesday week an aggregate meeting of operative house carpenters of Liverpool and Birkenhead was held to consider the position of the operatives in reference to certain demands which they made some months since. On the 1st of November last the operatives gave notice of their intention to introduce altered trade rules on the 1st of May. These rules included fifty hours' work per week, at eightpence per hour. Considerable correspondence and one or two interviews took place between the men and the employers, who offered to pay an increase of one-half-penny in summer, and one farthing in winter upon the present rate of wages. The operatives objected to the proposed terms, and suggested that the matter should be referred to arbitration; but the masters declined to accede to that suggestion, and the meeting was therefore called to consider the present relations of the operatives and their employers on these points. At the commencement of the proceedings the secretary read a lengthy correspondence between the Liverpool Master Builders' Association and the men's committee, embodying the facts already stated.—Mr. W. M'Millen moved—"That this meeting, whilst regretting the action taken by the employers in refusing arbitration as a means of settling our claims, offer the following concessions from our original demands:—That the working hours be 52½ per week, and the wages 7½d. per hour." Mr. D. Swale seconded the motion. Mr.

Whalley proposed, and Mr. Perrell seconded, an amendment to the effect that the terms be 54½ hours, and the wages 8d. After some discussion, Mr. Whalley withdrew his amendment, and the original resolution was then put and carried.

STOCKTON-ON-TEES.—The master builders of Stockton having taken no notice of an application from the men, made some weeks ago, for an advance in their wages, the men have held a meeting and passed a resolution to strike until the advance is conceded. What they demand is something like 3s. per week on their present rate of wages, and some diminution in their hours of labour.

ASHTON & GREEN.

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slate—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.
 21 by 12 22 by 12 20 by 10 18 by 10 18 by 9
 12s. 30s. 25s. 22s. 6d. 22s. 6d.
 16 by 10 16 by 8 14 by 10 14 by 8 12 by 8
 22s. 6d. 17s. 21s. 6d. 13s. 7s. 6d.
 Per m. of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A & G's Special 40d Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BEDFORD.—For new printing-office and alterations to premises, Silver-street. Mr. John Usher, architect.
 Corby and Son £293 0 0
 Richards, jun. 2 1 0
 Cunvin 171 0 0

BEDFORDSHIRE.—For farmhouse and offices for Messrs. J. and F. Howard. Mr. John Usher, architect. Quantities supplied.
 Coles £1,447 0 0
 Foster 1,287 0 0
 Wright and Goodchild 1,265 15 0
 Spencer 1,265 0 0
 Dover and Co. 1,239 19 0
 Potter 1,230 0 0
 Hull 1,226 0 0

BEDFORDSHIRE.—For farmhouse and homestead together. Mr. J. Usher, architect.
 Claridge £3,445 0 0
 Hobson and Taylor 3,648 0 0

BEDFORDSHIRE.—For farm homestead for Messrs. Howard. Mr. John Usher, architect. Quantities supplied.
 Coles £2,456 0 0
 Wright and Goodchild 2,345 0 0
 Hull 2,179 0 0
 Dover and Co. 2,167 0 0
 Foster 2,137 10 0
 Potter 2,110 0 0
 Spencer 2,068 0 0

BLACKFRIARS.—For erecting the new London City Mission House, Blackfriars. Messrs. Spalding and Knight, architects. Quantities by Mr. G. Fleetwood.

	In Portland	In Bath
	Stone.	Stone.
Higgs	£8,029	£7,717
Grover	7,922	7,506
Ashby and Horner	7,904	7,599
Henshaw	7,763	7,493
Vicks, Bangs, and Co.	7,736	7,394
Brass	7,727	7,432
Dove, Bros.	7,660	7,260
Perry and Co.	7,598	7,381
Scrivener and White	7,545	7,169
King and Son	7,524	7,269

(* Accepted in Portland stone.)

BRECON.—For Brecon Priory Church. Sir G. Gilbert Scott, R.A., architect.

	Nave.	North Aisle.	South Aisle.	Total.
Williams	£2,260	£1,105	£582	£3,954
Wood and Son	2,605	1,041	591	4,237
Coleman	2,500	1,075	620	4,195
Williams	2,740	1,080	600	4,420
Collins and Cullis	1,675	750	515	2,940

(* Accepted.)

BLUNHAM.—For parochial schools, Blunham, Beds. Mr. John Usher, architect.

Foster	£1,406 0 0
Wright and Goodchild	1,357 15 0
Coles	1,386 0 0
Richards, jun.	1,335 0 0
Cunvin	1,315 0 0
Hobson and Taylor	1,297 0 0
Spencer	1,297 0 0
Dunham	1,250 0 0
Hull	1,240 0 0
Edey	1,210 10 0
Richards, sen.	1,186 6 0
Howe	1,152 16 0

CHISELHURST.—For the erection of five cottages for Mr. O. Edwards. Mr. William Mundy, architect and surveyor.

Grover	£1,064 0 0
Hampshire	1,038 0 0
Wenborne (accepted)	750 0 0

CROYDON.—For house at Croydon, Mr. Richard Martin, architect, Caterham Valley. Quantities supplied by Mr. Frederick Sparrow.

Bridgman, Nuthall, and West	£2,949 0 0
Ward	2,736 0 0
Jarrett	2,733 0 0
Hyde	2,712 0 0
Waller	2,637 0 0
Wright Bros. and Goodchild	2,415 0 0

HAMPTSTEAD.—For building four houses in Gayton-road. Mr. Frederick Sparrow, surveyor. Quantities not supplied.

Brown	£3,497 0 0 (4)
Stephens	3,390 0 0
Thompson and Smith	2,533 0 0
Bridgman, Nuthall, and West	2,399 0 0
Edgar	2,435 0 0
Temple and Forster (accepted)	2,188 0 0
Title	1,947 0 0 (4)

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 25, 1873.

THE NEW COURT, SOUTH KENSINGTON.

SIXTEEN years ago a writer, in describing the South Kensington Museum, then recently opened, said it might be used as an illustration in a double sense. "If it be judged by autocratic and æsthetic rules, it will appear as a curious jumble of odds and ends, thrust into a new iron building, shaped very much like three monstrous steam-engine boilers placed side by side; but if regarded as an attempt to give practical value to the labours of many disconnected commissions and boards, and to surmount difficulties of almost every kind, it becomes really a creditable and interesting display." Many changes have taken place, and vast alterations and additions have been made since those words were penned, and whatever faults may be found with the style and decoration of the more recent buildings, it cannot be denied that the apartments or compartments, on the whole, are certainly admirably fitted to display the various collections; for the constructors, troubled by no scruples touching architectural style, have placed the windows and skylights just wherever they would best throw light: as a consequence, everything is well seen. This is also the great merit of the new court, of which we gave a brief and necessarily imperfect description in last week's *BUILDING NEWS*. But there are other points of the building which will, we fancy, provoke not a little criticism. The peculiarity of the design and the style of decoration adopted, are likely to be freely commented upon. Internally, the new court is indeed a novelty of construction, and it may safely be said that the world does not possess such another. Then, again, some persons will, perhaps, be inclined to question the wisdom of erecting a facsimile of a monument like the Trajan Column, and placing it where it will doubtless be an object of wonder to the public, but will be of very limited benefit to the art student, since, though the column is in two pieces, there is much bas-relief that can hardly be distinguished, much less copied, without the aid of a "lift." The largest portion reaches to the height of about 80ft., the smaller will be at least 50ft. high, including the statue of S. Peter. It may be intended to furnish some such aid to students, but at present there is no indication of this, and the result seems hardly to justify the vast expense and labour incurred in putting up this mammoth model. The balcony of the court, though 50ft. above the floor, will not assist the student much in his study, because the column being in the middle of the court, is at least 25ft. distant from him. A few plaster casts of the work more convenient to his hand, might serve his purpose better. It may be stated that the balustrade and pedestal of this balcony are of terra-cotta, with stone coping, and it runs round the four sides of each court. Fixed to the balcony is a ring of gas-jets some hundreds in number, which will throw a flood of light over the building, and one can imagine the effect will be very pretty. The wall space above this is covered with casts of architectural detail, Greek and Roman, for the use of the students. Access to the balcony is gained by a stair leading from an adjoining court of the Museum, and on a level with the balcony is the upper central gallery above the corridor dividing the two courts. This will be fitted up with plaster casts and specimens of ancient terra-cotta. Here too may be seen Sir C. Wren's model of S. Paul's, which after lying in the Cathedral since 1675, was gifted a few years ago to South Kensington. It is well

known that the design was not approved by Wren's brother-commissioners for rebuilding the cathedral. They insisted that in order to give the edifice the true cathedral form, aisles should be added as they now exist, although the great architect is said to have felt so strongly the injury done to his design by that alteration, that he actually shed tears in speaking of it. The Museum employed a person to finish the model, but it appears all that was ever done was the addition of a few mouldings, and the thing remains unfinished. The gallery immediately below this, which is reached by a separate stair in the court itself, and is of similar dimensions (16ft. by 10ft.), is devoted to the exhibition of mosaics, many of which are worthy of note. There is, for instance, a couple of panels inlaid with various stones, called Florentine Mosaic, modern Italian, bought at the Paris Exhibition of 1867, for the large sum of £720; a fine portrait in mosaic of Margaret of Austria, wife of Philip of Spain, in a carved chestnut frame, gilt, early sixteenth century, Italian, cost £136; another mosaic portrait, of our Saviour, signed by Arminius Incatus, fifteenth century, Italian; and a medallion mosaic head of S. John the Evangelist, on gold ground, modern Venetian; also a very curious interesting colossal head of S. Peter, Roman, 1530, from the Museum of the Collegio Romano. There is a fragment of tesserae, of coloured and gilt glass, head of the Virgin Mary, from the Basilica of S. Marco, Venice, dated the fourteenth century, and presented by Salviati & Co., and a beautiful niche, for garden-fountain, mosaic of coloured stones and shells, antique Roman, from Baia, near Naples—the latter lent by the Hon. Ashley Ponsonby, who has also lent some good specimens of ancient Roman mosaic flooring. Underneath this gallery is the central corridor, having on either side five openings into the courts right and left of it. Each of these openings is flanked by two pillars in white and chocolate colours, and gilt capitals; while the entrance to the corridor itself is approached by a flight of stone steps, and flanked by four columns of polished Peterhead granite, the caps and bases being, like the others, gold gilt. The roof of the corridor consists of thin slips of wood, about 2in. wide, coloured white, and laid on a series of iron girders painted in blue and white, the floor being of marble mosaic executed by female convicts at Woking, from designs by the students of the art schools. The walls of the courts are in distemper, the same colours being used throughout—namely, olive-green and purple-red, only the colours are reversed in the two courts. The spaces between the brackets supporting the balcony are done in panels, in which are inserted the names of cities celebrated in the history of art, alphabetically arranged from Ahmedabad to Zurich. Lower down appear the names of distinguished masters of all countries, with the date of their birth and death. The whole is stencil ornament, and the general idea is Italian. This portion of the work has been executed under the direction of Mr. Townroe, decorative artist at the Museum.

The Courts have now received nearly the whole of their contents. In addition to the objects previously mentioned, we may notice several others. One of the finest in the place is a cast from the chimney-piece in the Council Chamber of the Palais de Justice, Bruges. The original was designed by Lancelot Blondel and Guyot de Beaumont, and carved by Herman Glosevecamp, Andre Rasch, and Royer de Sinet, and was erected in 1529, in honour of Charles V., to celebrate his victory at Pavia. It is a splendid specimen of the luxurious decoration of interiors. The most graceful Renaissance ornament is here combined with representations of figures, namely, the able and almost life-size statues of Charles and his ancestors; of Charles the Bold and his wife, his daughter Mary and Maximilian, and other relatives. Besides these, there are four marble reliefs

with the history of Susanna, the whole being a magnificent work of the highest art. We next come to a cast from the Minstrels' Gallery in Exeter Cathedral, fourteenth century, bought for £90. 7s.; another from portal of Norwich Cathedral (1297 to 1325), cost £120; cast from the Schreyer Monument, outside S. Sebaldus' Church, Nuremberg, executed by Adam Krafft in 1492; angle of the cloisters in S. Juan de los Reyes, Toledo, fifteenth century; from the Jewish synagogue at the same place a cast of arch in centre nave, Moorish, 14th century. The first cost £110, the others £147 each. There is an excellent cast of the famous "Prentice's Pillar" in Rosslyn Chapel, near Edinburgh, with its profusion of ornament and finely-sculptured foliage. It is said that the master-builder of the chapel, being unable to execute the design of this pillar from plans in his possession, proceeded to Rome to study a similar column there. During his absence his apprentice proceeded with the execution of the design, and upon the master's return he found this elaborately-ornamented column completed. Stung with envy at this proof of the superior ability of his apprentice, he struck him a blow with his mallet, and killed him on the spot—a favourite legend related in connection with various other buildings. There is also much worthy of study in a bas-relief of Christ at the tomb of Lazarus, and another of the Saviour raising the Widow's Son—both taken from the original cathedral founded by S. Wilfrid at Selsey, Sussex, in the 11th century. The Diana of Fontainebleau is also represented, an easy and gracefully reposing figure, with its too slender form verging upon mere external elegance. The original, now in the Louvre, is by Cellini (1543); and it belonged to a fountain in the Castle of Avet, which Henry II. built for his mistress, Diana of Poitiers. Among the altar-works at Halle, the panelled altar of S. Ulrich's Church, of the year 1488, is the most distinguished. A cast of it will be found in the Court.

It may be added that underneath the floor of the courts is a series of extensive brick vaults, which are lighted by three glazed lights in each court. These lights are each ten feet square, and are of thick plate-glass, with mosaic transferred on to it by a new process of Messrs. Powell and Sons, Whitefriars, the designs being by Mr. F. W. Moody, of the Museum. The vaults are also lighted from the gratings over the hot-water pipes by which the courts are heated. The terra-cotta balustrade was executed by Blanchard, of Blackfriars-road, the general contractors being Messrs. George Smith and Co. Something like 14,800ft. of iron drawn sash-bar have been used in the roof of the building, or about 100 tons of iron, with 28cwt. of bolts, and 2,653ft. of louvers 10in. wide. The courts have been erected from the design, and under the superintendence, of Major-General Scott, C.B. No day is, we understand, yet fixed for the opening.

NOTES ON STONEMWORK.—VII.

NEW RED SANDSTONE.

THE last-named rocks, the Magnesian Limestone, or Permian series, are the last in order of deposition of those which geologists call the Palæozoic rocks, or those in which fossils of the *old life* period of the world are found, as being distinguishable from the Mesozoic or intermediate forms of life, and from the recent or Cainozoic forms. Before altogether leaving the subject of the Permian rocks, it may be useful to quote some remarks by Professor Hull, in his memoir of the Triassic and Permian rocks of the Midland Counties of England. He says that the lower Permian series of the western and central part of England may be arranged under two distinct types of strata, of which those at Enville, in Shropshire, and at Collyhurst, near Manchester, may be considered as representative beds. To the Salopian type may be referred the whole of the Permian

rocks as they occur in Shropshire, Staffordshire, and Warwickshire; and to the Lancashire type those of this formation which occur at Stockport, in Cheshire; in South Lancashire, and in the north-west of England. At the close of the Carboniferous period terrestrial movements of greater or less amount took place over the region of central England and Wales, resulting in local elevations and depressions, and in some places in the removal, by denudation, of a large amount of the older rocks. The result appears to have been the formation of an inland sea, into which were poured the detritus of the surrounding land. The margin of this sea may be traced without much difficulty in some directions. In West Shropshire it was formed by the Longmynd, Shelve, and neighbouring hills. Traced southwards it had probably a very indented outline, stretching perhaps as far as Carneddau and the Black Mountains. Towards the north-east the margin was clearly in the region formed by the Cambrian rocks of Charnwood Forest, and it extended in a north-westerly direction by Leek to Congleton Edge. By this barrier, composed for the most part of Lower Carboniferous rocks, the Permian basin was dis severed from the region of the north-east of England, which we must suppose was dry land during the earlier part of this period. The Enville beds, to the south of Bridgnorth, taken as a whole, consist of a series of red, purple, and brownish sandstones, irregularly bedded. The lowest beds rest upon the upper coal measures of the forest of Wyre. They consist of purple sandstones, passing into various shades of red, brown, and, in one or two instances, white; they are often calcareous, and mottled with carbonaceous spots, and are shown in quarries two miles south of Bridgnorth, in the Kidderminster-road, and at Uplands. The sandstones are interstratified with red marls, and the thickness of this series is about 850ft. These are succeeded by a middle series, containing calcareous conglomerates and trap-poid breccias separated by beds of sandstone and marl; thus, of breccia in a marly base there is a thickness of from 60 to 120ft.; of sandstone and marl, from 40 to 50ft.; of calcareous conglomerate, from 1 to 30ft.; of sandstone and marl, again, from 30 to 40ft.; and, lastly, of calcareous conglomerate varying in thickness up to 12ft. The calcareous conglomerates are a characteristic feature of the Lower Permian series, both in this (Enville) district and the margins of the coal-fields of South Staffordshire and Coalbrookdale. There are two beds, separated by sandstones and marls; the upper one is quarried at the Green, on the Bridgnorth-road, and is 7ft. thick; at Four Ashes it is composed of fragments of the following rocks, as determined by Professor Ramsay:—Carboniferous limestone, pieces of chert, sandstone, quartz, quartz rock, Silurian limestone, greenstone, felspathic trap, banded felspathic ash, red granite, red sandy marl, red sandstone, black slate, red jasper, and hornstone. The carboniferous limestone pebbles predominate.

The upper series of beds, like the lower, consists of red, pale brown, and purple sandstones, speckled and interstratified with bright red marls.

The Permian beds of the Lancashire type are traced along the southern margin of the coal-field from Sutton, near S. Helens, by Haydock, Edge Green, Astley, Manchester, and Stockport into Cheshire. These beds consist of two divisions, the lower being formed of bright red and variegated sandstone of uniform composition, soft and without pebbles, and suitable for moulding purposes; the upper one of red marls with bands of limestone. The Lower Permian sandstone is well opened out to view at Collyhurst, near Manchester, and on the banks of the rivers Mersey and Tame, above Stockport, and is of a bright red colour, and of a thickness estimated by Mr. Hull at not less than 1,500ft.

Although not immediately connected with

our present subject, it may at this moment, when coal is so dear, be of interest to know that Professor Hull, a great authority on the coal question in a geological point of view, says, in the memoir from which we have quoted: "The Upper Coal-measures and Permian beds east of Denbighshire coal-field form a rich storehouse for the future supply of mineral fuel. Throughout a distance of nearly 18 miles, from north to south, there is a steady dip to the eastward of the coal-measures under the newer formations, combined with great regularity in the stratification. The coal-seams themselves are of excellent quality, and of fair thickness; and the distance to which they may be mined in the direction of the dip is only a question of depth."

The New Red Sandstone is the introductory stage of the Mesozoic period, or secondary group of formations; and being unconformable to those of the Palæozoic or Primary group, rests indiscriminately on any of the older formations, whether Silurian, Devonian, Carboniferous, or Permian. Thus, in Shropshire and Leicestershire, these beds are supported by the Cambrian rocks; in Derbyshire and Lancashire by Carboniferous; and in the midland counties by Carboniferous and Permian. The whole series lies between the Permian or magnesian rocks below, and the Lias beds above. In this country it consists of two chief members—the Bunter, or lower, and the Keuper, or upper, member. On the Continent there is a middle member—the Muschelkalk, but it is nowhere to be found in this country. The Bunter is subdivided into three portions, as follows:—1, the Lower Red and Mottled Sandstone; 2, the Conglomerate or Pebble-beds; 3, the Upper Red and Mottled Sandstone. Professor Hull considers the neighbourhood of Bridgnorth, Salop, to be the typical locality of the Trias, or New Red Sandstone, and the lower subdivision here attains a thickness of about 650ft. The Lower Mottled Sandstone may be described as a mass of rather homogeneous sandstone, of reddish-brown, yellow, and bright-red colours, almost approaching vermilion, and entirely devoid of pebbles. From Bewdley Bridge to the Hermitage it forms the banks of the Severn, and is very finely opened out to view in the river-cliff and the sections made by the roads. This valley is remarkable for the almost entire absence of brooks, as all the rain that falls over its surface is absorbed or evaporated. In the neighbourhood of Chester, the finest section is that shown along the banks of a brook at Cuckoo Hill, north-east from Hope. Here is a continuous view of the rock, from the basement upwards, for a distance of one-third of a mile. It consists of a rather coarse soft sandstone, passing from a dark purple upwards through all the shades of red, yellow, and white. The change from white to red is often instantaneous, and does not always take place along horizontal, but sometimes inclined, and even vertical, lines; having, in fact, no apparent connection with the stratification.

The Conglomerate subdivision, or middle member, of the Bunter, is found in many parts of the midland counties of England, but it is not generally used for building purposes. In Shropshire, however, north of Shrewsbury, the beds of this subdivision along the western borders of Cheshire are more fully developed, less pebbly, of a firmer texture, and often adapted to building purposes.

In the bank of the Severn, at Longnor Hall, a quarry has been opened of tolerably hard reddish-brown sandstone, which probably belongs to the Conglomerate series, though no pebbles could be found in it ("Hull's Memoir"). A quarry has been opened at "The Grips," on the banks of the Dee, at Bangor, of reddish-purple sandstone. The Conglomerate Sandstones, which occupy a large area of country south, east, and north of Chester, preserve a uniform character over the whole area, and are rather coarse brownish-red sandstones, streaked occasionally with

yellow, and having pebbles scattered at intervals through the mass. They are extensively quarried between Holt and Chester, and at Handley, Waverton, Dunham, and Backford. At Chester numerous sections are exposed along the banks of the Dee, and in the railway and canal-cuttings. Though extensively employed as a building-stone, the crumbling condition of the cathedral before its restoration, the churches, and other buildings in the city, prove that the sandstones of this subdivision are not sufficiently durable for edifices which are intended to last for centuries. In the Liverpool district the beds of the Conglomerate subdivision consist of reddish-brown pebbly sandstone, moderately hard, and adapted for building purposes of ordinary character, for which they are largely quarried, as at Liverpool, Walton, Kirkdale, and West Derby; also at Roby, Hale, and Woolton. East of Croxteth the Pebble-beds spread out over a large tract of country, and are shown at the Red Delf and Windmill quarries. At Knowsley quarry the rock is very hard, and is traversed by planes of current-bedding, along which it is worked for flags and paving-stones.

The third or upper subdivision of the Bunter is the Upper Red and Mottled Sandstone, which is, for the most part, similar in appearance to that of the lower subdivision, consisting of soft fine-grained sandstone, generally laminated, and of a bright red or vermilion tint. Streaks and blotches of yellow or white are observable, and occasionally it is traversed by planes of current-bedding. In the neighbourhood of Birkenhead, Liverpool, and Ormskirk, the lower portion of this subdivision is red, the upper yellow, and sometimes sufficiently hard for building purposes. This diversity of colouring has been shown by Mr. George Maw to be due to the presence of iron occurring in the red portion in the form of anhydrous, and in the yellow in the form of hydrous, sesquioxide. One of the characteristics of this subdivision is the absence of pebbles of other rocks (in marked contrast to the underlying pebble-beds) and the particles of sand are smaller. This Upper Mottled Sandstone is sufficiently hard for building purposes along the range of hills which rise to the north of Shrewsbury at Harmer Hill and Ness cliff, &c. It is here extensively quarried, and yields blocks of compact fine-grained red sandstone, easily worked, and of a beautiful colour, but probably rather liable to disintegrate. The ground upon which the town of Birmingham is chiefly built consists of this upper subdivision of the Bunter sandstone, and the greater part of Liverpool is built upon it; but on the east side of the town it is terminated by a large fault, which traverses the town from north to south, and brings to the surface the pebble-beds of Kirkdale, Everton, and Edge Hill.

Above the Bunter, the Keuper series of beds occur. These are divided into the Lower Keuper Sandstone and the Red Marl, but it is to the Lower Keuper Sandstone that we have occasion to refer. This is subdivided into—1. The basement beds, consisting of coarse, irregularly-bedded sandstones, calcareous breccia and conglomerate, with bands of marl and mottled calcareous beds, similar to the "cornstones" of the Old Red Sandstone. 2. Building-stones, consisting of fine-grained, light red, brown, yellow, or white freestones, regularly bedded, with occasional beds of red marl, producing the best building-stone of this formation. 3. Waterstones, forming the passage beds into the red marl above. These are brownish, laminated, micaceous sandstones and flags, ripplemarked, with beds of sandy marl. A building-stone belonging to the Lower Keuper Sandstone, of delicate red and yellowish tints, is found at Ombersley, and in the adjoining parish of Hadley, used in the restoration of Worcester Cathedral. The higher beds, which underlie the New Red Marl, are extensively quarried near Brewood

and Penkridge; they consist of finely-grained, evenly-bedded, brown, sometimes yellow, sandstone. In the neighbourhood of Rugeley and Colwich, these beds are laid open in many large quarries, and they produce very fine freestone, capable of being quarried in large blocks, and often nearly white, or pale red. In other places the colour passes into yellow or light reddish brown. In the vicinity of Whitmore (we are quoting from Professor Hull's memoir before referred to) and Norton, the Lower Keuper Sandstone is generally introduced by a hard brecciated sandstone, upon which rest the usual compact sandstones interstratified with marls, which are often quarried for building purposes. At Weston and in Hawkstone Park, the higher beds yield a fine white freestone. At Grinshill, the Lower Keuper Sandstone yields a remarkably fine white freestone, the quarry presenting a face of 100ft. in depth of rock, remarkably homogeneous both in texture and colour. In West Cheshire, a large quarry has been opened at Grug Hill, of remarkably fine white freestone, the beds of which occur in the form of large wedges. Overton Scar is composed of white and light red sandstone, resting on calcareous cornstone and breccia. In the grounds of Edge Hall these beds are quarried, and produce a fine white freestone.

The fine range of the Peckforton Hills, in Cheshire, produce brown, regularly-bedded micaceous flagstones (waterstones), seen at Broxton Hall, and hard red and white freestones, quarried for building purposes, and used in the construction of Peckforton Castle. Yellow, white, and brown building-stones are found at Longley Hill, in Delamere Forest, of a total thickness, including the partings of shale, of 210ft.

In a quarry in the "Waterstones," at Delamere, the beds consist of brownish-red, evenly bedded, micaceous sandstones. At Manley, quarries have been opened in the Lower Keuper sandstone, which yield a very durable white freestone, producing blocks of handsome building-stone of any required size.

Massive white, yellow, and light red freestone is quarried at Storeton, Bidston, and Oxtan hills. In North Staffordshire quarries have been opened at Pitt's Monument, in Sandon Park, at Weston Bank, Tixall, and Brocton. In these the rock is for the most part of a light brown colour, but at Colton and Rugeley the same beds yield a white freestone which affords a handsome building-stone. The beauty of the country in which these hills of Lower Keuper Sandstone occur is great, indeed, and, as it is but a short quotation we shall make, and as we can fully confirm it, we quote this remark of Professor Hull's of the Alton district, in the Churnet valley, in North Staffordshire:—"I can scarcely trust myself to describe, even in strictly geological phraseology, the landscape features of this lovely spot—this English Vale of Tempe—so enchanting does it seem, even when looking back upon it through the vista of years."

The following is from an appendix to Mr. Hull's "Memoir":—"The sandstones of the Lower Keuper are the most economically valuable of all which the Trias produces. In the central counties it is from them exclusively that the only good building-stone can be procured, the remaining beds being either too soft, or coarse, or pebbly to be used in the construction of edifices. In the western counties and Lancashire, though the other subdivisions in some measure enter into competition with them, the Lower Keuper Sandstone alone yields the white freestones which, in the choice of a building material for elaborate Gothic or Grecian architecture, must ever be preferred to coloured stone. In a land of comparatively cloudy skies, we need a lightly tinted stone to give lightness of effect to massive architecture.

The following are some of the quarries in the Lower Keuper Sandstone:—

Locality.	Nearest large town.	Remarks.
New Brighton, Wallacey Bidston, Stourton Hill	Birkenhead	Yellow: middling quality. Light yellow and white: good.
Helsley, Delamere		
Manley		
Peckforton Hills	Chester	Red: good stone. White: good. Red: very hard.
Overton Scar, Edgell		
Malpas		
Betton Muxton	Market Drayton	White and light red. White: very good. White.
Grinshill		
Weston		
Grughill, Baschurch	Wolverhampton	White: rather soft. Brown and yellow. White.
Railway near Albrighton		
Oretton Hill		
Wooley Castle	Birmingham	White. White. White.
Colton Mill		
Colwich		
Tuxal and Weston	"	Light brown. Light brown. White.
Fulford		
Blythe Marsh		
Woodhead	Cheadle	White. White: very good. White and light yellow.
Crumppwood		
Alton		
Hollington	Ashbourn	White. White. White.
Stanton		
Bowbridge fields, near Kirk		
Langley	Derby	White and light brown. White and light red.
Weston Cliff		
Donnington Park		
Ombersley	Worcester	

QUANTITIES.—XIV.

MASON (continued).

IN continuing this trade, I propose, firstly, to speak of Yorkshire stone, the measurement thereof varying from the other stonework, inasmuch as, in many respects, it is customary to combine the material and labour in the one item, instead of keeping them separate, as explained of stonework in general in my article last week. This arises in great measure from the fact that the labour executed upon the stone is, in the majority of cases, worked at the quarries, and sent up to London in a finished state, ready for setting. And, moreover, this description of stonework occupies such a limited and ordinary position in a building, that any further detail than that usually given by quantity-surveyors would be unnecessary. Of course, where used to any large extent, or where it occupies the positions now taken up by the stones in more general use, viz., in walling, &c.—as, for example, Portland or Bath stones—it would have to be measured in the same way as these stones, as will be explained hereafter.

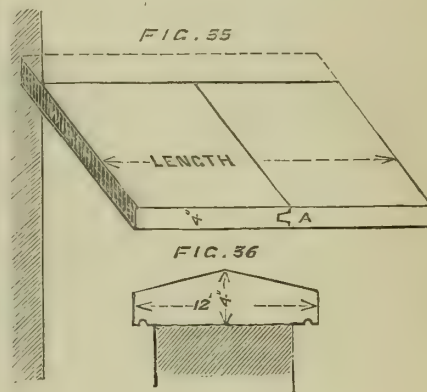
It is always understood that "hoisting and setting" is to be included on each of the several items for the stonework; and in the case of Portland and other stones it is included in the cube-blocks of the stone; and in the latter case all stonework more than 40ft. above the ground must be kept separate from that below that height.

Also, any stone which exceeds 6ft. in length must be kept separate from the general item, and be described as scantling-lengths, and the different sizes stated.

PAVING.—Take the length by the width, and state the thickness, and the description of the labour executed upon the same, whether tooled or otherwise. State also if laid in regular courses, and if bedded and jointed in mortar, cement, or as the case may be. Where the plan is irregular, and it becomes necessary to cut the stonework to fit against splays, or irregular projections, it will be necessary to measure the cutting separately. This is taken by the foot run, and described as "Cutting and waste to (2½in.) York paving," stating the thickness as shown. No allowance, however, is made in the superficial area of the paving to meet such contingencies, the net

surface only being taken, the additional cost being provided for by the item for "cutting and waste." Any circular cutting should be kept separate from the straight. Number any holes for pipes, &c.

LANDINGS are measured similarly to paving, and my remarks thereon will apply here. The student will have to include in the dimension for the length or width the portion tailed into the wall, as per sketch, Fig. 35. In the description state whether both faces are worked, and, if so, the nature of the work on each face, as it is frequently the case for one face to be rubbed, whilst the other is only tooled. Cutting and waste would be measured as described to paving, and any rubbed or tooled edges would be taken in the same way. Where the thickness of the landing exceeds 6in., it is customary to take the latter by the foot superficial. Joggle joints, Fig. A (sketch 35),



as "Joggle joint and cement to 4in. landing," or as the case may be, stating the thickness of the landing. Any circular cuttings would have to be kept separate from the straight, but if preferred may be taken with the same, and a second dimension taken for the extra labour in forming circular cutting, beyond the price allowed for the straight. I think the former the better plan of the two, however, and one that is more in vogue. Number all mortices for rails, newels, &c., and state whether they include "running with lead" to the rails or newels when they are fixed, though the labour in fixing the same would of course be included in the Smith, the lead, however, being usually taken with the mortice.

It should be remembered that when the length of a landing exceeds 6ft., or the area of any one stone contains more than 30 superficial feet, it must be kept separate, and specified accordingly.

In measuring hearths, take the full dimensions, and specify the thickness of the material. State whether rubbed, or otherwise, and number the notchings for the chimney pieces, stating whether single or double.

SHELVES, &c., are measured in a similar manner to the foregoing, including the cutting and pinning to walls—all worked edges, &c., being taken as described to landings.

CURBS, COPINGS, &c., are measured by the foot run, stating the length, and giving scantlings, the largest dimension being taken each way. Specify the nature of the workmanship, whether tooled, rubbed, or otherwise; and in the case of copings it is always preferable to give a sketch in addition to the description. Thus sketch 36 would be described as—

20 · 0 12in. × 4in. tooled, weathered, and throated on both edges, York coping, as sketch, including all joints.

Some surveyors number the joints to copings, curbs, &c., but as it is an understood fact that one joint is allowed to every 3ft. of stone, I have always considered it unnecessary to number them, and accordingly include them

in the one item with the stone. It will, however, be necessary to number all cramps, plugs, &c., stating whether galvanised iron or otherwise, and including running with lead. Also specifying the length of the same, and if plugs are single or double. Where angle stones occur they must be kept separate from the straight, and specified accordingly.

STEPS are measured by the foot run, stating the length and scantlings, and giving description of the work. For the length include the portion pinned into the wall; and where there is more than one step, take a running dimension the length of the step, for the labour in forming "back-joint" or rebate.

Risers are also measured in this way:—Enumerate the "fair ends" and the "ends cut and pinned in cement"; and also number all mortices for iron balusters and newels, as described to landings, and also any mortices for door-posts.

Thresholds are measured as the foregoing:—

CILLS.—Measure by the foot run, taking the length of the cill, and state the width and thickness. Describe the nature of the work on the same, whether tooled, weathered, and throated, or as the case may be. Number the "fair ends," the "ends cut and pinned to wall," and also for "bedding hollow and making" good to cills.

SINKS are usually numbered, the dimensions being given, including the portions pinned into the wall. State the thickness or total depth of the sink; and some surveyors, in addition, give the depth of the sinking in the stone, though this course is exceptional. Take the labour to cutting and pinning to wall in the manner already prescribed to other work, viz., by the foot run. Should the sink have one or more rounded corners, number them; and also enumerate the rebated hole for bell-trap. Stone bearers to sink would be also measured by the foot superficial.

Sink-stones are also numbered, stating the sizes and the thickness of the stone, and the number of holes, and whether dished or otherwise.

TEMPLATES are numbered, giving dimensions and stating how worked, whether tooled or otherwise; also whether laid in cement.

This concludes this portion of the subject. I would call attention to a clerical error in Fig. 33 of last week. Instead of the height being 1ft. 0in. as figured, it should be 1ft. 6in., in accordance with the dimension given in the item preceding it; and I would mention that in taking cube-stone it is advisable always to adopt the same course—namely, to take, firstly, the width; secondly, the height; and, lastly, the depth or thickness.

I propose treating of the measurement of Portland and other stones next week.

B. F.

THE ROYAL ACADEMY IN THE ROYAL ALBERT HALL.

WHATEVER may be said of the *past*, however slow it may have been to change, either for better or for worse, it is quite certain that the *present* cannot be said to lack energy or quickness of movement. Things go on nowadays at truly railway speed. There may be, and there often enough is, no small difficulty in getting things to start; but when they do move, the pace cannot be complained of. Sometimes, as the late Joseph Hume said, it is *too fast*. All goes together, the good and the bad—what is worth preserving, and what is fit only to be destroyed and got rid of. Change and "Reform" are the watchwords of the hour, and are certainly going on fast enough, but it is to be feared in but, in too many cases, a wonderfully superficial sort of way. Few things go further than skin deep, and a mere wordy promise of change and reform is but too often enough. It satisfies for the moment, and then there is an end of it for years and years, and sometimes for whole

generations. Can any one contradict this? If they can, here is a case in point, well worth a little talking about and a little agitation.

Most readers have heard that a proposition, under the most brilliant auspices, is on foot for the removal of the Royal Academy, its yearly exhibition, and its library and schools, to the Albert Hall, South Kensington. At present the library of the Academy is in its old place, Trafalgar-square, while its exhibition rooms and schools are at Burlington House, in the rooms specially planned and designed for them. It would be impossible to imagine any kind of institution more fortunately placed than the Royal Academy, or one more carefully looked after, and cared for, and fostered. It is royally looked after, and is, indeed, the last, the greatest, and the most well-to-do and self-satisfied of monopolies. All the other monopolies well-nigh have gone and disappeared, but this one. Why does it last? The political economist, who has routed out everything, from pin-making to railways, and from petty huckstering to the "population" puzzle, has, somewhat strangely, forgotten, or left out, art and art action, and art monopoly. It is truly a wonderful omission, when we consider that, but for art and artists, the dead and raw materials of the earth provided by nature, are and must be simply wrought into unsightly masses, without beauty of form, or colour, or sentiment! What subject can, therefore, be more important?

It will be needless to do more than to remind the reader of the actual position of the Royal Academy of Arts. There are "forty" Academicians, and no more—i.e., there are in all England but forty men, at one time, capable of real and high artistic doings. In addition to these there are twenty, and but twenty more artists to succeed them—the "Associates," who are waiting their turn to be admitted into this select and limited circle of high artistic capacity. These fortunate individuals are provided by the State with a building and rooms rent free; and what is, perhaps, more than all, they have it in their power practically to keep out of this public building, and out of the public view, all other artists, whatever their capacity, who desire to exhibit that capacity to the public in the most conspicuous and certain way—viz., in that public building provided by the State for the express purpose of exhibiting and encouraging art and painters, sculptors and architects, and draughtsmen. It is but very few, even of professionals, who can realise to themselves the value and importance of this advantage, and what a fearful monopoly it really is. It is in vain to deny this, and to contend, as some will perhaps be inclined to do, that *all* have a chance. It is not so: for without some *social* advantage or other, irrespective of artistic power in the work produced, it is in vain to hope for a fair and even chance at the hands of the "hanging committee"—as they are called, who do the work of selecting the works to be exhibited. They meet in reality, not to select or to arrange, but to watch and exclude! Like all monopolies, the Academy must be well looked to, and well guarded. It is really something truly wonderful that, considering that all, or nearly all, the great monopolies have disappeared, from the days of good Queen Bess down to the present hour, this, the greatest of them, should still remain. We say the greatest of them, and the most influential and widely-spread in its action. If there be those who wish to go into this momentous question a little more deeply, and to thoroughly understand it, as every artist ought to do, we would recommend him to begin by a perusal of the life of Lord Chancellor Bacon. He will there see into the nature of monopolies. Lord Campbell, in his able sketch of the life of the great Chancellor, tells us how hardly he tried to secure all to himself, and to keep a monopoly—i.e., to have it all to himself without any one else having the power to touch it—of gold lace-making. But with all his power, and

capacity, and cunning, it may be added, he could not do it. It was absolutely impossible, even in Bacon's day, to secure to one man, or select section of men, the right solely, to himself or themselves, to manufacture for the rest of the community the sole and simple article of gold lace for the trimming of caps and coats. It was thought even then, as it would be now, that to sacrifice a whole trade and community of men for the sake and sole profit of one man, was an impossible performance. Why, nowadays it would be far more easy for a popular minister, like Mr. Gladstone, to concoct and pass half-a-dozen "Irish Education Bills," each one worse than the last, than to single out any one trade or manufacture, however limited, and to give it into the hands of one single individual as a monopoly. It could not by any possibility, or stretch of "statesmanship," be done. The attempt, indeed, would upset any ministry; the public mind would at once, and in a moment, reject it and those who proposed it. The manifest injustice of such a measure would alone condemn it—the thought, surely, of sacrificing the *many* to *one* would break it into a thousand atoms. Yet would such as this be as nothing compared to the action, as it now is, of the Royal Academy monopoly. Let any one consider for a moment of the comparative *few* who would be, shall we say, *ruined* by the creation of a monopoly of gold lace-making, or boot-lace manufacture, or indeed of any trifle, or even of bigger things, such as state carriage-building, compared with the vast *multitude* of those who are year after year disappointed of their just hopes in offering to public view specimens of their artistic power, and patience, and painstaking. Any one trade is as nothing to it, either in amount of disappointment, loss and suffering, or in the number of those who suffer!

Let no one suppose for a moment that we are putting the case too strongly, or with any attempt at exaggeration; for it is not too much to say that of all the sacrifices of time, and talent, and skill, that of the artist's is the greatest in amount, and the most exacting, and calling for the most intense personal work, both mentally and bodily, and takes up the longest time to accomplish. We have known instances, and not a few of them, wherein all but the common necessities of life have been sacrificed to complete a picture, or a figure, for the annual exhibition; but with no more chance, we are sorry to say, of its being exhibited than the blank canvas would have had, or the formless lump of clay.

We have thus brought before our readers this subject of artistic monopoly, not because it is anything new to them, but from the fact of the contemplated movement of the Royal Academy into more spacious quarters, and from the fact of this contemplated movement, if it does take place, doing so, under the highest auspices. It will be recollected, too, that when the Royal Academy obtained the grant of their rooms, at the public expense, in Burlington House, it was understood that one item in the agreement with the public was, that the number of the Associates of the Academy should, at least, equal that of the Academicians. This was a fair and *bonâ fide* agreement with the artistic public, but, as is well known, it has never as yet been acted upon, and fairly carried out. There are but twenty Associates; the "agreement" said forty—preposterous as the notion is that there can be but forty artists in all the British empire, and that there are forty, and but forty, more—unequal, it is true, to the task at present—but waiting for death to do the work of clearing the way by degrees for them to occupy the same ground. Let us, therefore, in the first place, ask for those forty to be made up. It is for her Majesty the Queen to compel this—no other power can. It is in vain to think—if there are any indeed who are weak and vain enough to think it—that the Royal Academy will reform itself. This be assured, all ye who are interested, it will

never do. Nothing will induce a "monopoly" to destroy itself. No man could be expected to give up the lucrative trade of gold lace-making of his own accord, and for the mere sake of justice, and to profit others. To open the doors of the Academy would be to admit rivalry, and "competition," and Free Trade in art. Who can expect those who hold the position, and the shop window so well placed, to give it up, or to admit others to a share in it. Human nature is too selfish for this, and it cannot be expected of it; but surely no Royal patronage should stand in the way of better things and fairer doings. May we hope, therefore, that if the Albert Hall, built out of funds got from the public for the encouragement of art and to help artists, is destined in the future to hold, and to house free of cost, the Royal Academy, then should the doors of this larger building be thrown open for a fair number of those whose artistic works are found worthy to fill a space in it. C. B. A.

EDINBURGH.

(FROM OUR OWN CORRESPONDENT.)

THE Exhibition of the Royal Scottish Academy has been open for some weeks, and purchases to the amount of £6,000 have been made—a good certificate of merit. The architectural section has often been grudged the space it occupies, specially by artists whose finished water-colours have been lately rejected in great numbers for lack of room. These objectors have no reason to complain this year of architecture as an interloper. It has not come to the front with any works of magnitude or great public interest, and this circumstance has doubtless suggested a new arrangement by which a much larger percentage, both of water-colours and architectural drawings, are exhibited. The latter are now classed together in the small octagon, an apartment so dimly lighted under the cloudy skies of March that the drawings which could then be hardly seen were in great peril of being over-hastily criticised. The gleams of April sunshine however have come, and this drawback is almost altogether removed. Considering the average quality of the pictorial element in these drawings, the new arrangement is perhaps the best that could be made. They are all placed together on the line or near it, in a more subdued light, and in circumstances more favourable for a critical inspection of their proper merits, than when they hung in all positions in the northern room and in damaging contrast with finished water-colours. Still it might be some improvement if subjects which could stand the contrast were allowed to do so, where they were of high artistic merit or much public interest. The separation is justified by the privilege allowed to architectural drawings of dispensing with much that is required in the finished picture. The mere fact of a building being erected in this locality, provided there be some accuracy of delineation, creates in the drawing sufficient interest to give it place upon the walls. Unlimited chromatic license is allowed, and under this law of liberty, natural effects and the harmony of colour are too frequently ignored. Skies and their broken and unbroken reflections on the lights get "very very blue, the trees extremely green." In some, sunshine is represented as the livid glow of some volcanic fire or unearthly light; whilst in others the atmosphere of the pictures makes the spectator shiver. Houses built of the same material (if specifications were consulted) take the sunny tint of Craighleith which Grecian Williams loved to copy, or are loaded with dingy red and yellow, representing strata more than 40 miles away. In these circumstances, which never seem to alter, the arrangement which keeps architecture apart is undoubtedly the best. It has also the advantage of allowing the spectator a comprehensive view of the architecture of the day, as far as the Exhibition represents it, whilst the drawings are all

in a position favourable for examination of details.

Upwards of thirty subjects are this year exhibited, being about a third more than the number of the preceding year. The great majority are of local interest, and in no wise representative of architecture as a fine art. Of works of the imagination, or castles in the air, we have six or seven. Unhampered by the disquieting thought that they have to be paid for and constructed, the exuberance of ornament which these creations of the fancy display is what we might expect. They are generally samples of no mean excellence in drawing, and are beyond criticism as the vigorous protest of hopeful youth against the uniform economy which marks the great bulk of architecture actually executed—a level to which by-and-by they will surely come. Of these we can only notice two. Mr. Price, from Aberdeen, in No. 760, gives in his "architectural idea" of a church a very vigorous sketch in brown ink, but rather heavily etched in the shadows. The one great fault of the design is the lack of judgment in disposing of his ornament, which in itself is graceful and effective, if there were only less of it. The idea of capping one belfry with another on the top of the tower is certainly not to be commended. The design, if it never adorn the landscape, is worthy of honourable place in the portfolio.

Mr. Somerville, in 811, gives us his idea of the "Adaptation of the Dome to Mediæval Ecclesiastical Architecture," without giving much help towards a solution of the problem treated by Sir G. Scott and so well illustrated in the BUILDING NEWS. Commending the study of these papers to Mr. Somerville, we may add that his idea of a dome seems to have been taken from the steam-box of the locomotive, as we have about twenty of these solids projecting through what seem to be the ordinary roofing of nave and aisles, whilst the one great dome over the centre partakes too much of the elongated proportions of the spire. Taking the liberty to remove these absurd appendages, with unnecessary buttressing to the church, the drawing is an etching in ink, and all details, with exception perhaps of clerestory lights, very accurately drawn. The windows and other details show good appreciation of these elements of beauty in Gothic architecture.

Cottage architecture is represented by Mr. Pilkington in 805—a design for school buildings. The principal feature of the decorative part is the highly ornamented barge-board and mullioned windows. The belfry is of wood, and the ornamental connections with the stonework appear to be designed without regard to the effects of weather, and suggest fears of the whole toppling over in a gale.

In villas, the exhibition presents no subject for remark; but of mansion-houses, large and small, there are not a few. Mr. Kinnear, in 780, exhibits a very happy metamorphosis of Auchmore House, of which the spectator can judge by a small elevation of the front, as it appeared before the alterations. These alterations are Italian in style. All the designs exhibited this year avoid the Scotch Baronial in style, and there is hardly a turret to be seen. We miss the favourite Scotch baronial of Mr. Bryce, R.S.A. Mr. Leiper exhibits three: Nos. 779, 795, and 818, all remarkable for the highly artistic treatment of the masses of his structures, and the judicious and happy delineation thereof. The style is Jacobean Classic. In painful contrast with these as perspectives are the designs 791, "A Shooting Lodge," and 797, "Lochinvar House." The colouring of the landscape and edifice in the latter, and the perspective (which represents the edifice as very shaky), are a "caution" to all who wish to make a decent appearance in architecture or in art. In the same category must be classed No. 804,—"Mansion house on Corstaphine Hill,"—which in colour is perhaps the most flagrant offender in the room. As a design it is an unsuccessful attempt to cope

with the difficulties of the site. It consists of one large circular tower, planted at the corner, or in front, of a very ordinary villa of the larger sort, and its awkward position in connection therewith is not improved by the sham castellated wall carried on into the roof. In these three, the large circular tower is dominant, and in none has the treatment been successful. Messrs. Beattie and Son, in 792,—"Lanark Lodge"—have been happier in the adoption of this feature, partly by its position at an inner angle, and partly also by reducing the proportions.

The Exhibition contains only two or three designs for public or civic buildings. 794 is a section of the telling-room of the Royal Bank, Glasgow, with Greek or Byzantine detail. 759 is the "Municipal Buildings, Aberdeen," which have been long erecting by Messrs. Peddie and Kinnear. The length of frontage is very great, and the material granite, but by happy fenestration and arcading, with a stately tower, the edifice is a masterpiece of simple but effective art. 766—"New Lecture Hall for Watson's College"—is drawn to a scale wholly disproportioned to its size. Like many another specimens of modern Greek, the very worst position for such an edifice has been selected, at the foot of a steep declivity, and it is lighted from the roof by something very like the chimney of a magic lantern.

In churches, the exhibition is exceptionally poor. 806—Competitive design for a Church at Oban, by Mr. Small—is an elegant design, with lofty lancet windows, but rather unseemly projection on the gable. No. 777—"Proposed Free Church, Morningside"—will add only another poverty-stricken specimen to the Gothic of this city. The Building Committee must have insisted on a spire, as the main building is of the most bald and barren order of design conceivable. The spire and tower are far too lanky; the belfry louvres, too near the ringing-loft windows, and there is a lack of other windows in the church which seems unaccountable. The wheel window in the front gable is not large, and the tracery (which seems to have been studied from some wood panel) will exclude more light than it admits. 813—"Interior of a private Roman Catholic Chapel,"—is well designed about the roof, but the colouring and decorative parts are badly managed; the drawing of angle pillars and statues very faulty. 752 is "The interior of the new Catholic and Apostolic Church" about to be erected here by Mr. Anderson. It represents a long and very lofty basilica with apsidal chancel and transept. The nave is "fashed," with no pillars, and has much wall-space, relieved by mural decoration. This interior is very imposing from its height; and the graceful composition of the ground chancel, with the waggon-roof of the nave supported on long and slender pillars, reminds one of the interior of Mr. Burges's design for Edinburgh Cathedral, which many thought to be decidedly the best. The church has secured a noble site, but it is to be feared that the exterior will not equal the interior design. The style is Early Gothic, of a continental aspect, and the windows of the nave, being double lancets, with large plain circular apertures above, give an air of poverty to the design which is much to be regretted.

There is little space left to notice the street architecture of the Exhibition. Suffice it to say that it will bear comparison with any before noticed. The only two examples are in Forrest Road, and they would be well worthy of a place in the pages of the BUILDING NEWS, which would be much more satisfactory than any description which could be given. 799 is a block now finishing by Mr. Shiels. The drawing does not do justice to either the material or happy outline of the parts. If one must find artistic, if not constructive fault, it would be to notice the lack of artistic treatment in the wire lintels, avoided however in No. 751, "The Odd Fellows' Hall," by Mr. J. C. Hay. This building, being a public enterprise, is much more ornate. It presents

a lofty gable in the centre, surmounted by a modern Madonna and her Child. The gable is flanked by two square turrets, and a judicious application without any overloading of the facade with sculptured detail, as well as a slight projection of the whole, make up a very graceful and picturesque addition to this street, which, perhaps, contains more artistic study of design than can be found in all the stately buildings which have been lately added to the west.

BOURNEMOUTH—AN IMPRESSION.

A SHORT visit to Bournemouth on business, with an eye also to admire those natural beauties which it in common with other sea-side places possesses, has sufficiently impressed the writer with the want of that agreeable union between art and nature which, singularly enough, seems to mark especially most watering-places. That there is a singular incongruity between the natural surroundings of the place and the numerous detached residences which of late years have sprung up over its undulating surface—any visitor who happens to spend a few hours there will testify. There is, in short, a want of some intervening link or bond of union which shall agreeably blend the barren expanse of heath-clad common with the scattered heaps of brick and mortar. To the casual visitor the impression that it is neither town nor country, but a confused huddling of the two elements, can hardly fail to create a kind of disappointment. There is no unbroken line of expansive terraces skirting the coast as at Brighton; no regular lines of streets to compose the eye of the wandering visitor, but a constant interruption of surface and sky-line by villas of a class which rather aggravate than otherwise the grievance of confusedness. The town itself has undoubtedly been spoilt by an unchecked propensity of peddling speculative land proprietors and builders, who care only to cover their land for profit. But perhaps a greater evil is the utter want of regulation in the planning, or the bad laying out of the roads, which the authorities, town commissioners, or owners of land have tolerated. This, undoubtedly, is one of the principal causes of the confused appearance alluded to. Hardly three houses can be found in a line with, or at right angles to, each other. Aspect or prospect seems disregarded. It may be said views of the sea are to be obtained at any hazard. But only a few facing the coast can possibly obtain this advantage.

Land here is increasing in value, and some sites fetch fabulous prices. Bournemouth is just now a very fashionable resort, and inducement is offered to builders and others to put up a superior class of residence as regards accommodation. It cannot be said, however, that anything beyond barest utility has been attempted in the majority of cases, and even here there is much room for improvement. Speculative builders generally fall into the mistake of undervaluing or overlooking just those little requirements in a gentleman's residence which, after all, constitute its main interest and value, and which are duly valued as such. For example, the necessary offices are cramped to obtain large reception rooms; staircases and halls are pinched; and the finishings and detail of the houses generally show a want of taste and discernment in just those things necessary to make a good impression. In short, there is a "disproportion," if I may use the term, manifest between the essential and subsidiary members which evince the want of the architect or master-mind in the construction of the houses and the laying out of the accessories and ground-work. Nothing certainly can be more hideous than the manner in which some of the villas, as regards their position and natural accessories, are planned. The landscape-gardener has been certainly ignored, and the style or character of the villas in many instances is not in keeping with the scenery or immediate surroundings. As I have hinted, building restrictions as to line of frontage and intervening spaces would have a good effect; conflicting interests have seriously marred an otherwise beautiful locality.

There is no skill shown in thinning the thick plantations of fir which abound, and which might have been managed to produce much effect. As it is, the firs are thinly dotted about, destroying breadth and repose, or so dense as to shut out all

view. Many houses, again, are so denuded of verdure, that a glimpse of a fir would be a boon.

Besides the coast scenery, there are few attractions at Bournemouth. I may note the Pleasure Grounds, which occupy a valley running through the town, as in course of formation; the competition for plans appeared in these pages. It will add much to the beauty of the place by restoring the green foliage so much wanted. At present, nothing but dark sombre firs relieve the barren sandy soil, and form a background to the buildings. A little bright deciduous foliage will wonderfully improve the contrast.

One of the few architectural features of interest is the Church of St. Peter's, designed by Mr. Street, I believe. The structure is a handsome one, but the at present uncrowned tower is, I think, its chief merit. It is certainly a fine tower, the upper stage being marked by lofty windows, deeply recessed and moulded, which makes it a conspicuous object in the distance. The interior is very ornate, and the church is one, I understand, noted for its Ritualistic services. Here, as elsewhere, Ritualism appears to be in the ascendant; and only the other day the Bishop of Winchester was compelled to take exception to some excess of religious zeal, in the consecration of a new church at Springbourne.

Yet, with all its shortcomings, Bournemouth is a rapidly rising place. Other watering-places on the south coast, Torquay and the Isle of Wight conspicuously, have greater attractions, but the former and the Devonshire sea-side are farther removed from the metropolis. Bournemouth possesses a fine sea-frontage, skirted by lofty cliffs of sand, and being protected in a natural bay, with Swanage on the west and a like projecting cliff on the east, its air is proverbially mild, and as a winter resort it is much frequented. It has suffered much from the want of a well-directed scheme of laying out, and from want of skill in the design of its buildings; but perhaps this is attributable to the limited amount of local talent. A new railway is being formed to Poole, a place of some little trade formerly, though now sinking into a quiet life. Corfe Castle is one of the few notable remains in this part of the southern coast.

G. H. G.

THE PAST AND PRESENT OF ARCHITECTURAL ART.*

I AM now about to close the very fitful and non-continuous series of lectures which I have from time to time, during the last fourteen years, had the honour of delivering from this chair.

I have to express my regret that it has never been in my power, owing to the press of other engagements, to give the full complement of six lectures in each season; and that in some years I have been prevented by circumstances, wholly beyond my own control—from lecturing at all. I may further mention that my earlier lectures were only pro-professorial, and were coupled with a parallel course, on Classic Architecture, by Mr. Smirke, who subsequently, on being appointed professor, took for five years the whole duty upon himself; so that, as I said before, my own lectures have been but fitful and non-continuous.

I have further to confess that these disjointed lectures have been for the most part limited to the particular phase of our art in which I am myself most deeply interested; for I do not see much utility in artificially forcing myself to appear as a teacher in a phase which is not that which I view as my special mission.

I trust, however, that on my own special subject I may have been useful; anyhow, I believe I have done more than has been done before, and I am sure that I have at least taken an infinity of pains, and that by the kind aid of those around me, I have illustrated my lectures by drawings profuse in number, and often excellent in execution.

My lectures have been non-continuous, not only as to their periods of delivery, but as to their subjects. I think, however, they will be found, should they be hereafter published, to contain a fairly clear account of the rise and perfection of our Mediæval architecture, with some useful digressions extending somewhat beyond this range.

I have not continued this history of Mediæval architecture beyond the period of its perfect development; because, beautiful though are its late

phases, their history does not maintain the same interest with that of the noble enthusiasm which urged on its earlier growth.

On now closing my lectures, I think I may become, for once, rather more discursive, and may venture a little to the right and left, and in other directions, in search of matters bearing generally upon architectural art as viewed in reference to the past, the present, and the future, and (which concerns yourselves more nearly) in reference to your own individual studies.

Our art, as has so often been remarked, differs from the sister arts of painting and sculpture in this,—that whereas they arise directly from the artistic aspirations of our nature, apart from practical necessities and utility, ours arises first from these necessities, and then from the desire to clothe their results with beauty. It may be said that the yearning after abstract beauty unlinked with utility is the higher and more spiritual sentiment; but, on the other hand, if we look around us throughout the creations of nature, we are prompted to reply that, in linking beauty with utility, we are more directly imitating Him who made man in His own image, and in whose works this union of the useful and the beautiful is one of the most universal characteristics.

Architecture, then, as distinguished from mere building, is the decoration of construction. If I were lecturing on architecture, in the broadest form of the expression, I must treat throughout of construction, and of its decoration, *pari passu*, as the latter has but little meaning if severed from the former, which is its groundwork. And, even in lectures from this chair, where architecture is viewed specially in its character as a Fine Art, it is still impossible—as indeed it would be undesirable—wholly to sever that higher characteristic from the more practical phase to which it owes its origin.

Now, the history of this concurrence of art with construction is the History of Architecture; and, to an architectural historian who is capable of taking at once an artistic, a philosophical, a political, and a religious view of the facts which he chronicles, nothing can be more interesting than to follow out from the earliest ages to which we can carry back our researches,—firstly, the practical changes in building, arising from the exigencies of climate, the stage of civilisation, the traditions of race, and the varied influences of political and religious circumstances; and to connect with these the changes, the progress, and perhaps the decline and degradation of the art made use of in the decoration of their buildings; and to trace out the causes which led to those changes.

Let us not, however, suppose that a knowledge, however intimate or accurate, of architectural history, is of necessity a part of the study of architecture itself. On the contrary, at no period when a genuine, unborrowed style of architecture has prevailed, has any knowledge whatever existed of the history of art; nor at any period previous to our own has the history of architecture—beyond a very limited knowledge of that of Greece and Rome—been viewed as any object of study.

From the dawn of civilisation to what is known as "the revival of letters," the leading nations of the world possessed each a genuine architecture of their own; all growing, by a natural growth, from an original stem—unborrowed and unimitated—and practised by artists highly skilled in their art, but ignorant of its history.

The "revival of letters" was followed by a revival also of the architecture of those races whose literature was resuscitated; and with this revival came a certain, though scanty, knowledge of its history; but the investigation of the entire history of architectural art, and the constituting it into a branch of our literature, has been reserved for a period which possesses no architectural style of its own, excepting as the result of revival or imitation.

Is, then, this study to be viewed as a thing to be avoided? Certainly not. Our predecessors worked honestly and with perfect success, in accordance with the conditions of their times; those of our times are wholly different, though, I fear, the reverse of favourable; but, nevertheless, they are the conditions to which we have succeeded in the due course of events which we could but little control. It may be that this historical and archaeological tendency of our time is the saving clause in our position; which, in its absence, might have been an utter blank. Let us not, then, throw away that which, for aught we know, may be our solitary birthright, in the vain hope of recovering conditions long since

* Sir GEO. GILBERT SCOTT's last lecture at the Royal Academy.

passed out of our reach. It is ours rather to use well and wisely what we possess, regulating, controlling, and guiding it, striving earnestly after better things by whatever means; but without rejecting those suggested by the circumstances of our period.

Nevertheless, let it ever be remembered that art history is not art, nor architectural history architecture. They may, like the Syren's song, lead us wide of our mark, though they may, perhaps, if rightly used, be made to guide or aid us in a right path.

The study, however, of architectural history has many and wholly different phases. It may, for example, be followed purely from an historical and archaeological point of view, or it may be pursued mainly with an artistic sentiment. Both are interesting, but I need hardly say, the latter is the spirit in which our studies as artists should be followed up.

It may, again, even if artistic in its purpose, be followed up generally, and through the whole course of the history of the art; or it may, while not neglecting the main line of history, be concentrated and intensified upon those styles, or that style, which we desire to be the guide and foundation of our own artistic productions. I need not say that here, again, the latter is the course most profitable to ourselves.

The great danger of the study is the dissipation and unfocussing of our own artistic thoughts; just as the great strength of the days when this study was unknown was the absolute concentration of all architectural thought upon the matter actually in hand—an advantage which in our day is absolutely and, I fear, irrecoverably lost.

Be this, however, as it may, it has become a part of the necessary education of a gentleman to know something of the past history of our great art; and, *a fortiori*, it is necessary to an architect, if only as a matter of literary culture. We must, however, take care that our thoughts and tastes are not led away by it into a state of objectless dissipation, having no concentration on any one guiding form of art, but viewing all forms of beauty with equal pleasure, and free from any strong and healthy preference.

The most natural course for the student of architectural history is to limit himself mainly and firstly (though not eventually, perhaps) to those styles from which our own architecture, whether native or borrowed, whether living or revived, is lineally descended—"to look to the rock whence we were hewn." And truly it is a right glorious genealogy which we can boast!

The history of architecture is the history of civilisation, for architecture unites and embraces the sister arts, and art is the visible exponent of civilisation.

Our more Western civilisation is distinct from that of the far East; and, without disparagement to the latter, its study may be viewed as separate from it.

Our own branch of civilisation and art may be said to have arisen on the banks of the Euphrates, of the Tigris, and of the Nile, and to have moved westward with a quiet course along the genial shores of the Mediterranean; while the Eastern branch took a contrary direction by India and China, reaching Japan and perhaps the opposite continent of America. Let us, however, confine our attention to our own branch.

Though the banks of the Euphrates and the Tigris were the nursery of our race, and though recent discovery has made us in some degree familiar with their architectural monuments, we, nevertheless, fail to trace them back to a period which will compare with the antiquity of the remains on the banks of the Nile. In studying the one, we long for relics carrying us back to a date even approaching that of the known history of the inhabitants, while in the other we are perplexed to find chronological room for works stretching back into such unknown regions of the past.

Egypt must, we may fear, ever remain a land of mystery. Its chronology seems inscrutable, its painting, its sculpture, and its architecture alike wonderful and mysterious. One flash of historical light shines upon its earlier days—like the lightning upon the midnight landscape—in the Scriptural history of those three centuries during which the people of Israel sojourned there and helped in their slavery to prepare materials for its structures. After this it seems again involved in indistinctness till the period of its decline. Its monuments seem continuous through all these ages, and even onwards to the days of the Roman Empire; but how early they com-

menced no antiquary has yet been able to show; while, strangely enough, the earliest and latest monuments—those preceding Greek architecture by, perhaps, fifteen hundred years, and those erected when that art was in decay—as clearly belong to one and the same style as do the earlier and later of our own Mediæval buildings.

Their character may be said to be threefold. The imitation almost of mountains in the pyramids, the rock-cut tombs, and the architecture proper—which is columnar in its most stupendous form, and whose greatest remaining monument is the mighty Hall of Karnac, with its hundred and thirty columns—perhaps the most impressive of all the works of antiquity. All these were accompanied by painting and sculpture of a highly mythic but most marked and characteristic kind.

An art like this, existing in full perfection in its ancient monuments, and also as a still living art, side by side with the rise of Grecian architecture, could not fail to exercise some influence upon it; yet the evidences of that influence are far from being clear. The genius of the two peoples was absolutely distinct, and Egypt was already a conquered nation while Greece was making its early strides towards fame. They were, too, of wholly different races, so that, though the young nation, during those brilliant strivings which led to its surpassing all races of men in its culture, was familiar with Egypt, and must have looked with wonder at its almost appalling structures, it is, after all, but little that we can trace of actual imitation; and that, strangely enough, not of the productions of its living art, but of a phase which had been extinct fully a thousand years. The inner and earliest sanctuaries at Karnac, and an obscure rock-cut tomb at Beni Hassan, contain pillars to which we trace some resemblance in the Grecian Doric; but whether that resemblance was intentional or accidental no one can say. Curiously, the tomb of Beni Hassan evinces proof of the imitation of timber construction, which gives it an additional alliance with the Doric; but can we conceive of a new art, founded on wood construction, being imitated from an art of a thousand years back, which chanced to evince the same conditions? As reasonable would it be for timber constructors in our own colonies to make pilgrimages to Anglo-Saxon churches which happen to suggest a timber prototype, in search of types for their new structures.

More reasonable, however, it may be to suppose that the latest type of Greek art, the Corinthian capital, may have been suggested by the foliated and bell-shaped capitals of Egyptian columns.

Passing, for a moment, from the Nile to the Tigris, we find buried under the Assyrian mounds an architecture as different as possible from the Greek, yet containing a few almost accidental foreshadowings of some of its details. This architecture, seems, however, to have influenced firstly that of Babylon (now almost wholly lost), and subsequently that of the Persian monarchy, which brings us again in contact with the Greeks.

Here we find, at last, a direct similarity in taste; for, different as are their capitals, no one can look at drawings of the columns of the Chehil Minar—the great hall or temple built by Xerxes at Persepolis—without being convinced that there was a near relationship in their style to that of Greece. Strangely enough, however, this resemblance is not to the earliest phase of Greek—the Doric—which was its contemporary, but to its second phase—the Ionic—which, putting aside the chronological difficulty, need not be wondered at, as the Ionic cities had long lain within the Persian monarchy. Yet it goes to prove that the influence of Persian architecture was unconnected with the origin of that of Greece, and only affected its more advanced stage.

I view Greek architecture then, in the main, as an art of spontaneous growth. Its first form, the Doric, as strictly and absolutely Greek. The second, the Ionic, as Greek in the main, but with a few suggestions from the land of the Great King; and the third, the Corinthian, as equally Greek, but with one single suggestion, perhaps from Egypt; the whole as the spontaneous creation of that most wonderful, in intellectual power, of all the races of man—that race inspired, as it would almost seem, of God to be our instructors in literature and art, and our initiators in science, just as was another people to be the teachers of His holy religion.

The actual origin of Greek architecture is

buried in impenetrable obscurity. If the building called the Treasury of Atreus, or the Tomb of Agamemnon, was really of that period, it would distinctly prove that what we now know as Grecian architecture was unknown to the heroes in the "Iliad," inasmuch as over its entrance remains a little piece of highly-decorative columnar work bearing no resemblance to the subsequent architecture of Greece, and going far to prove that these early inhabitants of Greece had a style of building which did not evince a timber but a stone original. Of these early structures, including the Cyclopean walls of the Pelasgian cities, Mr. Freeman eloquently remarks,—"These awful remains of the world's youth stand before us as the relics of unrecorded days, of the dim times of poetical legend, enveloped, as they were, in religious mystery for ages before a line of what we deem ancient history was penned. The historians and philosophers of the days of Pericles knew no more of the authors of these gigantic fragments than ourselves; all that survived, even to them, were the shadows of fallen greatness, the feeble echoes of a voice long since hushed in death. Our ancients had to explore the remains of these far earlier days by the same faint glimmerings of legend and tradition as ourselves . . . and to us, whose early youth is spent among the immortal lays, whose living substance is called up by even the pictured resemblance of these massive piles—monuments, as we would fain believe, of the days of Achilles and the Atreids, and the old time before them—to us every rugged stone seems vocal with some old heroic legend. Each gateway may have seen the marshalling of heroes, arrayed to man the thousand ships of Argos, and to wait upon their chariot-wheels, to whom Leus had consigned her twofold throne and sceptre."

The difficulty is to explain how, in a country where a distinctly stone architecture (stone not only in fact, but in idea) had for ages existed, it could be suddenly changed for an architecture evidently based upon a timber ideal. Were it only the Cyclopean walls of the old cities which remained, the perplexity would be less. Such walls exist also in Etruria; yet we gather from Vitruvius that the Etruscan temples had a construction founded upon timber. It is that little scrap of actual columnar architecture at Mycene which defies explanation, but which is thought to point to an Assyrian original.

The Dorians, however, were a different (how different is not known) and an invading race. It may be that their former seat had been in a specially timber country, and their former architecture actually of wood; and that, on emigrating into a stone country, they translated their architecture into its prevailing material.

The intrinsic marvel, however, is their power to invest art, so homely in its origin and so simple in its character, with such sublimity of aspect and such refined beauty of detail. But why should we wonder at this? Look for a moment at their figure-sculpture, even in its first archaic simplicity, and we need not wonder at what such men could do. But, oh! look at it again, after the desolating Persian had been driven from their shores, when the shattered institutions of Greece had been re-established, and her ruined temples restored; when national glory, self-gratulation, and thankfulness had given a new and generous impulse to every feeling of the great mind and soul of Greece, and see then what art they produced (you know it right well in the Elgin-room at our own museum), and then you need not wonder at any other miracles of art that they performed!

(To be continued.)

The original oak screen of fifteenth century construction, which formerly decorated the chancel at St. Mary's Church, Taunton, has been discovered in a remote place by Mr. Edward Jeboult. It is of light and beautiful workmanship of the Perpendicular style, and in keeping with the peculiar design of the church. The same local antiquary has rescued a large portion of St. James's screen, of similar style, and highly illuminated in colour. Specimens of both have been placed in the Somersetshire and Taunton Museum.

It is proposed to restore the parish church of Asaby-de-la-Zouch. In 1829 the whole of the interior of the church underwent considerable alteration. It was then re-peaked, and galleries were erected on the north and south sides. The expense then incurred was about £1,200. The church is an ancient and substantially built stone edifice.

OUR LITHOGRAPHIC ILLUSTRATIONS

DODDINGTON RECTORY.

Until recently the living of Doddington, in Cambridgeshire, held by the Rev. Algernon Peyton, was well known as "the richest in England." It had an old-fashioned rectory-house built principally of timber, lathed and plastered inside and out, and covered with roofs of reed thatch. At the latter end of the summer of 1871, a plumber, whilst mending the gutters, managed to set fire to the roof, and as may be imagined, a very short time sufficed to completely destroy both the old rectory-house and the stables adjoining, with nearly all the goods and chattels that they contained. The present rector at once engaged the services of Mr. William Smith, of John-street, Adelphi, to prepare plans for a new rectory-house, and the building, an illustration of which we give this week, is now complete. The materials used are Whittlesea bricks for the walls, Bath stone for the dressings, and Staffordshire brindled tiles for the covering of roofs. For the internal fittings of best rooms, pitch-pine has been freely used, with other woods. The whole of the works, at a cost of over £3,500, have been executed by Mr. John T. Fast, builder, of Melton Mowbray, under the direction of the architect.

NEW SCHOOLS, NEWPORT, SALOP.

One of our illustrations this week represents the new National Schools, Newport, Salop, recently erected under the architectural superintendence of Mr. J. Ladds, architect, Chapel-street, London. The accommodation provided is for 250 children in all, and consists of a boys' school-room, 41ft. 6in. by 19ft.; a girls' schoolroom, at one end adjoining, 38ft. by 18ft.; infants' school-room, of same dimensions, with two class-rooms 18ft. by 10ft. 6in., and separate porches and lobbies for boys and girls, with necessary offices outside. In addition, and adjoining, there is a master's house. The following are references to the plan:—B, boys'-school; C, class-rooms; D, boys' entrance; E, girls' and infants' entrance; F, lavatory; G, girls'-school; I, infants'-school; K, kitchen; L, living-room; S, scullery; Y, yard.

DESIGN FOR LEICESTER TOWN HALL BY E. W. GODWIN.

Our readers will remember something of this competition. There were forty sets of drawings sent in, and after conferring amongst themselves, the Town Council wisely decided to call in Mr. Street as referee. On June 23rd, 1871, in our criticism, we said, "1250 shows the best architecture," and a month after, Mr. Street, in his report, said, "The architectural character of this design is extremely good. In my opinion there is no other design equal to it in this respect, and it would be a great satisfaction to see so beautiful a design carried into execution." Mr. Street's advice, however, was not followed, as the Council awarded the first premium of £200 to Messrs. Barrett and Smith, of Leicester. As usual in competitions, whether they be great or small, a considerable correspondence followed, but the council's decision was not disturbed in favour of Mr. Godwin. Though the design was not carried into execution, we consider it well worthy of the foremost place in our paper, as given to day. It will by many be not considered less interesting at the present time, when another public competition is invited for designs for the same building. The time for the competition terminates on the 14th of next month.

SPECIMENS OF EARLY GREEK ART.

We have to apologise this week for a blunder of the lithographic printer's. He has put the right name on the wrong plate, namely, "Specimens of Egyptian Art" should be "Specimens of Early Greek Art." Next week we will rectify the mistake, as far as we can, by giving the plate illustrating Egyptian art, and a description of the illustrations wrongly designated this week.

ALTAR AND ROOD, SOUTH LEIGH CHURCH.

Our illustration shows the new Altar and Rood recently carried out during the restoration of this interesting old parish church. The chancel archway is entirely surrounded with paintings. The chancel screen is ancient, but all traces of the old Rood had disappeared: an endeavour has been made to supply its deficiency, as shown by the

illustration, and, upon the new Rood are painted the figures of Our Lord with the Blessed Virgin and St. John. The whole of the work is executed in English oak, and the lighter colour of the new work clearly shows what is old and what is new. The altar is also framed of English oak, in a very substantial manner. The panels are painted to represent the adoration of Our Saviour by Saints on earth and in Heaven. With this mode of treatment but one embroidered frontal is required, which should be a very rich one, and used only upon the great festivals. It is supposed by some authorities that Saxon Altars were adorned in this manner.

The paintings on Rood and Altar were carried out by Messrs. Gibbs and Moore, of Great Russell-street, London, and the restoration work by Mr. Groves, builder, of Milton. The works were designed and superintended by Mr. Clapton C. Rolfe, architect, of Reading.

THE REPORT OF THE METROPOLITAN BOARD OF WORKS FOR 1872.

YEAR BY YEAR the report of the Metropolitan Board of Works becomes more and more a record of accomplished facts. Gradually the minor links in the vast network of drainage that has been spread beneath the metropolis are being completed; the two great riverside thoroughfares are free to all comers, and pleasant gardens and grass-wards have almost effaced the memories of the rotting wharves and foul mud-banks that so recently disgraced the noble river. Nor only in the capital itself are the traces of the Board's work manifest. North and south, amid the rapidly rising suburbs—that bid fair, in too short a time, to vie with the parent city in density and extent—thanks to the Board's jurisdiction, have been saved open parks and spaces; east and west it has sought sites for its great workshops—its pumping-stations, and the like. In spite of all shortcomings and mistakes, it would be hard to point to any other executive body that has effected so much good work in so short a time, to the benefit of the health and convenience of the inhabitants of London.

Of the great main drainage system, the only portion not completed is a part of the low level sewer on the north-side of the Thames. This is now being carried out under the Chelsea Embankment, together with the new western pumping station, which is being erected at a cost of £183,739. The work of connecting main and local sewers, draining the low-lying districts on the north side of the Thames, with the northern low-level intercepting sewer, has been further proceeded with during the past year; as also has been the improvement and enlargement of a number of the old main sewers which came under the authority of the Board at its formation.

Reference is made to the report made during the year by a committee appointed by the Board on the subject of the ventilation of sewers. The consideration of this matter has for a long period occupied the attention of the Board's engineer, and a large number of experiments have been made with the various methods of ventilation brought under his notice, and the defects attending the use of some of the best known among them are briefly pointed out. The charcoal ventilators were found to diminish the upward current of foul air through the shafts and confine it in the sewers, thereby endangering the safety of the men working in them; the method of ventilation by means of air-flues connected with the furnaces and shafts of factories and other buildings has also partially failed, owing to the difficulty of displacing the noxious gases in the more distant parts of a long sewer. Another plan which has been found impracticable, thanks to the opposition of householders, is that of carrying pipes from the crown of the sewer up the sides of houses to a height above the level of the upper windows. The neutralisation of sewer effluvia by means of acids, though successful in many cases, has not been uniformly so, owing to the reception by the sewers of fumes and drainings from chemical factories, which counteracted the otherwise beneficial effect of the acids employed. The extension of the plan of erecting ornamental ventilating shafts in the streets has been con-

sidered. The expense attending its adoption appears, however, seriously to militate against it. The Board have arrived at the conclusion that no one plan can be indiscriminately applied in all localities, and that the only principle capable of wide application is the general one of flushing the sewers with such a copious supply of water that the decomposing matter within them shall be diluted and removed before any noxious gases may have been generated. The Board have authorised the Committee, however, to continue its investigations, with the view of removing as far as possible the grounds of any local complaint, and each case that arises will be dealt with in the way best suited to its particular circumstances. The question of the utilisation of sewage has arrived but little nearer its solution, unless, indeed, it is to be found in General Scott's plan. The experiments of the Native Guano Company have not terminated satisfactorily, and it seems hardly likely that their process will be adopted.

The Victoria Embankment has, during the year, been repaved and the roadway repaired at a cost of £12,000, and the Board has lately contracted for fencing off the land fronting the Middle and Inner Temple. This fence will consist of ornamental iron railings, upon a dwarf wall of Portland stone, 900 feet in length, along the south and western sides, and a return wall, also of Portland stone, about 100 feet long and 11 feet in height, along the eastern side of the Temple, with two pairs of carriage-way gates, having footway gates on either side. The Chelsea Embankment is progressing towards completion. A length of 3,880 feet of river wall has been constructed out of a total length of 4,130 feet. The wall is of concrete, faced with granite.

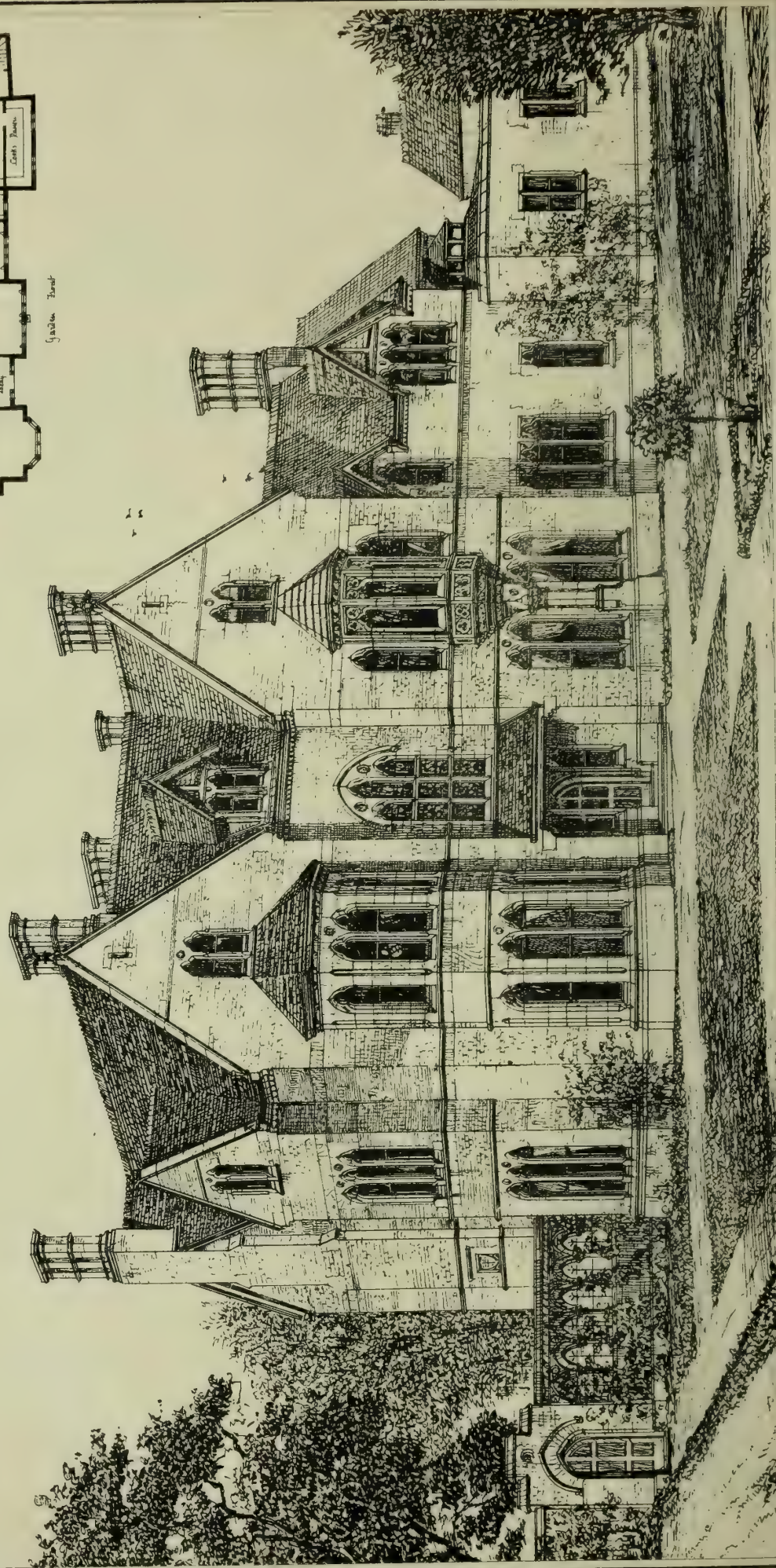
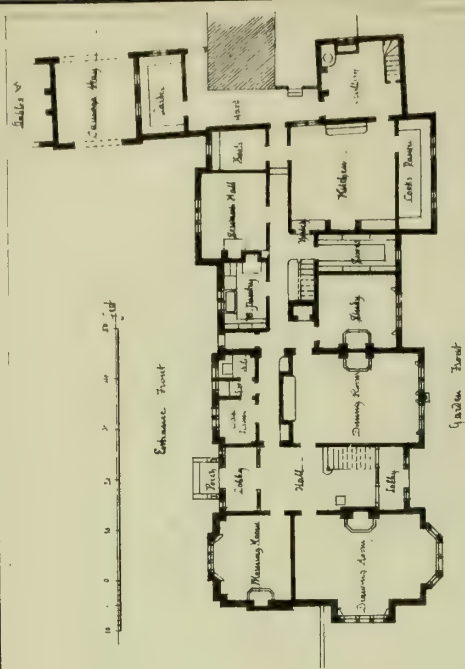
The principal street improvement effected during the past year has been the formation of a new thoroughfare 50 feet wide in the line of the old Stingo-lane in continuation of Seymour-place from Upper York-street to Marylebone-road. The new street is 450 feet in length, and was opened in September last. The improvement is to be completed by the purchase, at the price of £300, of a piece of ground in front of the Marylebone County Court-house, in order that the approach from Stingo-lane to Lisson-grove may be more nearly in a direct line.

The wise compliance of the Board with the popular wish to retain as a park the whole of the 116 acres acquired for that purpose at Finsbury Park has necessitated a further outlay there. The portion of land which had been reserved for building purposes is being devoted to the purposes of a children's playground, a fringe of trees being planted to separate it from the other parts of the park. A permanent boundary fence has also been erected in the Seven Sisters-road, at a cost of £322. A greenhouse has been constructed in the park, in which will be propagated plants, to be placed on the Thames Embankment and the parks, under the charge of the Board. A similar greenhouse has been erected in Southwark Park, and there, too, the idea of building on one part of the site has been prudently relinquished. Seventy-three acres of land adjoining Victoria-park, which the Commissioners of Woods and Forests have been trying to let for the last twenty years, have been redeemed by the Board at a cost of £20,450, and have been added to the park, greatly to the delight of the East Londoners, and, if we may judge from her recent visit, to the satisfaction of the lady whose names it bears. Blackheath and Hampstead would now hardly be recognised by any one familiar with their neglected condition before the interference of the Board. The former has been well fenced, the turf looked after, seats provided, and a regular ride provided for the donkey riders. At Hampstead Heath the equestrians, too, have been cared for, and regular licenses are issued by the Board to the men and boys who hire out the animals. Stepney Green, which the Board undertook in 1871 to inclose and lay out, has been completed at a cost of £3,000, and was handed over to the Mile End Vestry in August last.

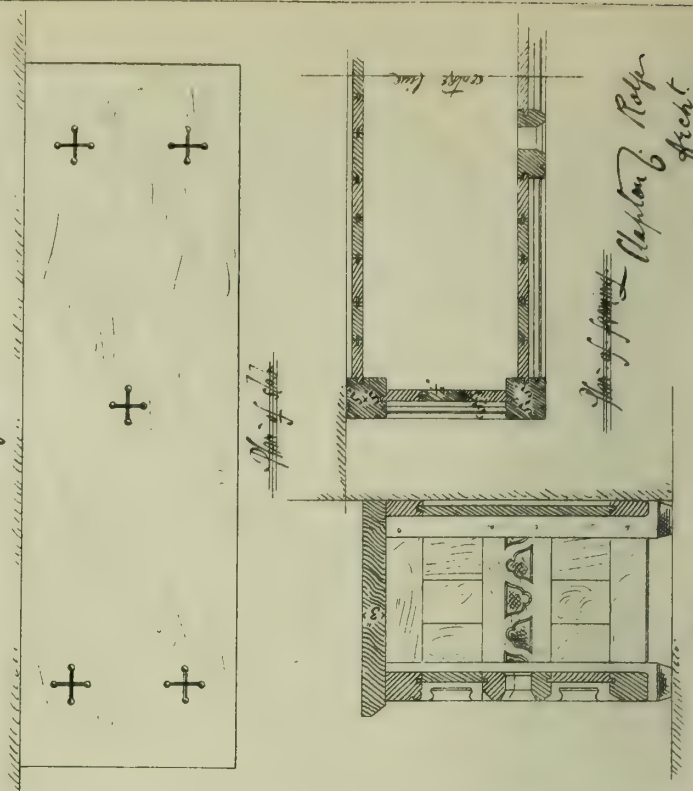
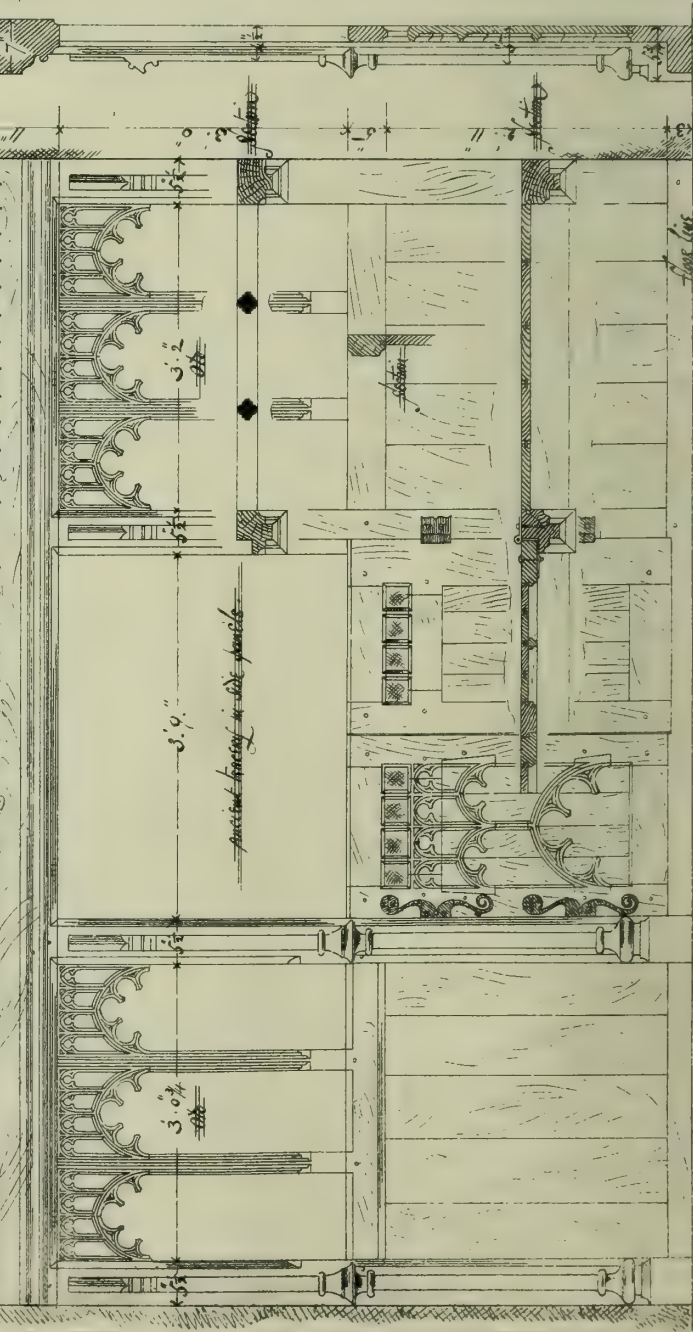
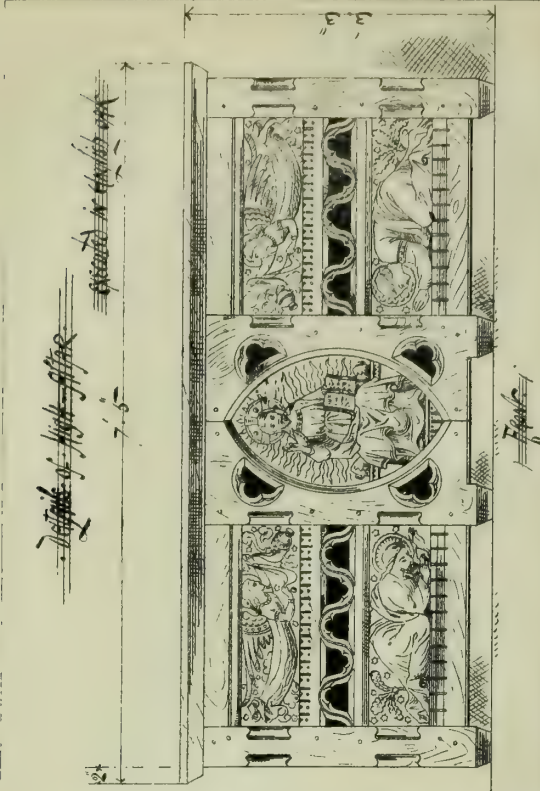
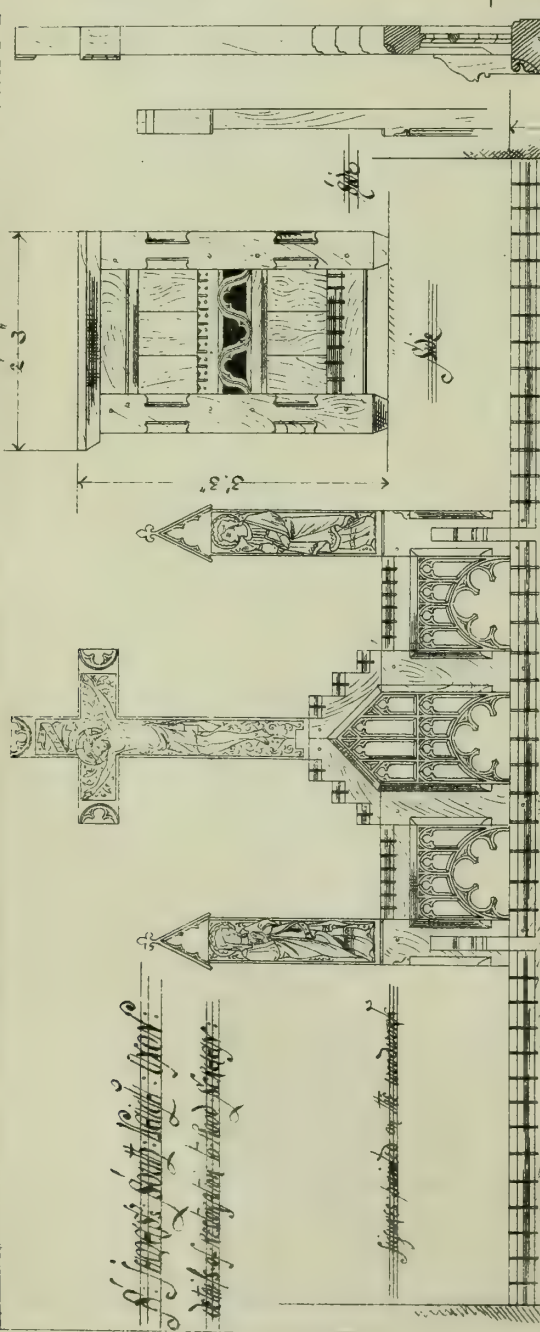
The attention of the Board is now being directed to the freeing from toll the bridges over the Thames. The financial arrangements for the facilitation of this object have yet to receive the sanction of the Government. The matters of gas and water supply, in which the Board is to far too great an extent powerless, are also referred to in the report, and suggestions offered for the improvement of the present divided control exercised over the private companies to whom we are as yet content to entrust those important interests.

DODDINGTON RECTORY, CAMBS - GARDEN FRONT.

WILLIAM SMITH, ARCHT.



THE BUILDING NEWS. APR 25. 1873.

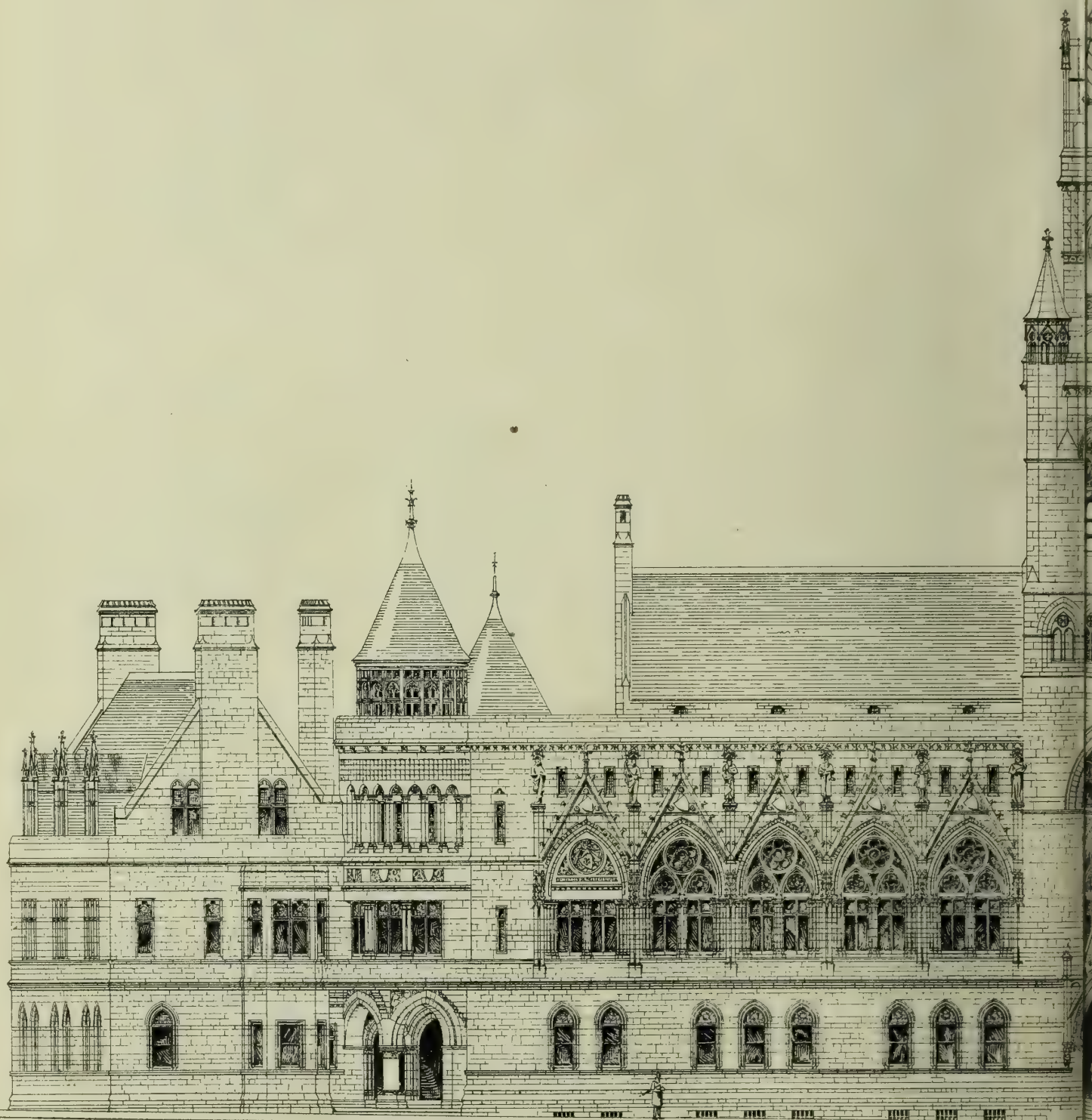


St. James's South Church - New York
 details of restoration to last stage
 figures painted on the windows

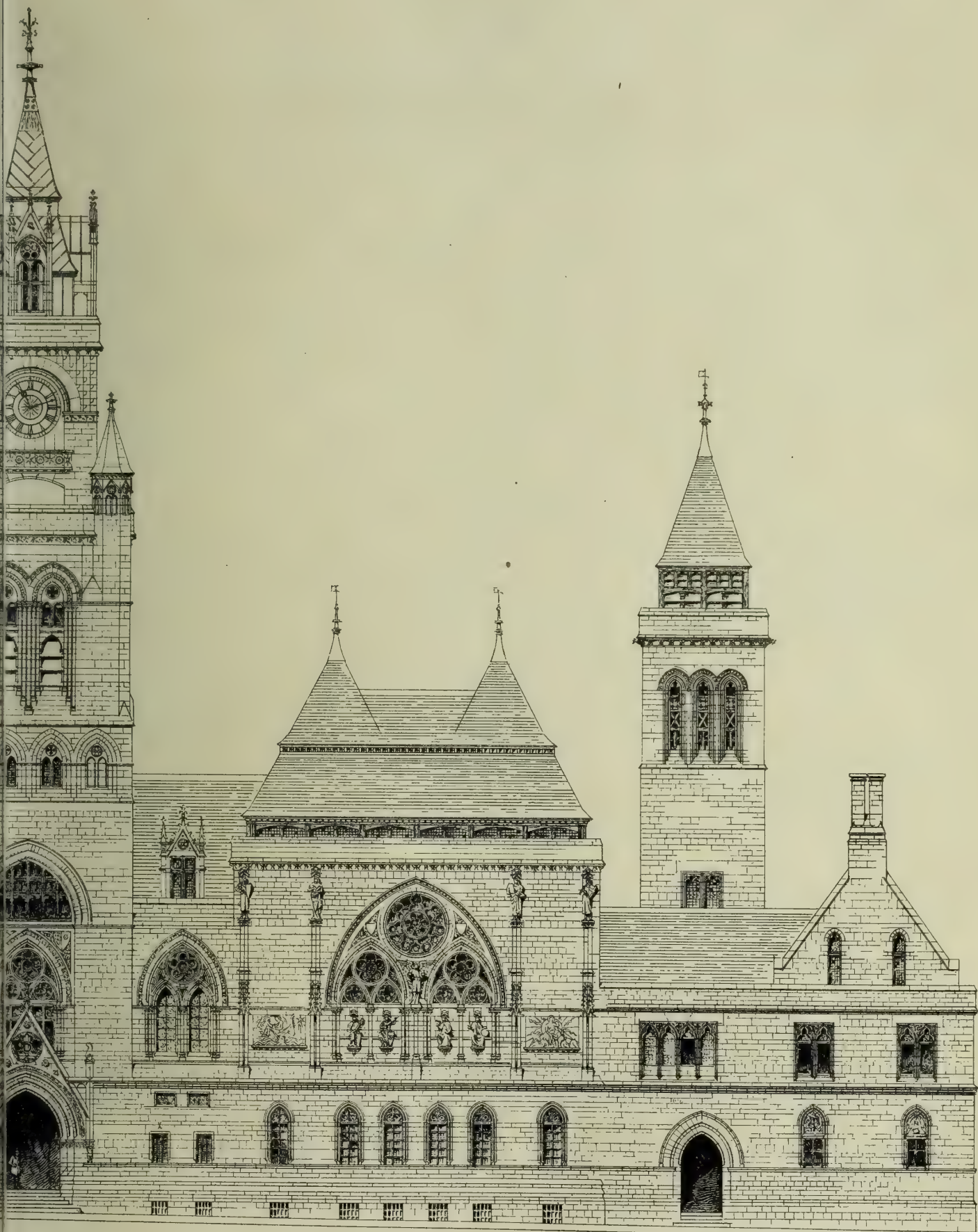
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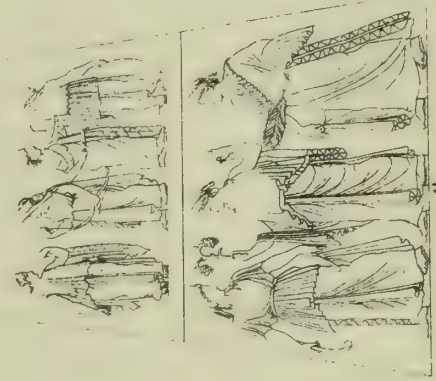
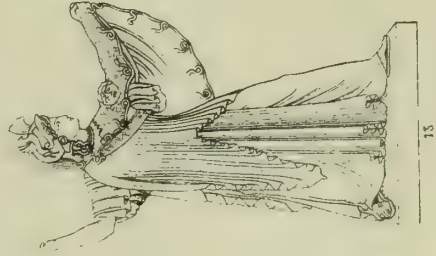
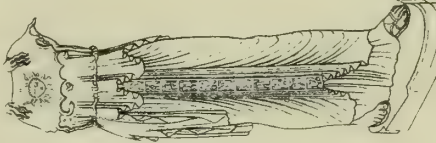
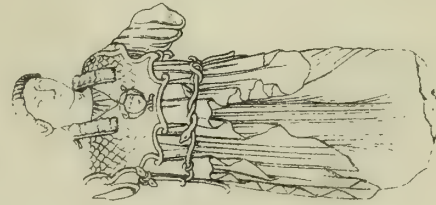
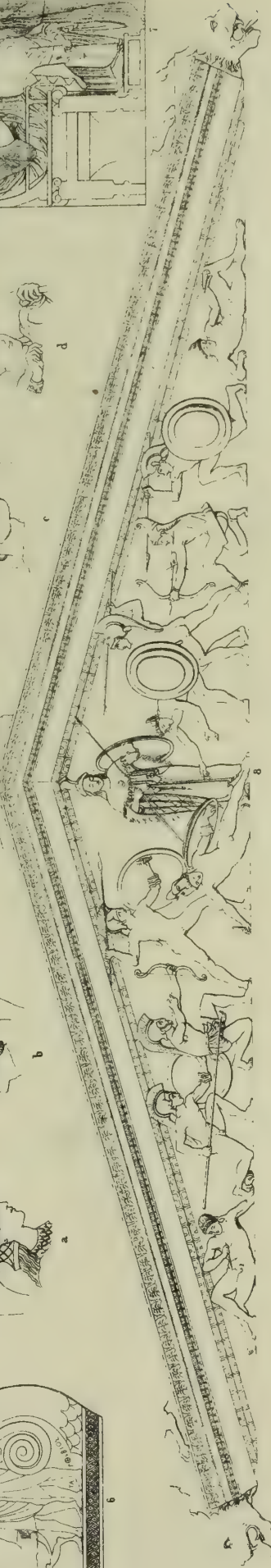
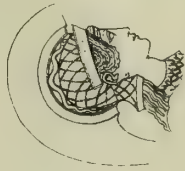
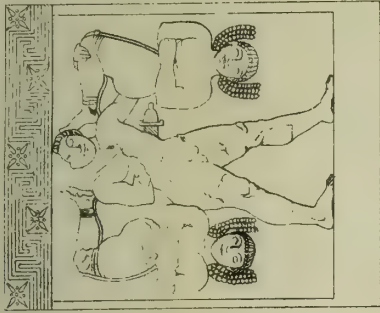
COMPETITIVE DESIGN FOR MUNICIPAL BUILDINGS: LEICESTER.

BY EDWARD W. GODWIN. F.S.A. F.R.I.B.A.



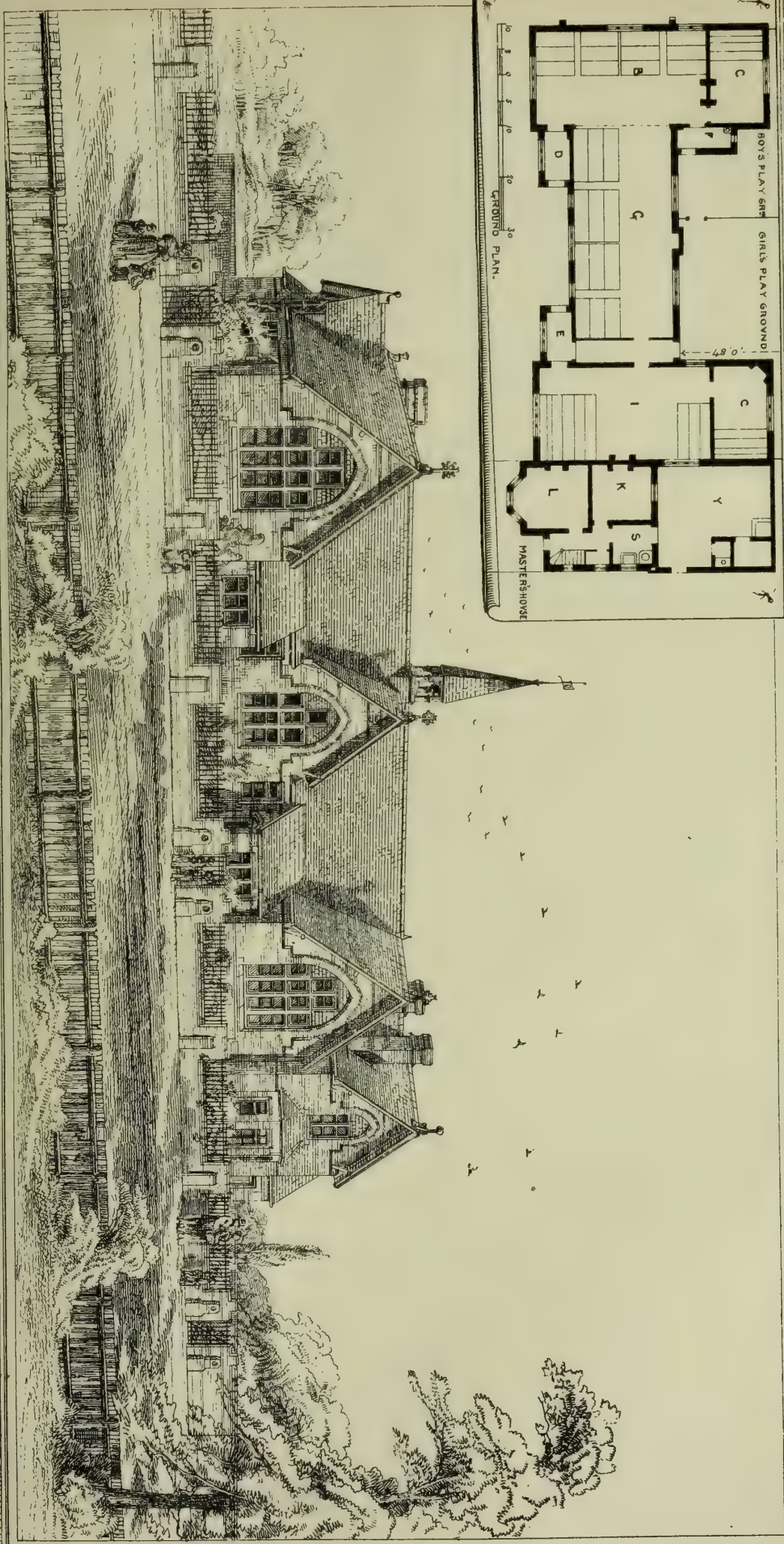
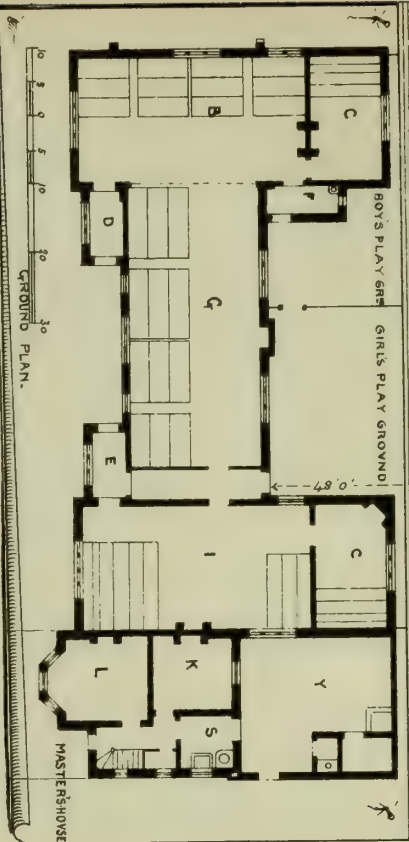
. APR. 25. 1873.





THE BUILDING DEWS, APR. 25, 1873.

New School, Newpor Salop.



J. L. LADD, ARCHITECT.

4, Chapel St. Bristol, Eng.

SIR WILLIAM TITE.

THE news of the death of Sir William Tite, which happened at Torquay, from inflammation of the throat, supervening on an attack of bronchitis, will be received with regret by the three professions—Art, Finance, and Politics,—with which he was more or less intimately connected.

Sir William Tite was born in 1802, his father was Mr. Arthur Tite, a city merchant, and his mother, Anne, daughter of Mr. John Elgie. He was christened at the old church of S. Bartholomew the Great, West Smithfield, and it is interesting to note that more than fifty years later, when it was proposed to restore that venerable fabric, he became Chairman of the Restoration Committee, and with his accustomed liberality, gave £1,000 towards the cost of the work. He was educated at a private school at Hackney, and was articled to Mr. Laing, best remembered as the architect of the Custom House, just at the time the erection of that building was commenced. While with Mr. Laing, Sir William almost entirely superintended the rebuilding of the church of S. Dunstan-in-the East, which, as one of the earliest and best known specimens of the revival of Gothic architecture, considerably contributed to his reputation, and obtained for him in early life a large share of public favour. His next great work was the great Gothic church in Regent Square, Gray's-inn-road, which he built for Edward Irving, and he was subsequently busily engaged on some of the most important of our earlier railway stations. The work, however, by which he will be best remembered, is the Royal Exchange. The competition for this building, like those for many more recently erected public edifices, was anything but satisfactory to the architects concerned. In the first open competition Sir William failed to obtain any one of the three prizes awarded. It was, however, afterwards decided that no one of the premiated designs was really suitable for the purposes of an Exchange, and the Committee determined to abandon the principle of open competition, and invite five well-known architects to a limited competition. These were Sir Charles Barry, Mr. Gwilt, Sir Robert Smirke, Professor Cockerell, and Sir William Tite. Sir William Tite and Professor Cockerell alone consented to send in designs, and ultimately those of the former were chosen. The building was completed at a cost of about £150,000, and was opened by the Queen in October, 1844, and placed its author at once among the best-known of his profession.

His subsequent works, though many of them of large extent, have been comparatively unimportant in comparison with the Royal Exchange. Among the best known are the London and Westminster Bank, in Lothbury, designed in conjunction with Professor Cockerell; the original Vauxhall terminus of the South Western Railway, the Southampton terminus of the same line, the Blackwall station of the London and Blackwall Railway, the termini and most of the stations on the Caledonian and Scottish Central Railways, some works of a similar class in France, and several other buildings of a commercial character. After a long and prosperous career, he retired some few years ago from the active duties of his practice, which was transferred to Mr. Edward Norton Clifton.

As an author he was well known by his "Descriptive Catalogue of Antiquities found in the Excavations of the New Royal Exchange," and by various essays and lectures. He was married in 1832 to Emily, fifth daughter of Mr. John Curtis, of Herne-hill, Surrey, but had no children. A nephew, whom he had brought up (Mr. A. J. Green), and who gave great promise of becoming a very distinguished architect, died about eleven years ago. As hinted above, he was most active in other pursuits than those connected with his profession. He was Vice-President of the Administrative Reform Association, a director of the Globe Assurance Company, of which, at one time, he had almost the entire management, a director of the London and Westminster Bank, Chairman of the Bank of Egypt, and was, in 1856, on the Select Committee of the Bank of Egypt. In 1854 he unsuccessfully contested the borough of Barnstaple in the Liberal interest; in the following year, however, he was returned for Bath, and has represented that city without intermission ever since. In Parliament he strongly opposed the contemplated adoption of the Gothic style in the new Foreign Offices and other buildings lately erected near the Treasury. He was magistrate for the counties of Middlesex

and Somersetshire, and a Commissioner of Lieutenancy for London. In 1835 he was elected a Fellow of the Royal Society, and in 1839 of the Society of Antiquaries. He was for some time President of the Architectural Society, and has been twice elected President of the Royal Institute of British Architects, and was also President of the Camden Society. He received the honour of Knighthood in 1869, and was made a C.B. October 12th, 1870. He was for many years one of the governors of Dulwich College, in the re-construction of which he took the greatest interest. He was also a member of the Metropolitan Board of Works.

Sir William Tite was a painstaking and prolific writer on archaeological and architectural matters. He was a frequent contributor to the *Archæologia* of the Society of Antiquaries, and was the author of the following "Sessional Papers" in the "Transactions of the Royal Institute of British Architects," which were read before the Institute on the dates appended:—"Proceedings taken in building the Original Exchange, by Sir T. Gresham, and that built in 1666; with some account of the Antiquities discovered in preparing for the foundations of the present building."—15th December, 1845. "Recollections of a Course of Lectures on Architecture, delivered at the Royal Academy, by Sir J. Soane, 1817."—30th November, 1847, and 17th April, 1848. "A Letter from Rome."—17th May, 1852. "Remarks on the present condition and future of Architecture in England."—5th and 19th Nov., 1855. "Recent Discoveries of the Remains of the Mausoleum at Halicarnassus."—1st Nov., 1858. "Progress of Architecture in Europe since the Establishment of the Royal Institute of British Architects."—7th Nov., 1859. "Address delivered at the First Meeting of the Royal Institute of British Architects in the New Rooms, Conduit-street, 7th Nov., 1859."—8vo., 1860. "Stone Preservative Processes."—28th Jan., 4th and 11th Feb., 1861. "Some Information relating to the late Mr. Elmes, Architect of S. George's Hall, Liverpool."—30th Nov., 1863. "On the Paris Street Improvements, and their Cost."—14th Dec., 1863. Four opening Presidential Addresses (4th Nov., 1861; 3rd Nov., 1862; 2nd Nov., 1868; 1st Nov., 1869).

He also published, "Reprints and Sessional Papers on Egyptian Obelisks," by R. Burgess, J. Bell, and others, 8vo., 1862; and "Paris Street Improvements and their Cost" (from the *Journal of the Statistical Society of London*, 8vo., 1864).

In 1856 he received the Royal Gold Medal annually awarded by the Sovereign, through the Royal Institute of British Architects, to an eminent architect or archaeologist.

He was a devoted and munificent supporter of the Institute, of which he was one of the earliest members, being elected Fellow in 1843. In 1868 he made a special donation of £500 to the Library fund, and this munificent sum was principally expended in the purchase of foreign standard works on architecture. Subsequently he made another special donation of £67. 13s. for the purchase of Mr. Wardle's drawings of the screens in the churches of Norfolk. These special donations were in addition to numerous and frequent donations of smaller amounts. Sir William took a warm interest in the welfare of the juniors of the profession, and offered numerous prizes for their encouragement. His career has been one which will eminently serve to illustrate how much may be done by diligence and determination on the part of young architects. Such prizes as were his will not fall to the lot of all, but all may seek to deserve them.

Sir William Tite took great interest in the *civilians* Architectural Exhibition, and its collapse was due to no want of interest on his part. From the first, too, he has been a strong supporter of the Royal Architectural Museum.

His courtesy to all, and his willingness to aid in any matter affecting the interests of the profession or of the Institute, are well known. Of the esteem in which he was held by his constituents, and which was shared by all others with whom he came in contact, the following extract from a correspondent in Bath, on Monday, may be left to speak:—"The death of our senior member came like an unexpected blow to his constituents, and caused a feeling of profound regret to pervade the city. It was the absorbing topic of conversation yesterday, for by all classes and parties Sir William was beloved and respected. People forgot their political differences in admiration of the benevolence and munificence which he so constantly employed. During the two-and-twenty years in which he represented Bath there

has not been a single undertaking of public usefulness that he has not generously supported, and he has been equally ready to assist individual cases of distress and suffering. Though his health had been for some time delicate, compelling him to reside at Torquay, it was thought that for many years he might be spared, a belief that the absence of any intimation of alarming or dangerous symptoms tended to strengthen. Lulled by this conviction, the intelligence of the death of Sir William was so little anticipated that the first announcement of it was received with doubt. The tolling of the Abbey bell, and the flag half-mast high, confirmed the sad news, and the deep feeling of regret for his loss found expression in kindly words of remembrance of the many excellent qualities that adorned his character."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary general meeting of this Institute, held on Monday evening last, Professor Kerr, vice-president, in the chair, the following gentlemen were elected members, viz., as Fellows: Mr. W. Emerson, of Westminster Chambers, Victoria-street; Mr. George A. Mansfield, president of the Institute of Architects of New South Wales; Mr. John D. Webster, of Sheffield, and Mr. F. R. Wilson, of Alnwick. As Associates: Mr. Horace Cheston, of Upper Clapton; Mr. Alfred Conder, of Park-place West, Gloucester-gate, Regent's-park; Mr. Robert F. Hodges, of 28, Cross-street, Manchester; and Mr. Frederick N. Pettingell, of Parliament-street, Hull. Several donations of books were announced, the principal being several volumes sent by M. Viollet le Duc to complete the sets of his works in the Institute library. Professor Kerr having in feeling terms announced the death of Sir Wm. Tite, Mr. H. W. BREWER read a paper.

ON THE CHURCHES OF BRITANNY (NORTH COAST).

The author remarked at the outset that he feared he could not do full justice to the subject, as his knowledge of Brittany was confined to a few sketches and notes made last year during a month's tour in the Ille et Villain Cotes-du-Nord and Finisterre. Mr. Goldie had, however, kindly placed his sketches and notes upon the same subject at the disposal of the author, and with their assistance he had been able to prepare the paper. He did not intend giving a general description of the architecture of Brittany, but rather to give some account of the most interesting churches and buildings in a single district, viz., the part of Finisterre round and about the ancient episcopal city of S. Pol de Leon. The buildings in this district possess the peculiarities of Breton architecture more strongly marked than those in any other part of the province. As Morlaix is the best starting point from which to commence an exploration of this most interesting neighbourhood, he began with a description of the quaint old town. It would be nearly impossible for any town (except, perhaps, a modern English one) to look ugly in such a beautiful position as that occupied by Morlaix. Lofty and nearly precipitous rocks rise up immediately to the rear of the singularly quaint and picturesque gabled houses. Unfortunately, the ecclesiastical buildings suffered terribly at the hands of the French Revolutionists. The magnificent collegiate church of S. Maria du Mur was entirely destroyed, and the noble church of the Dominicans desecrated and turned into a military storehouse. The nave of the church of S. Matthew (the principal parish church of the town) was either destroyed or so injured as to render its rebuilding necessary, and this was done in the meanest possible way, and all the conventual chapels, except one, were either destroyed or desecrated. Of the two remaining parish churches, one is a hideous building, erected by one of Talleyrand's bishops, and the other, dedicated to S. Melaine, is a small but rather interesting Third Pointed building, consisting of a nave and aisles, a tower at the west end of the north aisle, and a south porch. The nave is separated from the aisles by arcades of very obtusely-pointed arches, the mouldings of which consist of a series of flat hollows, and die into cylindrical columns, which possess neither capitals nor bases. There is no clerestory, and immediately above the arches is a heavy cornice of wood, adorned with some very rude carving, supporting a Gothic barrel-vault of the same material, and of very ugly form. The windows have fair Flamboyant tracery, and contain some remains of painted-glass of the

same date. There is a beautiful Flamboyant porch on the south side. The west front of this church, which is situated at the top of a broad and lofty flight of steps, is a pleasing composition, and inscribed upon it is the date of its erection (and probably that of the greater portion of the church), "Anno Domini 1489." The tower, which is fairly lofty, is of mixed Third Pointed and French Renaissance work, and was commenced, as we are informed by an inscription upon it, in the year 1574. The only other objects worthy of notice in this church are a very elaborately and delicately-carved canopy over the font, in the Renaissance style. Upon it is a small tablet, inscribed with the date 1660; it is a very pure and beautiful piece of work, quite free from some of the vulgarities and absurdities which so often disfigure sculpture of that period. The other is the western organ-gallery, which is composed of the remains of the ancient rood-loft, and ornamented with some well-carved tracery panels. This church looks much smaller than it really is, from the fact of its standing close to the new railway-viaduct, which is a gigantic work, consisting of a double series of arches, super-imposed, and is nearly 200ft. high; it is one of the few modern engineering works of large size which are not ugly. Crossing the deep valley, with its lofty and graceful arches, perfectly simple, and without the slightest attempt at ornament, it has a noble and striking effect, and shows what grand things our engineers can do in the nineteenth century, if they will only confine themselves to their own profession, and not attempt to practice that of the architect. The destruction of the churches at Morlaix, during the Revolution, is a matter of the greatest possible regret, as the great collegiate church of S. Maria du Mur would, without doubt, have thrown great light upon the history of Gothic architecture in Brittany. This church was erected between the years 1295 and 1408, and is said to have possessed a tower of the same type as that of the church of Kreisker, at S. Pol de Leon, only the tower, or rather spire, of S. Maria du Mur rose to the height of 313ft., which is 53ft. higher than the Kreisker spire. Not a single stone of this great church now remains, nor did the author know of the existence of any drawing or view of it. The now desecrated Dominican church is a most interesting building, consisting of a long nave and one aisle under a single external roof, and a transept on one side, which originally formed the Lady Chapel. The architecture is very pure and beautiful, but cannot be of the date ascribed to it—i.e., 1237, as the tracery of the windows is thoroughly-developed Second Pointed, and the ogée is to be found amongst its mouldings. The east and west windows (the church is square-ended) have both of them had large roses, of very elaborate design, in their heads, but both are now blocked up, and so mutilated that it is impossible to trace them out exactly. Internally, the nave is separated from the aisle by a row of equilateral arches, supported upon tall and rather slender columns. The roof of the nave is a barrel-vault of wood, but with a very pretty piece of "lien-vaulting" introduced where the transept cuts into it; the whole shows extensive remains of colour and gilding. That this beautiful building should be left in its present condition is a disgrace to the French Government. Of the Church of S. Mathieu the tower alone is old, and dates probably from the end of the sixteenth century: it is an odd jumble of Gothic and Renaissance architecture; the great peculiarity about it is that the various stages seem to have no connection with one another, although they are evidently of the same date, and the only cause Mr. Brewer could suggest for this singularity is by supposing that, while the work was in progress, the architect must have been changed every month, and each new architect must have started upon an entirely fresh plan, thoroughly disregarding the work of his predecessor. The church to which this singular tower is attached is the ugliest he had ever seen in France. The domestic architecture of Morlaix has fortunately suffered far less than the ecclesiastical, and some of the streets in the older portion of the town retain all their ancient gabled houses. The most perfect are the Rue des Nobles and the Grand Rue. Many of the houses in these streets date from the fifteenth century, and are wonderfully fine examples of "timber framed" building of that date. The house, No. 14, Rue des Nobles, contains a magnificent entrance hall and staircase. The newel is composed of a single piece of timber, about sixty feet high, and the whole is covered

with carving, the various stages being marked by large statues of saints standing under rich canopies. A portion of the hall is screened off with ancient panelling, and serves the purpose of a kitchen. The timber framing is visible over the whole of this hall, and it has a roof supported by two arched principals, resting on carved corbels. This is the most elaborate piece of Gothic domestic work Mr. Brewer had ever seen, and probably dates from the end of the fifteenth century. There are several other staircases of the same description at Morlaix, but this is said to be the finest and the best preserved. Leaving Morlaix by the road, which passes under the great viaduct at about a mile distant from the town, is the hospital of Notre Dame des Victoires. The chapel alone is ancient; it is Flamboyant in style, consisting of a nave and one aisle, separated by an arcade of pointed arches resting upon octagonal piers; the choir is formed by a screen wall, some 15ft. high, which divides the church into two nearly equal portions, the eastern of which forms the choir for the nuns who serve the hospital, and an altar for the laity stands against the screen wall; there is no rood, and the face of the wall has been ornamented (?) with some terribly bad sham tracery. Along the side walls are a number of arched recesses and aumbries, probably intended originally for altars, as there are no signs of their having been tombs. The great beauty, however, of this church is its glorious stained glass; the east and west windows are full of it, and nearly all the side windows contain large fragments. It is all Flamboyant in style, and is remarkably brilliant; the east and west windows have small subjects placed in rich tabernacles. Pursuing this road for a few miles one passes an extraordinary number of ancient Calvary crosses, some of which may date as far back as the fourteenth century. This part of Brittany possesses as great a number of ancient churches as Northamptonshire and some parts of Norfolk. The most remarkable ones are those at S. Jean du Doigt, Plougasnon, Roscoff, S. Thegonec, Guimellieu, Landerneau, and the cathedral and church of Kreisker at S. Pol de Leon. The villages in which many of these churches are situated are also exceedingly interesting. S. Jean du Doigt is a small village situated in a beautiful dell about a mile from the sea; its church, which attracts a large pilgrimage, takes its name from a finger of S. John the Baptist, preserved over the altar. The building is one of great interest and not a little beauty. It consists of a nave and isles under one external roof, a transept on the south side, a fine tower surmounted by a lead spire, and four pinnacles of the same material, and a very fine Flamboyant porch. Internally the effect is very fine, from the great height of the nave, which is separated from the aisles by two arcades of well moulded arches, resting upon lofty piers, which are alternately octagonal and quatrefoil in plan. The east window is of six lights, and the upper part is filled in with a large circle containing tracery forming a star. A heavy transom cuts the lights just below the springing of the arched heads of the tracery; this is a common feature in Brittany, and to the author's mind a very ugly one, especially when it is used as it is in some of the side windows of this church, where the tracery above it is arranged so as to accommodate itself to a four-light window, but the mullions below the transom only divide the window into three lights. A more eccentric and hideous notion could not be well conceived. When he first saw it Mr. Brewer directly put it down as some bungling piece of restoration, but he found afterwards that it was far from being an uncommon treatment. There is no chancel arch, but the chancel is marked off from the nave by a rood beam, supporting an ancient rood and attendant figures, and a modern screen about 8ft. high, of very good design, the upper part of which is pierced with tracery, enclosed in triangular compartments; the stalls are also modern, but are well carved. The reredos is a work of the latter part of the seventeenth century, and though in the style of that period it gives a very rich appearance to the interior, and is not without considerable merit in its way. Attached to the second pillar from the west end on either side are large and very richly-moulded responds, which were evidently intended to carry an arch, but it is equally evident that this arch was never constructed, as these responds stop abruptly at the height of the capitals, and there are no marks upon the walls to indicate that there has ever been anything above them. It is a question in Mr. Brewer's

mind whether originally the church was not intended to have been much larger than at present, and whether this was not intended to have served as a chancel arch. It is true the choir, in that case, would have been very large, five bays in depth, and the idea is only tenable upon the supposition that the church was commenced upon a large scale, and the original plan abandoned. The details of these responds are remarkably like English Perpendicular work. The lower story of the tower is vaulted, and forms a baptistery, containing a fine double font of rather peculiar design. The tower is a fine example of Flamboyant work, and is ornamented with open galleries marking its various stages; the belfry windows are long and graceful, and the upper story is crowned by a finely-carved cornice, bearing up a pierced parapet; the spire, although of lead, is crocketed all the way up, which is a very unusual treatment. An inscription on the porch states that the foundation-stone of this church was laid in the year 1440, and that the church was completed and consecrated in 1513. The cemetery in which this interesting church is situated is one of the most remarkable in Brittany; it is entered through a very fine Flamboyant gateway, called here the arch of triumph; this gateway is flanked by pinnacled buttresses and canopied niches containing statues; on one side of it there is a semi-circular headed arch, with an ancient stone stile beneath it; a richly carved cornice runs along the top of the gateway, over which is a high stone coping, with pinnacles at either end. The village of S. Jean du Doigt is composed almost entirely of ancient mediæval houses, probably coeval with the church, and they are most interesting examples of the cottage architecture of the middle ages, and show that, while noble cathedrals and lordly castles were being erected, the humble agriculturist built himself his substantial comfortable cottage; nor are these cottages peculiar to S. Jean du Doigt, they are to be seen in all the villages in that part of Brittany; they are chiefly built of granite, and generally have small ogée-headed doorways, and two-light windows, with the heads rounded at the angles, and sometimes pinched up into a kind of ogée form in the centre; the roofs are high pitched, and composed of solid beams of chestnut; they are very superior to the style of cottage architecture we see in the present day. About two miles from S. Jean du Doigt is another wonderfully interesting church and village, called Plougasnou. The church consists of a nave and aisles, chancel and side chapels, and a lofty stone spire at the west end. The church is Flamboyant, but the tower and spire are good examples of Breton Renaissance work. There is a small transeptal chapel opening out of the south aisle, which bears so remarkable a resemblance to some portions of Rosslyn Chapel, that Mr. Brewer was led to believe that it must be by the same architect. There are the same Gothic barrel-vaults of stone, the same pendants hanging down from the crown of the vault, the same curiously moulded shafts, with the same flat carving in the caps—in fact, so great is the similarity, that he felt convinced they had some common origin. The church contains the remains of a wooden rood loft and stalls of the sixteenth century, and some good stained-glass in the east window. The interior has a very English look. The churchyard contains a curious chapel, with the sides open to the air; but the apse is pierced with little windows, curiously vaulted in wood, and a cross with a pulpit attached. The Church of Laumuir, very near to the last-named, contains a very singular Romanesque crypt, with rude representations of trees or monsters on the columns. The Church of S. Thegonec, a few miles to the east of this, is perhaps the finest example of Breton Renaissance work to be found; and it stands in a churchyard surrounded with most singular buildings. The triumphal arch by which the cemetery is approached is a most elaborate structure; it is flanked by huge buttresses, carried up to a great height and terminating in open turrets, covered with domes, which are again surrounded by open lanterns, crowned with smaller domes, the whole terminating in large stone orbs and crosses. Between these buttresses is a series of niches above the arched gateway, and these are capped with three singular pediments, behind the centre one of which rises a tall obelisk surmounted by a cross. This triumphal arch has on either side of it a large stone stile about ten feet wide, and these are again flanked with buttresses similar to those already described. Close to the buttress on the left hand rises the remarkable gabled apse

of the mortuary chapel, crowned with open pinnacles and a large domical turret in the centre. It is singular that although this chapel is a mixture of Gothic and Renaissance work, the tracery of the windows is perfectly pure Third Pointed work. Behind these rise up the magnificent square tower of the church, crowned with five domes and a lofty open lantern, and further on still the pierced thirteenth century spire, attached to the west gable of the church. Looking between the great buttresses of the triumphal arch and the stiles, one sees the great Calvary in the churchyard with its three lofty crosses and crowd of attendant figures, the elaborate entrance porch and the remarkable gabled aisles of the nave. A more extraordinary picture of architectural richness and a more perfect confusion of picturesque forms it is difficult to imagine than that presented to one's view when first coming in sight of this most remarkable church and cemetery. The church itself consists of a nave and aisles, transepts, and an apsidal chancel (the latter is rather an uncommon feature in this part of Brittany.) There is a large and very grand square tower of Renaissance work, with a porch beneath it, attached to the south aisle, and an old thirteenth or very early fourteenth century tower and spire at the north-west angle of the nave. The following are the dates upon some portions of the buildings. Tower, 1605; Triumphal Arch, 1587; Ossuary, 1677; Calvary, 1610. Both the church and the surrounding buildings are entirely of granite. About three miles from S. Thegonec is another equally singular church, that of Guimillieu; it is not so large a building as S. Thegonec, but possesses a still more wonderful calvary and ossuary. The church itself has a pretty little early spire of a very common Breton type; it is a singular compromise between a bell gable and a spire—a kind of combination of both. Within the church there is a magnificent Renaissance canopy over the front, and a superb organ of the same date. The calvary dates from the years 1581 and 1588, the ossuary bears the date 1648, the porch, which is a very fine one, 1605. The priest at Guimillieu says that some years ago the churches in this neighbourhood were full of the most beautiful Renaissance furniture and wood carving, and that just before he was appointed to his cure at Guimillieu the stalls had been removed out of the church and sold by a kind of local commission, who are called the "guardians of the fabrick!" and are appointed by the Government to take care of the churches. This good curé was only appointed just in time to save the font cover and organ case sharing the same fate, for they had been sold to an English gentleman, and it was only by going to Paris and making a personal representation of the matter to the Minister of Public Works, that this act of barbarity was put a stop to. Mr. Brewer said he was indebted to the Curé of Guimillieu for a very valuable piece of information respecting the numerous fine churches, calvaries, &c., erected in Brittany during the latter part of the sixteenth century, and the first few years of the seventeenth. It is remarkable to find ecclesiastical buildings of this date as it was anything but a church-building age. According to his information, and also to local tradition, these buildings were all erected by a confraternity called the "Builders of the House of God;" they were composed of architects, sculptors and masons, bound by vows of poverty, who went about from place to place, and erected churches and religious monuments wherever they were required, upon the condition that the inhabitants of the places where they went should supply them with food and clothing; and certainly without some aid of this kind, it would have been impossible for the Bretons, who were a very poor people, to have erected such works as the church and triumphal arch and mortuary chapel at S. Thegonec; the church, calvary, and ossuary at Guimillieu, the calvary and church-tower of Plougastel-Dowlas, the fine spire of the churches at Laudisvisen, and the porch and spire of the church at Lampaul, the church and calvary of Pleyben, and many other monuments of the same date scattered all over this portion of the country. The only place of importance between Guimillieu and Brest is the market town of Landernau, a picturesque old town with two churches. The smaller and more ancient one dates from the end of the fifteenth century; it has a good spire, bearing the date 1607, and some very fair Flamboyant stained glass in its east window. There is also an ossuary and a small calvary in the churchyard. The other and larger church at Landernau is

dedicated to S. Houardon, and dates from 1589. This building stood originally in a part of the town which is deserted and has fallen into ruin; and in the year 1856 it was taken down and very carefully reconstructed on its present site. The building has suffered far less from this operation than might have been supposed. The tower and porch are very fine examples of Breton Renaissance work, and as the tower is typical of many in the neighbourhood, Mr. Brewer described it. At the west end of the church are two very deep external buttresses, and two internal ones of the same dimensions; these are carried up and form the lateral—i.e., north and south walls of the tower—a wall connecting these in the centre is carried upon the gable end of the church, of which it is a kind of continuation. Thus the walls of the tower form the letter H in plan. The lateral walls are left quite solid, but the connecting wall is pierced with rows of arcades one above the other. At the top two immense cornices project from the surface of the connecting wall till they reach rather beyond the angles formed by the lateral walls, and thus form a stone platform, which is nearly square in plan; upon this is placed a square lantern of similar plan, and the arrangement of cornice and platform are again repeated, but this time they support an elegant octagonal lantern several stories high, and four turrets, all crowned with domes. The effect is very remarkable but decidedly picturesque, the great mass of shadow below the cornices contrasts well with the flat side walls, and gives a great look of lightness and elegance to the crowning lantern and pinnacles. Towers of this description in Brittany are often carried to a great height; the one at Landernau is considerably over 200ft. high. Not far from Landernau, in a dreary and desolate situation, stands the celebrated church of Notre Dame de Folgoat; it is a fine Second Pointed building of rather singular plan, and consisting of a nave and aisles, under one external roof, with two western towers, a short choir and aisles, and a long and important looking south transept at the extreme east end. The church has three very magnificent porches adorned with sculpture executed in the black Kersanton stone. The north-west tower is crowned by a spire of great beauty 160ft. high. On the whole, Mr. Brewer was rather disappointed with this church, for although it is undoubtedly a fine building, it does not deserve the lavish praise bestowed upon it by Murray's and other guide books, and he could not conceive how any one can be enthusiastic, as some of the guide writers appeared to be, about the Kersanton stone, which is exactly the colour of cast iron, and looks so like that very inartistic material that the rood screen at Folgoat has the appearance of having been just turned out of a Birmingham factory. The small port of Roscoff, not far from here, is of interest to Englishmen from the fact that it was here Mary Stuart landed when she went over to France to marry the Dauphin, afterwards Henry II., in 1548. The chapel dedicated to St. Ninian, which she erected in commemoration of her landing, is now in ruins, and is sadly neglected; it is a small building about 46ft. by 20ft., and what is so singular about it is the fact that although its architecture is thoroughly English, it is English work of the fourteenth century, and has nothing whatever in common with English or Scotch work of the sixteenth century. The west doorway is ogee-headed, and has mouldings singularly suggestive of Northamptonshire work of the fourteenth century; the east window is the regular three-light curvilinear network tracery window, exactly similar to that at Tyrsol, in Warwickshire, and so common through all the Midland Counties of England. The small hospital adjoining this chapel, and which is also said to have been founded by Mary Stuart, is quite in the architecture of the time, a mixture of very late Flamboyant and Renaissance work. Were there not documentary evidence clearly establishing the fact that this chapel was built by order of Queen Mary of Scotland, Mr. Brewer would feel inclined to dispute the point, and should believe the date of the building to be at least two centuries earlier. The church of Roscoff has a tower of very similar type to that of Landernau, with the date 1550 upon it. Mr. Brewer concluded by giving an account of the ancient episcopal city of St. Pol de Leon. This town is of great antiquity. It appears that there was a Roman settlement here as early as the second century, called Castellum Leonensi, but it was either abandoned or depopulated at the commencement of the sixth century, for when the S. Pol visited it first in the

year 530, he found only the remains of the earth ramparts, and the only inhabitants he could discover were a sow with a litter of young pigs, a swarm of bees in a hollow tree, a savage bear, and a mad bull. The city of S. Pol de Leon was frequently in the hands of the English during the middle ages, and this may account for some of the architectural peculiarities which the author proceeded to point out. The Cathedral of S. Pol de Leon is a fine church, consisting of a nave and aisles, western towers, transepts, a long choir and aisles, terminating in a chevet with radiating chapels. The western arch of the crossing carries a large sanctus bell-cot of stone, and is flanked by two lofty octagonal turrets. The western towers are surmounted with stone spires of dissimilar design, pierced with many cusped openings; the belfry windows are long and shafted; the western end, not a very striking composition, has a gallery for giving the episcopal benediction from; and one of the doorways under the south tower is called the "leper's door." The clerestory of the nave is supported by flying buttresses, and a large chapel dedicated to S. Michael projects from the south side aisle; the south transept end contains a most magnificent rose window; it is of fully developed Decorated work, and is said to be composed entirely of granite; the apse is not very striking externally. The effect upon entering this cathedral quite astonishes one. The nave is like the best English late thirteenth century work, and very much reminded one of Wells. The length of the church is given in a History of Brittany which he had seen, as being 260 feet, and the height to the vaulting only 52 feet, but to judge from the effect produced by the interior, he should have thought that the height was at least 13 feet more, and the length greater by nearly a hundred feet. It was one of the most pleasing interiors he had ever seen, and all the parts seem to harmonise most admirably. The proportions are singularly satisfactory, and although the height is small, it is amply sufficient. The transepts are rather later than the nave, and the choir again later still; in fact the choir is said not to have been completed before the year 1431; it is a very fine example of Late Second Pointed work, with richly moulded arches; in fact one of the features which gives this interior such a thoroughly satisfactory effect, is the great richness of the mouldings in every part of it. The arches of the apse are not stilted as is the usual plan in France, but are very acutely pointed. The aisles and chapels are all simply but effectively vaulted. This church is rich in ancient furniture. The choir stalls, which are said to date from the year 1430, are remarkably fine, and rather like very excellent German work than either French or English work. They are in a remarkable state of preservation. The church possesses few of the peculiarities of Breton architecture, and Mr. Brewer was inclined to think that its architects were Normans; its architecture bears some resemblance to that of the cathedral at Coutances; another peculiarity is the fact that granite is not much used, and the Kersanton stone not at all; the whole of the interior is of a fine white stone, probably Caen stone, whereas at Dol, which is of pretty much the same date, nothing but granite is used. The apse and chevet, again, are uncommon features in Brittany, and although it is true the choir is later than the nave, there is such a harmony about the whole church that probably the same general design was carried through from the first, only the detail varied to suit the taste of the age. S. Pol de Leon contains another very remarkable church, the collegiate church of Notre Dame de Kreisker. This building consists of a nave and one aisle transepts, a rather shallow choir, and one side chapel. Over the crossing is a lofty tower and spire, 260ft. high, and a large north porch; this church dates from the years 1345 and 1399, and it is said that Mary, the wife of John IV., Duke of Brittany, sent over for an English architect to construct the spire! Now the peculiarity of the matter is that the spire is exactly the part of the church which is entirely unlike English work, whereas the columns and arches which divide the nave from its aisles, and other portions of the interior, bear a strong resemblance to English work. The columns are octagonal, and have octagonal moulded capitals, not of the best English time, but very like what one sees in churches in the north of Kent; the east window, again, bears a strong resemblance to that of Lincoln Cathedral, except that it has only six lights instead of eight and has an ugly

transom cutting it through, about two feet below the springing of the tracery. Of course, the churches of Brittany cannot be compared to the magnificent edifices of the same class in other parts of France; but they are the modest and earnest works of a pious, industrious, and thoughtful people, who, though labouring under great disadvantages and against nearly insurmountable difficulties—always poor, always a prey to the foreign invader, in a bare, barren, and bleak country, and with only coarse materials at hand—managed to stamp a certain character of originality and genuineness upon their work, which must commend them to our respect and admiration.

A brief discussion ensued, in which Mr. West, Mr. Bailey, Mr. Brooks, Mr. Cooke, R.A., Mr. Phené Spiers, Mr. Thomas Morris, and the Chairman took part; and Mr. Brewer having said a few words in reply, the meeting terminated with the announcement that the annual general meeting (of members only) will be held on Monday, May 5.

PROPOSED ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

ON Saturday afternoon last the second general meeting of engineers and surveyors to the various corporations of the kingdom was held at the Union Hotel, Union-street, Birmingham, for the purpose of furthering the objects and increasing the membership of the proposed Association of Municipal and Sanitary Engineers and Surveyors.

Mr. Angell, member of the Institute of Civil Engineers, engineer to the West Ham Local Board, London, and Chairman *pro tem.* of the Association, presided; and the following towns were represented:—Southampton, Coventry, Leicester, Leamington, Balsall Heath and Aston Manor (Birmingham), Stockport, Great Malvern, Redditch, Stow-on-the-Wold, Walsall, Willenhall, Ealing, Hanley, Warwick, Rugby, Oldbury, and Wolverhampton.

Mr. Edward Pritchard, Assoc. Inst. C.E., surveyor to the Warwick Corporation, who has been acting as hon. secretary for the district, read the following, which had been adopted at the first general meeting held at the Institution of Civil Engineers, London, February 15th. "1. That the society be named the 'Association of Municipal and Sanitary Engineers and Surveyors.' 2. That the objects of the Association be—
a. The promotion and interchange among its members of that species of knowledge and practice which falls within the department of an engineer and surveyor engaged in the discharge of the duties imposed by the Public Health, Local Government, and other Sanitary Acts. b. The promotion of the professional interests of the members. c. The general promotion of the objects of sanitary science."

The Chairman explained the *modus operandi* of the Association. The first annual meeting of members would be held at the Institution of Civil Engineers, Westminster, London, on the 2nd of May, when the president, vice-president, and officers would be elected, and the executive council would also be appointed. The country would be divided into districts, each district appointing its own secretary, who would be a member of the executive council. Birmingham would be the centre of one of the Midland districts, and Mr. Pritchard had hitherto acted as its honorary secretary. He spoke at some length on the need there was for the formation of such an association as the above, for while town-clerks and other public officers had their societies, there had never yet been any organised body of engineers and surveyors. Under the Public Health Act, the duties of borough engineers and surveyors would even be more constantly needed than before in assisting the medical officers of health, and so the sanitary authorities of the country, as well as the public in general, would benefit by the formation of such an association as the above, whereby an interchange of thought between the surveyors of the kingdom might be obtained.

A discussion followed the speech by the Chairman, in which several matters of detail were gone into, and ultimately it was decided to agree to the rules of the association, as adopted by the meeting held in London on the 15th of February, and the meeting also expressed a hope that as many surveyors of the country as could possibly make it convenient, would attend the inaugural meeting of the Association, to be held in London, on the 2nd proximo.

THE WORK OF THE CITY SEWERS COMMISSION DURING 1872.

IF of less extent than the area embraced by the jurisdiction of the Metropolitan Board of Works, that under the sway of the City of London Sewers Commission is looked after and reported on by their vigilant engineer and surveyor Mr. William Haywood, with a watchfulness and care not a whit inferior to that exercised by the Metropolitan Board.

The total length of sewers constructed in the City during 1872, was 1,107ft. of which 596ft. were upon the line of old sewers. Considerable alterations were made to the sewers in Thames-street, but this work was done, as elsewhere stated, by the Metropolitan Board of Works in completing their system of sewerage. Various improvements in widening thoroughfares have been effected. Among the more important may be mentioned the site of the church of S. Mildred, in the Poultry, the frontage of which has been set back to the line of the improvement now being carried out in that street. Arrangements have been completed for enlarging the public way on the western front of S. Paul's Cathedral. The improvement will commence on both sides at the western angles of the Cathedral, and will enable the street gradients between those points and the top of Ludgate-hill to be amended, and the large space thrown open will very much facilitate the general traffic. The improvement also includes the entire removal of the railings on the western front, and we heartily concur with Mr. Haywood in hoping that this may speedily lead to the removal of the remainder of the iron railings from around the Cathedral. A healthy activity has lately characterised the action of the Cathedral authorities in their efforts to render the Cathedral the principal church of the Metropolis, and in no better outward and visible manner can this be manifested than in the demolition of the heavy railing that has so long seemed to fence it from the people in exclusive idleness.

The experiments in the use of asphalt as a paving material have in some cases been brought to unfavourable terminations. MacDonnell's Adamantean Pavement, laid down in Carter-lane in 1872, has proved anything but adamantean, and in September last was taken up and replaced by Barnett's Iron Asphalt. Of the four specimens of Asphalt laid down side by side in Princes-street, two have proved unsuitable, viz., the Trinidad and British Alphas; the others—that supplied by the Société Française des Asphaltes, and the Montrotier, are as yet in good condition. Asphalt has also been introduced as a foot pavement with good results. The experiments with several kinds of wood pavement are being continued, but no definite conclusion as to their merits appears to have been arrived at.

The scavenging system is still carried on by the Commission by the agency of its own servants, and of the efficiency and regularity with which it is performed there is no need to speak. The question of street-washing has already been separately reported on by Mr. Haywood this year, and his conclusions recorded in these pages.

The New Mortuary Buildings which were opened in Golden-lane, in April, 1872, are answering their requirements. The number of interments at the City Cemetery, Ilford, was 9,797—ten less than the number in the year preceding.

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association on Friday evening last, Mr. E. J. Tarver, Vice-President, in the chair, Messrs. G. W. Webb and F. Castledine were elected members. Mr. Lacy W. Ridge having made a statement in reference to the late Architectural Art Classes, he said that, in the absence of Mr. Burges, Mr. Waterhouse, and Mr. Seddon, it devolved upon him to present the prizes to successful students during the last term. The Royal Institute of British Architects' prize to members of the Figure Class was won by Mr. J. Wager, and honourable mention was awarded to the studies by Mr. H. Frame. The Architectural Museum prize was awarded to Mr. Mallet for the best set of studies from the Antique. The Architectural Association prize was awarded to Mr. Cudworth, for the best set of drawings sent in by members of the Ornament Class; honourable mention was also made of the four very careful but rather elaborate drawings sent in by Mr. Pink in competition for this prize. Mr. Phené Spiers then read an interesting paper on "The Palace of Scarus," a report of which, accompanied by a plan, will appear next week.

ROYAL INSTITUTE OF BRITISH ARCHITECTS. SUBJECTS FOR MEDALS AND PRIZES, 1873-74.

ROYAL MEDAL.—Her Majesty having been pleased to grant her gracious permission that a Royal medal be annually conferred on such distinguished architect or man of science of any country as may have designed or executed any building of high merit, or produced a work tending to promote or facilitate the knowledge of architecture or the various branches of science connected therewith, the Council will proceed in January next to take into consideration the appropriation of the Royal medal for 1873-4.

At the special General Meeting, held on Monday, the 3rd March, 1873, the following recommendations of Council, with reference to the medals and prizes for the year 1873-4, were read and agreed to:—

SOANE MEDALLION.—That the Soane medallion and, under the usual conditions, the sum of £50, be awarded to the author of the best design on the following subject: "A London residence situated between houses of a corresponding character and plan, with a frontage of 45ft. and a depth of 120ft., inclusive of the front area, and exclusive of the space devoted to stables; in five stories above level of street." The materials to be stone, brick, or terra-cotta. The following drawings to $\frac{1}{4}$ in. scale will be required:—1 elevation, 1 longitudinal section passing through staircase, 1 plan of basement, 1 plan of ground-floor, 1 plan of principal floor, 1 plan of bed-chamber floor; and 1 plan of drawing-room ceiling to $\frac{1}{2}$ -inch scale, 1 perspective of drawing-room, and 1 perspective of dining-room. The foregoing drawings only will be required, and no others will be examined in reference to the award. The drawings (with the exception of the plans and sectional portions) to be in outline only, and mounted on strainers, in order that they may be hung with facility. The further award of £50 will be made to the successful competitor upon satisfactory arrangements being made for his going abroad for a period of six months to pursue his architectural studies within two years after receiving the medallion. The £50 will be paid in two instalments of £25 each: the first when the Soane medallist leaves England for the Continent; and the second when he shall have submitted to the Council satisfactory evidence of his studies abroad, in the form of drawings and sketches, after an absence of six months. [The competition for the Soane Medallion is open to all members of the profession under the age of thirty years.]

INSTITUTE MEDAL AND FIVE GUINEAS.—That the Silver Medal of the Institute, with £5. 6s., be also awarded for the best illustrations, geometrically drawn from actual measurement (with dimensions figured, both on the drawings showing the general arrangements, and on the details), together with descriptive particulars of any building of importance—Classic or Mediæval—in the United Kingdom or abroad, hitherto unpublished in that manner. The Council suggest the following as being subjects worthy of illustration, but others may equally well be taken, if more convenient to the competitor:—Ireland: Cashel Cathedral, Christchurch Cathedral, or any monastic or conventual building. Kent: Bayham Abbey, near Tunbridge Wells; Hever Castle. London: S. Mark's Church, North Audley-street. Middlesex: front of Dover House, Whitehall; Law Fire Office, Chancery-lane; Entrance gateway, Middle Temple-lane; Temple Bar. Northamptonshire: Warmington Church. Nottinghamshire: Steeples of Grantham and Newark. Scotland: Dryburgh or Melrose Abbey. Suffolk: Lavenham Church; Long Melford Church. Wales: S. David's Cathedral. The drawings to consist of at least one plan drawn to the scale of $\frac{1}{4}$ in. or (in the case of very large buildings) 1-16th of an inch to the foot, an elevation and a section drawn to the scale of $\frac{1}{4}$ of an inch to the foot, with details to a scale of half an inch to a foot, and mouldings one-fourth full size. The elevations to be in line without shade lines, the plans and sectional portions to be tinted in sepia. Perspective drawings may also be sent, and may be tinted in sepia or Indian ink. The jointing of the masonry is to be particularly marked, together with the mode of construction and materials used. It is strongly recommended that the rough drawings be plotted on the spot, and sent up to the Institute with the fair drawings. [This medal is open to all members of the profession, without limitation as to age.]

INSTITUTE MEDAL.—That the Silver Medal of the Institute be awarded to the author of the best Essay on the following subject: "The Architecture of London in the Sixteenth Century." A Medal of Merit may be awarded for any other essay or essays, if deemed worthy, upon suitable subjects selected by the authors themselves, without limit of number. All the essays to be written *very legibly* on alternate pages of lined foolscap paper, and to be accompanied by suitable illustrations.

STUDENTS' PRIZE.—(For Students of the Institute only).—That the Students' Prize in Books be awarded to the author of the best design for the following subject:—"An oak ceiling over a dining-room, 38ft. long by 20ft. wide, with a recess for sideboard not more than 3ft. deep." The drawings to be executed to half-inch scale, and tinted in monochrome or colours, as may best illustrate the design.

GENERAL DIRECTIONS FOR COMPETITORS.—Each essay and set of drawings is to be distinguished only by a motto, without the name of the author attached; and is to be accompanied by a letter, sealed with a blank seal, and having on the outside the same motto as that attached to the essay or drawings, and inclosing his name, with an address to which a commu-

lication may be sent. The packet directed, "To the Secretaries of the Royal Institute of British Architects," and marked "Essay for Medal" (or) "Drawings for Medal" (Motto), is to be delivered at the rooms of the Institute on or before the 31st of January, 1874, carriage and all expenses paid. Drawings, when possible, should be mounted on strainers, in order that they may be properly hung. The names of the successful competitors alone will be made known. Should none of the essays, drawings, subjects, or buildings respectively, be deemed by the Institute of sufficient merit and importance to deserve the distinction of the premium offered in each case, the right is reserved of awarding such other premium in lieu thereof, as may be deemed fit, or of withholding it altogether; and if the best essay or drawings should be by a candidate who has been successful on a former occasion, the power is reserved of adjudging such other reward as may be thought fit, and of awarding the medals to the second in merit. All essays and drawings will be returned to all the candidates, on application, to the unsuccessful after the adjudication, and to the successful after the presentation of the medal or prize. Copies of the premiated essays, and photographs of the perspective views or principal drawings to which a prize is awarded, will be required to be furnished by each of the successful competitors, for deposit in the Institute Library before Midsummer, 1874. [Strict compliance with all the above directions is required.]

PUGIL TRAVELLING STUDENTSHIP.—Candidates for the above studentship are requested to send in their applications, together with specimens of drawing, testimonials, &c., as required by the Deed of Trust, (copies of which can be previously obtained at the Institute) on or before 25th January, 1874. Extract from the Schedule appended to the Deed of Trust:—"Every person of whatever nation shall be eligible as Student, who shall be more than eighteen and less than twenty-five years of age, provided that he give to the Electors satisfactory evidence of his moral character, and satisfy them that he is a Student of Architecture, *bona fide* intending to practice the profession of an architect, and that he exhibit specimens of his drawings and state the district of the country which he proposes to visit, and the class of buildings which he intends to study."

Any further information may be had on application to the secretary, Mr. Charles L. Eastlake, at the rooms of the Institute, 9, Conduit-street, Hanover-square.

PARLIAMENTARY NOTES.

THE HOUSES OF PARLIAMENT.—On Monday Mr. Anderson asked if anything was being done to check the decay of the stonework of the Houses of Parliament.—Mr. Ayrton said steps were being taken to arrest the decay of the stone, and where it was so defective that it could not be painted, it was replaced with good stone.—Colonel W. Patten observed that the decay was going on very rapidly, and it was important to know whether the experiment had been successful in any way.—Mr. Ayrton said it had to a considerable extent. Time was, however, the only test. The first experiments made some years ago were not adequately recorded. No steps were taken to ascertain the nature of the materials and the mode in which they were used; but it was now proposed to proceed in a more methodical manner.

THE NEW HOME AND COLONIAL OFFICES.—On the vote of £48,000 for the erection of new offices in Downing-street for the Home and Colonial departments, &c., Mr. Bowring asked whether the buildings would be completed for the original estimate. He desired also to know whether the buildings were rectangular.—Mr. Ayrton believed that the original estimate would not be exceeded. With respect to the other question he would remind the hon. gentleman that the line of Downing-street was not the line of Parliament-street, and the building was not precisely what could be called a regular building.—The vote was agreed to.

VARIOUS WORKS.—The following votes were also passed:—£11,840 for Sheriffs' Courts in Scotland, £35,425 for works connected with the National Gallery, £16,500 for new buildings connected with the University of Glasgow, £7,700 for the Industrial Museum at Edinburgh, £130,307 for the new Post-Office and Revenue offices, and £16,272 for buildings in connection with the Department of Science and Art.

THE ORDNANCE SURVEY.—On the question that £107,210 be granted towards the completion of the Ordnance survey, Mr. F. S. Powell asked when the survey was expected to be completed. The whole country bore the expense, but a portion of the country did not reap the benefit of the undertaking.—Mr. Ayrton replied that the survey would probably be completed in ten or twelve years. The vote was agreed to.

THE NEW LAW COURTS.—On the sum of £68,800, required for the year for the purchase

of a site, erection of building, and other expenses for the new courts of justice, &c., Mr. Selator-Booth said the total estimate for the erection of the building, &c., was £750,000, and there had been expended a sum of £32,000. He had been informed that tenders had recently been sent in for the erection of the courts ranging from £700,000 and a million of money, and if the tender accepted should exceed the statutory limit, he wished to know how it was proposed to get over the difficulty.—Mr. Ayrton said tenders had been received lately, and that the lowest sum exceeded £700,000. The tenders, having been recently received, were now under consideration, and the architect had been desired to see how far reductions could be made to bring the expenditure within the statutory limit. He was unable then to state what course it would be necessary to pursue under the circumstances.

—Mr. W. Hunt asked the First Commissioner of Works to state the amount of the lowest tender.—Mr. Ayrton said it was not expedient then to state the amount. He would endeavour to bring the sum within the limit authorised by Parliament.—Mr. W. Hunt said that being so, it was desirable that the consideration of the vote should be postponed.—Mr. Alderman Lawrence said that the cost of buildings of this kind had, within the last four or five years, increased at least 30 per cent. Their object should be, not to compress the building to meet the limits of the sum fixed, but to obtain a building according to the plans and specifications at the lowest possible cost of the day.—Mr. Ayrton said he would postpone the vote.—Mr. Whitwell said it would be very unwise to diminish the size and capacity of the building to bring the cost within the particular sum fixed on by Parliament. He expressed a hope that the widening of Temple-bar would be carried out.—Mr. Baxter moved that the Chairman report progress.—Mr. J. Goldsmid said it should be understood that the Law Courts ought to be completed at a cost commensurate with the style of the building and the accommodation to be given. An increase of £50,000 or £250,000 ought not to interfere in the erection of a suitable building.

THE WELLINGTON MONUMENT IN S. PAUL'S.—On the vote of £2,901 for the monument to the Duke of Wellington in course of erection in S. Paul's Cathedral, Mr. Goldney pointed out that the work upon the monument seemed to have come to a standstill, and that its completion had been delayed for a very long period. It was quite time that it should be properly taken in hand and completed.—The Chancellor of the Exchequer said this monument had led, from beginning to end, to a long series of misfortunes. Mr. Stevens was appointed by the last Government to execute the work; but though a good artist he was not a good financier, and he got into hopeless confusion with the payments which he had to make and receive. The work was therefore very much delayed, and Mr. Stevens became ill, when the contract was taken out of his hands and handed over to Mr. Coleman, who, however, was to employ Mr. Stevens in completing the work. Under that arrangement the work nearly approached completion, when Mr. Stevens had a paralytic attack, which had incapacitated him from work altogether; and what the Government now proposed to do was to call on Mr. Coleman to make other arrangements to complete the contract.—Mr. J. Goldsmid said he pointed out last year that Mr. Stevens was incapable of completing the work. The Government, however, ought to have appointed some other artist to carry it out, and not have left it in the hands of an upholsterer like Mr. Coleman.—The Chancellor of the Exchequer congratulated the hon. gentleman who had just sat down on his prescience in foreseeing that Mr. Stevens would have a paralytic stroke.—Mr. J. Goldsmid said that whenever Mr. Stevens was pressed to go on with the work he always fell ill.—Mr. Goldney thought that no more money should be voted until some definite arrangement had been made.—The Chancellor of the Exchequer said that only some castings remained to be done from figures already executed.—The vote was agreed to.

THE NEW NATURAL HISTORY MUSEUM.—Upon the vote of £57,000 to complete the sum for the Natural History Museum, Mr. H. Palmer drew attention to the desirability of building a museum for patents.—Mr. Dillwyn said that £395,000 would be wanted for the Natural History Museum; and he expressed the opinion that it would have been better to have found room for the collection by enlarging the British Museum.—Mr. Ayrton

explained that ten years ago the House deliberately voted that the ground for this museum should be purchased, and in 1866-7 Mr. Waterhouse, the architect, estimated the work at £508,000. Subsequently, this was reduced to £350,000, and later the revised estimate was for £395,000, and a contract for this amount was sanctioned.—Mr. W. Hunt asked when the contract was to be completed?—Mr. Ayrton said the time was within three years from the commencement of the present year. He added that the plans were now attached to the contract, but any hon. member could see them who wished. They had previously been exhibited in the library.—The vote was agreed to.

Building Intelligence.

CHURCHES AND CHAPELS.

BOURNEMOUTH.—The new church of S. Clement Bournemouth, was on Tuesday week consecrated by the Bishop of Winchester. The plan of the building consists of a spacious nave, with one broad aisle on the north side; a chancel, forty feet in length, separated by a lofty and richly carved rood screen. On the south side of the chancel are the sacristy, organ chamber, and choir vestry, communicating with one another and with the adjoining clergy-house by means of a covered cloister. On the north side of the chancel is a chantry, dedicated to the blessed Virgin and S. Anne, having open stone screens at the west and south sides. The style of architecture adopted is that of the latter half of the fourteenth century. The stained glass in the chapel is designed by Mr. Philip Westlake, and contains stones from the life of the blessed Virgin and her Old Testament types. The church has been built at the cost of £6,000, and is from the designs of Mr. John D. Sedding, of Bristol.

CHELMSFORD.—It is proposed to effect considerable improvements and alterations at S. Mary's Church, Chelmsford, at a cost of about £1,800. Mr. Chancellor, architect, has prepared a plan, providing for the building of a north aisle, the removal of the galleries, and the removal of the organ to the east end of the church. The plan also provides for the removal of the old spire.

INCORPORATED CHURCH BUILDING SOCIETY.—This Society held its usual monthly meeting on Monday last, at the Society's house, No. 7, Whitehall, S.W. Grants of money were made in aid of the following objects, viz.:—Building new churches, Bermondsey, S. Augustine, Surrey; Fulham, S. Andrew, Middlesex; Marston, in the parish of Great Budworth, Cheshire; Putney, All Saints', Surrey; and Wookey Hole, in the parish of S. Cuthbert, Wells; rebuilding the churches at Llantrissant, near Aberystwith, Cardigan; and Pontnewydd, near Pontypool, Monmouth; enlarging or otherwise increasing the accommodation in the churches at Barnwood, near Gloucester; Birley, near Leominster, Hereford; Durham, S. Giles; Long Houghton, near Bilton, Northumberland; Llangorse, near Talgarth, Brecon; Longney, near Gloucester; Southampton, S. Luke; Stogumber, near Taunton; Stonham Aspal, Suffolk; and Teddington, SS. Peter and Paul, Middlesex. Under urgent circumstances, the grants formerly made towards building the Church of S. John-the-Baptist, Stockton-on-Tees; rebuilding that of Hartford, near Great Budworth, Cheshire; and towards reseating and restoring the church at Middle Chinnock, near Ilminster, Somerset, were each increased. A grant was also made from the School-Church and Mission-House Fund towards building a school-church at Hammersmith, S. Paul, Middlesex. The Archbishop of Canterbury, President, has appointed Thursday, the 27th of May, for the annual general court of the Society, to be held at the Society's house, 7, Whitehall, at three o'clock.

NOTTING HILL.—Trinity Presbyterian Church, Kensington Park-road North, Notting Hill, has been reopened. The building is in restoration of a church partially burnt down a few years ago. The work was carried out by Messrs. Hill and Sons, builders, of Islington, under the superintendence of Mr. W. A. Boulnois, architect, of Waterloo-place, Regent-street. The church, which is an exceptionally lofty one, is fitted with hot water apparatus by Messrs. J. Jones and Sons.

WORCESTER CATHEDRAL.—In the last notice of the restoration in progress in Worcester Cathedral,

it was stated that the floor of the nave had been prepared with concrete, and was about to be paved with blue slate and white (Hopton-wood) stone. Lord Dudley, however, offered to defray the extra cost of laying the floor of the nave with marble. At the same time, it was proposed that the flooring intended for the nave should be used in the cloisters instead of tiles; and his lordship also offered to fill the great west window of the nave with stained-glass, and to execute, at his own cost, other important decorations—the colouring of the roof of choir aisles and the Lady Chapel and chancel transepts. Considerable progress has been made in the flooring of the nave, about one-half of which has already been laid with Sicilian white and Kilkenny black marble, in squares ranged in panels, and joined by Parian cement. The painted west window is now in the hands of Messrs. Hardman, of Birmingham; and the same artists are employed on the decorations of the roof of the Lady Chapel, the transepts, and choir aisles. The Lady Chapel roof had been but meanly coloured in comparison with the roof of the choir and chancel, only the tops and bottoms of the spandrels having been coloured, leaving the centre parts plain. That work is being replaced by richer colouring of a similar character to the colouring of the choir and chancel. The bare stone roof of the Lady Chapel (or Dean and Bishop's) transept has been covered with plaster, and is being coloured to harmonise with the colouring of the choir and chancel roof. The roof of the aisle of the choir and that of S. John's Chapel on the south side (formerly used as the vestry or robing-room) are also plastered ready for similar decorations. The descent from the north aisle of the choir to the Lady Chapel has been put back westwards about 3ft.; a new flight of stone steps has been built, and new light iron gates have been erected here. The choir aisles are being laid with alternate squares of slate and Hopton-wood stone. Considerable progress has been made in the richly-carved oak case of the organ, which occupies two of the bays on the north side of the choir. The carvings are by Farmer & Brindley, of Lambeth, the design being by Sir Gilbert Scott. The chapel of Prince Arthur, beyond cleansing and very slight repair, has been left untouched. The oak entrance door of the chapel has been cleansed of the thick coating of paint which formerly obscured the beauty of the carvings. In removing the stone pulpit in the choir for the purpose of reconstruction, a fortunate discovery was made. In the pulpit as it lately appeared, there were emblems on three of the panels of three of the Evangelists—SS. Matthew, Mark, and Luke—but that of S. John was missing. In taking down the structure, the fourth, that of S. John, was found partly hidden by other stonework. This will be restored in the remodelled pulpit now being erected.

YORKSHIRE DIOCESAN CHURCH BUILDING AND ENDOWMENT AID SOCIETY.—An ordinary meeting of the Central Committee of this Society was held in the vestry of York Minster on Thursday week. The following grants were made:—New churches: South Eston and Eston Mines, £210; Moss, parish of Fenwick, £58. Increase of accommodation: Waghen, £85, and £15 fabric grant; Swinefleet, Hull, £63, and £20 fabric grant; Campsall, Doncaster, £105. New parsonages: Kirby Wharfe, £100; Fulford, £150. Endowments: Saltburn-by-the-Sea, £300; St. Andrew's, Ulrome, Hull, £300; Moss, parish of Fenwick, £300.

YORK MINSTER.—Mr. G. E. Street, on Thursday week, paid another visit to York to inspect the progress of the restoration of the south transept of the Minster. The larger half of the west clerestory wall has been successfully taken down, and operations have been already commenced for rebuilding it in a more substantial manner than before. In taking down this wall a serious defect was discovered in one of the triforium arches, owing, no doubt, to the settling of the large lantern tower, which has injured the arch to a considerable degree, causing the joints to give way to the extent of between two and three inches. These joints had been filled up with pieces of wood and tile and plastered over to conceal the unsatisfactory appearance they presented. A flying arch, too, underneath the roof, springing from the outer wall of the nave, has probably been also instrumental in thrusting the triforium arch inwards, so that from the top of the capitals to the crown of the arch it overhangs more than five inches. This part Mr. Street has ordered to be taken out as far as practicable without danger to the other parts of the structure, and solidly re-

built. All the fissures throughout the length of the bay will be thoroughly grouted with Portland cement to give it more strength and stability. The abacus moulds of the large clustered columns have been discovered to be Purbeck marble, and these, with the marble columns, are now undergoing the process of polishing, which will add greatly to the beauty of the transept. To render the restoration complete, it has been suggested that the stone columns which have been coloured to represent marble should be superseded with real marble, but this would add greatly to the cost.

BUILDINGS.

BLACKWELL.—The Birmingham Sanatorium, near Blackwell, was opened on Wednesday week. The new buildings have been erected from the design of Messrs. Martin and Chamberlain, architects, of Birmingham. They are designed to accommodate fifty patients, and are three storeys in height. Kitchen apartments, with committee room and matron's room, are also provided at the back, but one story only in height, with a separate building for washing and laundry purposes, the latter buildings being only one story in height. The buildings are arranged with a vestibule and entrance hall at the back, leading into a corridor, communicating on the left with the females' apartments, staircase hall in connection with same, and on the right with the males' apartments, and staircase connected therewith. The height of the rooms from ground to first floor is 16ft. 2in., from first to second floor 16ft., and to the level of ceiling of second floor 11ft. 6in. The various rooms are warmed by means of open fireplaces, and the staircases and corridors by means of warm air from apparatus under kitchen. The ventilation is secured by flues connected to the various chimneys. The cost of the Sanatorium is about £14,000.

LONDON.—The memorial stone of a new hall for the Curriers' Company, in London Wall, was laid yesterday (Thursday) week. The old hall, on the same site (close to Sion College) has been taken down, together with some adjoining houses, and part of the ground is to be occupied with the new building; whilst on the remainder, which is more than is required for the purpose, some warehouses are to be built. The new hall is to be in the Tudor Gothic style, the material to be used being white brick, with stone dressings. The architect is Mr. John Belcher, and the builders Messrs. Perry.

WEST HARTLEPOOL.—On Thursday week, the foundation-stone of the Hartlepool Exchange was laid at West Hartlepool. The building is being erected by the New Exchange Company, Limited, who adopted the design of Mr. G. G. Hoskins, architect, Darlington. The building will have three frontages in Italian Gothic style, with bugle turrets; it will be of red pressed bricks, with stone dressings. Premises will be erected in the building for the West Hartlepool Post-office and also for the North Eastern Banking Company. The contractors are Messrs. Robson and Son, of Darlington.

SCHOOLS.

GREAT BADDOW, ESSEX.—New Schools are about to be commenced at Great Baddow, from plans by Mr. Chancellor, architect, Chelmsford. The builder is Mr. Gozzett, the amount of whose tender is £1,365.

NEWCASTLE.—The foundation-stone of New Schoolhouse, Vestry, and Keeper's Rooms, in connection with and adjoining to the Methodist New Connexion Chapel, Garden-street, Newcastle, was laid on Easter Monday, April 14th. The building will be erected from the designs and under the superintendence of Mr. Septimus Oswald, of Newcastle, who was architect for the chapel adjoining. The chapel is in the Early English style, and the schools are designed in harmony with it, but with features adapted to the scholastic and domestic purposes of the intended building. The contractor for the mason work is Mr. William Wilson, and for the joiner work, Mr. Robert Mattison.

PONTEFRAC.—On Wednesday week, Mr. Childers laid the foundation-stone of New National Infant Schools at Pontefract. The new buildings will cost about £700, and accommodate 250 children. Built of local stone, in the Gothic style of architecture, and one story high, they will be composed of a classroom 17ft. by 14ft., and a general schoolroom 50ft. by 20ft. The central portion of the schools will be surmounted by a bell turret. The architect of the buildings is Mr. Geo. Malcolm, Pontefract.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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DRUID.—The process is a secret, only known to a few.

E. E. BOISSIER.—See particulars in this number.

JNO. H.—We do not know who makes cymagraphics.

CHAS. H. BURLEIGH, architect, of Worcester, Massachusetts, in a letter, says:—"The BUILDING NEWS was good before the enlargement, but now it is indispensable, and I trust you may long continue at the head of architectural publications, and receive an endowment of prosperity in excess of all anticipation." Since our enlargement in January last, we have received hundreds of similar testimonies; but the above was so well worded that we could not resist the temptation of quoting it.

J. K. J.—Drawing to hand, and returned.

P. and K.—Drawing to hand.

G. P. BLAND (West Phila., U.S.)—We can only supply the numbers from the date of the first one sent.

THOS. OTTIS.—We do not know.

J. V., Exeter.—We cannot and will not turn our "Intercommunication" column into an advertising medium. There has been a suspicious look about several communications which have spoken of the stone supplied by the firm mentioned by you. Any more attempts at such a mode of puffing will be publicly rebuked.

Correspondence.

BOARD SCHOOLS OF LEEDS, &c.

To the Editor of the BUILDING NEWS.

SIR,—It may be as well to supplement your account of the Board Schools of Leeds in your issue of April 11th, with the following particulars:—In the first instance, the School Board advertised for plans of a school for 700 children. No site had been obtained; but an imaginary one, containing 2,500 yards, was prescribed. My design was the only one, so far as I recollect, which proposed wide school-rooms (30ft.), and it was chosen by the board.

After some time, I was commissioned to prepare plans for a school in Beverley-street—which is now in course of completion—for 854 children in three departments. This is the first Board School erected in Leeds.

Messrs. Henman and Alexander, who obtained the second premium, had the erection of the second school put into their hands. The Board then selected two other Leeds architects, without

competition, to prepare plans for two other schools, which are also in course of erection. These are each to accommodate about 600 children; and one of them is upon exactly the same plan as the first school. None of the above-named schools are noticed in your description.

The Board then reverted to the competition system, and invited twelve Leeds architects to compete for three schools, to accommodate respectively 1,000, 600, and 400 children. The Board selected my design for the (Green Lane) largest school, and Mr. Backhouse's for the smallest; and, after some time, the design of Messrs. Adams and Kelly was adopted for the Jack Lane School, on the ground of economy, their estimate being £4,000, against an average of about £6,000. The accepted estimates are, however, about £4,800.—I am, Sir, yours respectfully,

GEORGE CORSON.

25, Cookridge-street, Leeds, April 17.

Intercommunication.

QUESTIONS.

[2823.]-Decorating Defective Walls.—We have been applied to for patterns of the laminated lead material for decorating defective walls. We believe it is a French invention of about twelve months ago. Can you, or some correspondent, give us any information respecting where patterns can be obtained, or whether they have an office or agent in London to whom we can apply? There is also an American material for decorating walls, which is, we believe, a thin veneer of wood. Can you give us any information respecting this also?—H. LITON-FIELD (*pro* GILLOW & CO.)

[2824.]-Colour Wash for Old Stuccoed Houses.—Will some of your readers kindly communicate through your columns any information they possess on the subject of colour wash for old stuccoed houses? I have been finding fault with the smeared and patchy look of a house just dried after a second coat. The tint desired was "dark stone," and although the workmen assure me that the umber and other materials were thoroughly and carefully mixed, constantly stirred up, and each painful kept in motion by the brush which laid it on, yet the appearance is unsatisfactory, as you will admit when I tell you that a dozen different shades might be counted—varying from brown to whitey-brown—in almost every square yard of the front. Any assistance would very much oblige.—AN OLD SUBSCRIBER.

[2825.]-Measuring Old Church Spire.—Will any of your readers inform me the simplest and most accurate method of measuring an old church spire, so that I can plot it to a scale drawing? How am I to measure the heights of the various parts and also the widths, &c., especially where beyond my reach? I shall be obliged to anybody who will give me a detailed answer.—MARTIN CRUZZLEWITT.

[2826.]-The Liebreich Desk.—Can any reader oblige me with information of a school desk and bench invented by Liebreich, and called after him? It is said to be recommended by medical papers, and I have been told that it has been adopted by several school boards.—R. R. R.

[2827.]-Parish Church, Ely.—Could any of your readers give any authority stating whether the parish church at Ely was originally a chapter-house or lady chapel.—F. W. W.

[2828.]-Party Wall.—A party wall I am connected with is in a falling state; I want my adjoining neighbour to assist in building it. He says the wall in question totally belongs to me. If so, am I at liberty to break out a door or window in my own wall and expose my neighbour's premises?—M. G., Dublin.

[2829.]-Best Pump for House Use.—Will any of your readers kindly inform me what is the best description of pump for lifting water for house use to a cistern 50ft. above the level of water in the well? The working space is between two walls about 3ft. apart.—H. F. S.

REPLIES.

[2824.]-Iron Window-Frame Fastening.—I believe they are made by Chew & Co. (not Clunn & Co.), 24, King-street, Stroud, Gloucestershire.—KAPPA.

[2827.]-Whitewash may readily be cleaned off by scrubbing with water and sand, being previously acidulated with about .04 of hydrochloric acid. The common acid will do, about 6d. per pound.—W. R. A., Uckfield.

Our Office Table.

TUNSTALL NEW WESLEYAN CHAPEL AND SCHOOL.—Twelve competitive designs were sent in for the above. Those of Mr. G. B. Ford, of Burslem, have been unanimously selected, and the buildings are to be erected forthwith, the estimated cost being about £3,000.

ARCHAEOLOGICAL LECTURESHIP IN EDINBURGH.—Among the many ways in which the late Mr. A. H. Rhind sought to foster and encourage the study of archaeology, perhaps the most directly practical was the bequest of the reversionary interest of the estate of Sibster, in Caithness, to

the Council of the Society of Antiquaries of Scotland, for the foundation of a lectureship of archaeology. By the terms of the bequest the lecturer is to be appointed by the Council of the Society, either for life or for a term of years, to deliver annually a course of not less than six lectures on some branch of archaeology, ethnology, ethnography, or allied topic, and the Council is to determine whether these lectures shall be free to the public, or whether admission shall be by a moderate fee. As Mr. Rhind's relative, Mr. David Bremner, formerly of Aberdeen, was life-rented in the estate, and as it was considered by many noblemen and gentlemen interested in the promotion of archaeology, that it would be a public benefit to anticipate the operation of the bequest, a memorial by the Society of Antiquaries, and otherwise numerous and influentially signed, was presented to the Treasury some years ago, suggesting the appointment of John Stuart, LL.D., secretary of the society, who by his experience and special acquaintance with Scottish archaeology is peculiarly qualified for the duties, which, it was suggested, should also include a general superintendence of all monuments of the early races of Scotland. The Treasury did not adopt the suggestion of the memorialists, but, in consequence of the death of Mr. Bremner (which occurred recently at Wick), the bequest will come into operation as originally intended, and in a short time the Rhind Lectureship on Archaeology will be added to the number of permanent institutions for the advancement of science in Edinburgh. Mr. Rhind also left a sum of £5,000 for the foundation of two scholarships in the University, and £7,000 for the establishment of an institution for the industrial training of orphan girls at Wick, which will now also come into operation.

BRICK CLEANING MACHINE.—The expense of cleaning with a hatchet the millions of bricks in the burnt district of Boston is an important item in the expense of rebuilding. A machine that will do the work well and expeditiously, and cheaply too, is something that is to be desired. Mr. T. M. Schleier, of Knoxville, Tennessee, has lately patented an invention for cleaning, and one of his machines has been built in Boston. The bricks are carried on an apron to a hopper, into which they are fed one by one, falling end first. A descending bar pushes the brick through a narrow way surrounded on each side by steel chisels pressed against it by springs, which clean the mortar from the four long sides at once. As soon as it has passed through, a horizontal bar pushes it through another set of chisels which clean the ends, and it drops out ready for use. The springs adjust the chisels to the various thickness of the bricks. Bats are cleaned, except on the ends, as readily as whole bricks. The chisels are so set as to keep themselves ground. The machine is so powerful that an extra thick brick will have a shaving scraped off without stopping it, and so easily run that the work can be done by hand, although the use of power is contemplated. Another advantage is that bricks which would inevitably be broken by a blow on the side are preserved whole. Running at a slow rate, the bricks are cleaned at the rate of thirty-five or forty a minute, which is about as fast as they can be placed in position.

THE CONSERVATIVE LAND SOCIETY.—At the eighty-second quarterly meeting of the Conservative Land Society, held at the offices in Norfolk-street, on Tuesday week, the receipts for the quarter were declared to be £29,822, and the grand totals to Lady-day, £1,888,020. The number of the last share issued to Lady-day was 38,363. The reserve fund stands at £9,000. The half-yearly interest warrants will be issued on the 1st of May. The rate of interest remains at five per cent. per annum on shares, and four per cent. per annum on deposits. The Chairman expressed the deep regret of the Board at the death of Colonel Brownlow Knox, a member of the Board, and intimated that Mr. Gerald F. Talbot had been elected in his place. There were present at the meeting:—Viscount Ranelagh (chairman), the Hon. and Rev. W. C. Talbot, Hon. R. Bourke, M.P., Colonel A. Meyrick, Mr. J. Goodson, Mr. T. K. Holmes, Mr. N. W. J. Strode, Mr. N. Winstanley, Mr. J. H. Hiley, Mr. J. Hugh Thomson, &c., &c.

THE SOCIETY OF ARTS AND TECHNICAL EDUCATION.—The Society of Arts, as our readers are aware, has taken up the question of technical education, and has announced a scheme by which it is hoped that working men may be encouraged to study the details of their respective trades more

thoroughly than they have hitherto. It is to be feared, however, as the *City Press* points out, that this plan is so elaborate that comparatively few of those for whom it is designed are likely to be able to avail themselves of it. One part of the examination is to deal with practical trade matters, so that only those actually engaged in the workshops are likely to be able to compete successfully; but linked with this is a formidable array of subjects, in most, if not all, of which the candidate must pass before taking his certificate. That no doubt may exist as to the thoroughness of the examination, it is expressly stated that "the theoretical knowledge must not be a mere 'cram' of empirical dicta, nor the practical knowledge a mere committal to memory of descriptions of manufactures picked up from text-books," all of which is right enough, so far as it goes; but when we turn to see what is expected from the candidate, we begin to fear that comparatively few will venture to attack such a list of subjects. Taking, for instance, the manufacture of paper, we find the candidate is to be examined in mathematics, steam, vegetable anatomy and physiology, economic botany, and organic chemistry; while some knowledge of magnetism and electricity, acoustics, theoretical and applied mechanics, practical plane and solid geometry, machine construction and drawing, and building construction, will also be expected of him, and the technical part of the examination is planned on an equally extensive scale. Of course this is all right if workmen can be found in any number to undergo such severe tests of their knowledge; but, considering how small are the opportunities afforded for acquiring the special information demanded, and how little general preparation the class appealed to can have had from any examination of the kind, it seems a pity that at the outset, at any rate, a somewhat lower standard could not have been adopted. As it is, the Society should see what can be done in the way of special classes to lead up to the well-meant scheme which has been propounded.

CHIPS.

A new Baptist Chapel has been opened at Llan-fair Caerinion. Mr. Hugh Ellis was the architect.

A new Wesleyan Chapel has been opened at Wallingford. The style is Gothic. Mr. J. S. Dodd, of Reading, is the architect.

A new (Roman) Catholic Church, dedicated to the most Blessed Sacrament, is to be erected in Maiden-lane, Covent Garden, at a cost of £7,000. Mr. F. H. Pownall is the architect.

A new school has been opened at Salisbury. The cost was £1,500, and accommodation is provided for 263 children. Mr. John Harding was the architect, and Mr. James Plowman the contractor. The style is Gothic, and the materials used red brick with stone dressings.

A new lectern has just been placed in the old parish church of St. Nicholas, Brighton. The lectern takes the form of an eagle with outspread wings, and is carved in oak. It was supplied by Mr. Frank Smith, of Southampton-street, Strand.

A new church is being built in Radcliffe-square, South Kensington. Messrs. Hill and Sons are the builders.

Cheriton Church was reopened on Tuesday week, after a thorough restoration and enlargement, during which operations the tomb of the granddaughter of Sir Walter Raleigh was discovered, the date being 1716.

In our account last week of the restoration of Downe Church, we omitted to state that the church is warmed by hot-water apparatus supplied and fixed by Messrs. J. Jones and Son, of Bankside.

New class-rooms were opened at Romsey, on Easter Monday, in connection with the Abbey Chapel. The building is of red brick, with stone dressings. Mr. H. J. Paull, of Manchester, is the architect, and Mr. J. Crook, of Southampton, the builder.

The new S. Pancras hotel will be opened on the 5th of May. There are within the building 250 public and private sitting and bed rooms.

The first sod of the West Lancashire Railway was cut on Saturday near Southport. This line is promoted with the object of bringing Southport, Preston, Wigan, and Burnley in closer communication, and of opening up a more direct route to the principal towns of Lancashire and Yorkshire.

The Trinity Board have accepted the tender of Messrs. Livett, Frank, and Son, for the supply of paints, &c., for the current year.

The *Philadelphia Medical Times* reports that a student undergoing his examination was asked what was the mode of action of disinfectants. He replied, "They smell so badly that the people open the windows, and the fresh air gets in."

Trade News.

WAGES MOVEMENT.

BLACKBURN.—The dispute among the Blackburn masons has been reduced to smaller proportions. The men ask for 38s. per week in summer, and 30s. in winter. The masters have consented to give the advance, which is to come into operation on the 21st June, but the men say that unless it be paid on the 1st May they will resort to a strike.

BRADFORD.—The master builders of Bradford have agreed to give the masons' labourers 23s. a week in summer, for 49½ hours' work, and 22s. a week in winter, the men working from light to dark. No arrangement has yet been come to with the joiners. The men ask the same rate of payment for all men, but the masters, while willing to concede an advance, do not feel inclined to pay all the journeymen, no matter what their qualifications, the same standard rate of wages, believing that a system of this kind is unjust to the good workman.

BRIGHTON.—The operative carpenters and joiners of Brighton in August last adopted a memorial to the builders of the town and neighbourhood, asking that work should commence at 6 a.m. and terminate at 5:30 p.m., and 1 p.m. on Saturdays, making a total of 56½ hours per week, allowing within the above-named hours, half-an-hour for breakfast and 1 hour for dinner; the same to apply all the year round; and the wages to be 7d. per hour, making a total of £1.12s. 11½d. per week; overtime to be paid 9d. per hour. Up to last week, no reply had been given by the masters to the men's memorial, and the men have invited the masters to send a deputation to discuss the matter with them. The men have also resolved that, in the event of the employers refusing to meet the men, the committee shall be empowered to withdraw one or more firms, as they may decide, and they pledge themselves to allow full pay to any delegate who may be discharged in consequence of this movement. At the present time, the Brighton operatives are paid 6d. per hour, and do not leave work until 4 o'clock on Saturdays; hence the question at issue is an advance of wages of 1d. per hour, and a shortening of the hours of labour by 2 hours per week.

STOCKTON.—The Stockton operative brickmakers, whose wages are now averaging 10s. a day, have struck work for an advance of 1s. 8d. per thousand bricks made. The house carpenters and joiners have all struck, because the employers refuse to reduce their hours from 54 hours to 53 hours per week, and to advance their wages from 6½d. to 7½d. per hour. The masters offer to give the increased wages.

STOCKTON-ON-TEES.—The resolution of the operative joiners to come out on strike if their demands were not conceded, has been put into effect, and they are now idle. What they desire is 3s. per week advance, and to cease work one hour earlier on Saturdays.

ASHTON & GREEN.

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portmadoc and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.

24 by 12	24 by 12	24 by 12	18 by 10	18 by 9
420s.	295s.	245s.	222s. 6d.	222s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8½
222s. 6d.	170s.	212s. 6d.	130s.	77s. 6d.

Per m of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

ACTON.—For building additions to Acton National Schools. Mr. Edward Morrison, jun., architect. Quantities supplied by Mr. S. Bolton.

Suezum	£688 0 0
Gibson Bros.	619 0 0
Cowland	578 10 0
Adamson and Sons	545 0 0
Temple and Foster	519 10 0
Blick (accepted)	486 10 0
Johnson	486 0 0

BELGRAVIA.—For alterations, 28, Westbourne-place, Eaton-square, for W. Scott, Esq. Mr. Thomas W. Cutler, architect.

Bossett	£256 0 0
Temple and Foster	197 10 0

BLACKFRIARS.—For alterations to S. Alphege's mission room. Messrs. Sulman and Rhodes, Architects.

Martin	£345 6 8
Richardson (accepted)	268 5 0

CATERHAM.—For stables at Clareville, Caterham, Surrey, for Mr. W. J. G. Barrett. Mr. Richard Martin, architect, Caterham Valley.

Jarrett	£512 0 0
Gallyer	487 10 0
Scrivener	483 0 0
Smethurst	455 0 0
Simons (accepted)	448 0 0
Ward	448 0 0

CATERHAM.—For house and shop, Caterham, Surrey. Mr. Richard Martin, architect, Caterham Valley.

Ward (accepted)	£700 0 0
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GUILDFORD.—For a new residence in the Portsmouth-road. Mr. Henry Peak, architect. Quantities supplied.

Pollard and Son	£2,336 0 0
Nye	2,189 0 0
Loe	2,160 0 0
Garnett	2,151 9 0
Brett	2,035 0 0
Strudwick	2,024 0 0
Pink	1,963 0 0
Mitchell and Son	1,955 0 0
Goddard and Son (accepted)	1,828 0 0

GATESHEAD.—For villa residence, with stabling, &c., on the Shipcote estate. Mr. Sept. Oswald, architect, Newcastle. Quantities supplied.

All Works.

English	£2,987 5 7
Mason and Bricklayer's Work	
Wilson	£1,246 0 10½
Slater's Work	
Carr	£97 0 0
Hastie	85 10 0
Kirk and Dickinson	78 10 0
Nicholson	75 18 0

Plasterer's Work.

Oswald	£223 12 4
Charlton	210 0 0

Carpenter's and Joiner's Work.

Stimpson	£856 10 0
Grisdale	778 14 0
Harrison and Horn	781 18 0

Plumber's Work.

Walker and Emley	£119 3 9
Wilson	114 10 3
Russell and Davis	108 16 0
Archibald	105 14 2
Almond	104 19 0
R. B. Charlton and Co.	104 10 0
Scott and Richardson	103 18 5

Smith's and Ironfounder's Work.

Walker and Emley	£332 17 2
Dinning and Cooke	278 15 0
Almond	215 12 0

Painting and Glazing.

Cato	£168 11 6
Almond	166 12 0
Green	145 18 0
Total of lowest tenders	£2,729 5 3½

GATESHEAD.—For 48 workmen's houses, at the Pelling, in four blocks. Mr. Sept. Oswald, architect, Newcastle. Quantities supplied.

Mason's and Bricklayer's Work (Labour only).

	For One End	For One Ord.
	House.	House.
Watson and Keenan	£57 0 0	£43 0 0
Wilson	53 1 7	42 7 0
Hay	52 11 9½	40 6 1
Smart	47 16 8	35 0 10
Bell and Simpson	45 9 0	33 10 0
Flynn	45 2 6	32 19 6
Dermont	45 0 0	33 5 0
Musgrave	44 16 0	33 5 0
Falconer	43 18 0	32 12 6
Thornton*	43 2 10	30 4 0
Burn and Graham	43 0 0	32 0 0
Steel	42 12 6	29 10 6
Archibald	42 8 4	30 18 6
Myers	42 8 0	32 13 3
Beldon	40 12 0	29 2 0
Kell	39 19 9	27 12 9
Grant and Stratton	39 15 10½	25 6 9½
Storor	38 9 0	28 15 11½
Purdie†	37 11 0	27 0 5
Alexander†	37 0 0	27 0 0
Dick	35 14 0	27 17 6
Brand	33 10 0	21 10 0
Jones	32 16 9	22 17 0
Storey	31 0 0	21 0 0
Spor	29 10 0	24 0 0
Swinburn	23 2 0	19 19 3
Sykes	18 2 2	17 3 10½

Carpenter's and Joiner's Work (Labour only).

Jones	£22 0 0	£15 10 0
Nicholson	19 15 0	16 10 0
Beldon	19 10 0	15 8 0
Pyle	19 3 0	17 4 0
Burn and Graham	19 0 0	14 0 0
Bell and Simpson	18 10 0	15 0 0
Cryle	17 15 0	12 10 0
Archibald	17 10 0	13 0 0
Dermont	17 5 0	11 15 6
Reay	15 10 0	10 10 0
Robson and Smith	15 2 1½	11 9 0
Smurthwaite	15 0 0	13 0 0
Austin	13 17 6	10 13 0
Carr*	13 4 0	10 8 0
Thornton*	12 2 2	9 16 0
Blackett and Twiddle†	11 15 0	9 5 0
Noble†	11 14 9½	9 2 7
Galbraith and Dodds	11 10 0	8 10 0
Sykes	11 5 0	7 1 0
Moore	10 11 0	9 6 0
Edwards	10 0 0	8 16 0
Hall	9 14 0	7 0 0
Wilkinson	9 14 0	8 8 0
Brown	9 10 0	7 10 6
Miller	9 10 2	6 19 11½
Melvin	9 8 1	7 8 9
Storey	9 7 6	8 5 0
Robson	9 0 0	8 0 0
Redhead	5 10 0	8 0 0
Knott	5 2 6	4 17 6
Smart	4 13 10	3 19 8

* Accepted, subject to modification. † Accepted.

Average of 27 tenders for mason's and bricklayer's work—£40. 4s. 1d. and £29. 13s. 3d. Average of 31 tenders for carpenter's and joiner's work—£13. 0s. 4d. and £10. 3s. 11d.

GREAT BADDOW.—For new schools at Great Baddow Essex. Mr. Chancellor, architect, Chelmsford.

Gozzett (accepted)	£1,365 0 0
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HENLEY-ON-THAMES.—For the erection of a villa for the Rev. R. Prowse. Mr. J. S. Dodd, architect.

Rarnicoat	£2,748 0 0
Pither	2,539 0 0
Weyman	2,460 0 0
Clements (accepted)	2,410 0 0

KENLEY.—For stables. Mr. Richard Martin, architect, Caterham Valley.

Smethurst	£239 0 0
Ward (accepted)	220 0 0
Simons	218 0 0

LLANDANWG.—For school-house and teachers' residence at Harlech, for the trustees of Llandanwg Endowed School. Messrs. Roberts and Morrow, architects.

Lloyd	£1,397 0 0
Parry	1,345 0 0
Jones	1,313 0 0
Roberts	1,286 0 0
Evans (accepted)	1,146 0 0

KENT.—For mansion, with billiard-room, &c., Belvedere, Mr. Herbert Ford, Architect. Quantities supplied.

Simpson & Co.	£6,499 0 0
Foxley	6,387 0 0
Kirk	5,926 0 0
Carter	5,886 0 0
Crabb	5,878 0 0
Scrivener and White	5,830 0 0
Wilkins and Son	5,798 5 6
Rankin	5,687 0 0
Brown and Robinson	5,675 0 0
Menn	5,675 0 0
Sawyer	5,644 0 0
Tongue	5,458 0 3
Wright Brothers and Goodchild	5,436 0 0

LEE.—For further additions, 26, Belmont-hill, Lee, for James Ford, Esq. Mr. Thos. W. Cutler, architect. Quantities supplied.

Stimpson and Co.	£530 16 0
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LONDON.—For foundations for Christ Church, Lambeth (Rev. Newman Hall's). Messrs. Paul and Bickerdike, architects, London.

Myers and Sons	£2,497 0 0
Lucas Bros.	2,280 0 0
Perry and Co.	2,270 0 0
Trollope and Sons	2,250 0 0
Manley and Rogers	2,147 0 0
Henshaw	2,093 0 0
Dove Bros.	2,075 0 0
Hill and Sons	1,994 0 0
Higgs	1,945 0 0

LONDON.—For rebuilding No. 20, Haddon-street, Regent-street. Mr. Alexander Peebles, architect. Quantities supplied.

Fish	£2,173 0 0
Benstead and Son	1,970 0 0
Morter	1,947 0 0
Nightingale	1,895 0 0
Morsman	1,855 0 0
Scrivener and White	1,841 0 0
Ramsey	1,837 0 0
Ennor	1,791 0 0
Woodward	1,781 0 0
Longmire and Burge	1,698 0 0

LONDON.—For rebuilding No. 7, Rathbone-place, Oxford-street. Mr. Alexander Peebles, architect. No quantities.

Croaker	£2,230 0 0
Chapman	2,230 0 0
Sawyer	1,890 0 0
Ebbs and Son (too late)	1,875 0 0
Bridgman, Nuthall, and West	1,759 0 0

LONDON.—For alterations to, and part rebuilding of premises, No. 92, Fore-street, City, for Mr. T. Mein. Mr. James Harrison, architect. Quantities supplied by Mr. E. J. Cumber.

Henshaw	£1,905 0 0 (C)
Brown and Robinson	1,895 0 0
Watson Bros.	1,495 0 0
Little	1,463 0 0
Cooke and Green	1,437 0 0
Ashby and Sons	1,340 0 0
Ennor	1,290 0 0 (C)

LONDON.—For rebuilding No. 3, Oxford-street, W., for Mr. H. Lyons. Messrs. Burdow and Stewart, joint architects, No. 1, Wellington-street, S.E. Quantities supplied.

Brown	£1,230 0 0
Dove Bros.	1,195 0 0
Downs and Co.	1,190 0 0
Marshall and Son	1,120 0 0
Sharpling and Cole	1,043 0 0
Thomson and Smith	1,026 0 0

LONDON.—For alterations to Montague-grove House, Hampstead. Wm. Allen Dixon, architect. Quantities supplied.

Pritchard (accepted)	£636 14 0
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LONDON.—For alterations and additions to No. 20, Whitehall. Messrs. Glazier and Son, architects.

Hill and Son	£1,674 0 0
Jackson and Shaw	1,618 0 0
Downs and Co.	1,597 0 0
Rider and Son	1,580 0 0

LONDON.—For the erection of Wesleyan Chapel, Oakley-place, Old Kent-road. Mr. Charles Bell, architect. Quantities by Mr. H. Lovegrove.

Webb	£6,946 0 0
Richards	6,079 0 0
Henshaw	5,490 0 0
Cullum	5,383 0 0
Thompson	5,323 0 0
Nutt	5,314 0 0
Batley	4,932 0 0
Castle	4,689 0 0
Niblett	4,685 0 0
Wright Bros. and Goodchild	4,515 0 0

LUDGATE-HILL.—For buildings to be erected on the south-east side of Ludgate-circus, for Mr. George Wright. Mr. Albert Bridgman, architect. The schedule of prices of Messrs. Bracher and Son accepted.

Architect's Estimate	£20,000 0 0
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LUDGATE-HILL.—For buildings to be erected at 71, Ludgate-hill, for Mr. George Wright. Mr. Albert Bridgman, architect. The schedule of prices of Messrs. Bracher and Son accepted.

Architect's Estimate	£6,000 0 0
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MIDDLEBROUGH.—For the erection of a residence and stabling at Martin Grove, near Middlebrough, for Mr. R. H. Charlton. Mr. W. H. Blessey, architect.

Bellerby	£5,974 10 0
Shafte and Barry	4,998 0 0
Johnson	4,900 0 0
Johnson, John	4,835 0 0
Oliver (accepted)	4,414 15 11

MIDDLEBROUGH.—For the erection of a school in East-street, for the Middlebrough School Board. Mr. W. H. Blessey, architect.

Johnson	£3,986 0 0
Stainsby	3,890 0 0
Bellerby	3,738 12 0
Hallgate	3,275 0 0
Shafte and Barry	3,243 0 0
Oliver	3,184 3 10
France	3,175 12 0
Johnson (accepted)	3,070 16 0
Adamson	2,997 0 0
Bulmer and Co.	2,130 0 0

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 2, 1873.

SAN SALVADOR.

THE lessons taught by the ruin of this city, for the eighth time within a century and a half, by an earthquake, ought not to be neglected. The city lies about twenty miles from the coast, in the richest part of Central America; but its position, within a circle of eleven volcanoes, is most unhappy, and yet the inhabitants refuse to follow the example of Old Guatemala; and transfer their capital to another and less dangerous site. From the accounts received, it would appear that the only parts of the town which escaped were those constructed of wood; while, with respect to the palace, all its stonework fell, while the timber walls remained intact. This is no novelty in regions accustomed to be visited by earthquakes. Humboldt refers to it over and over again. He says that piles, driven deeply into the ground, and surmounted by tightly-framed superstructures of solid wood, are far less liable to be torn up and destroyed than the loose masonry, bound by imperfect mortar, with which the Spanish Americans, as they may still be termed, construct their edifices. An example was given of this in the City of Manila, in the Philippine Islands, more than two hundred years ago. It was the evening of St. Andrew's Day. A grand public celebration was preparing; the squares and the beach were crowded with revellers, gaily dressed, and enjoying the delicious air of that happy climate. There was not a cloud in the sky, or a wave on the sea. The palatial capital of Spain in the Indies rose towering on the margin of the bay. Suddenly a tremendous movement from beneath shook the entire mass of the waters; the river actually rose from its bed and was blown up in foam amongst the streets; the earth opened, emitting globular bursts of fire; land and sea trembled alike; shock after shock threw down the tall mansions of the European nobility and merchant princes; Manila was a wreck, and the convulsion went on, at intervals, during sixty days. What did the inhabitants then do? In raising their city from its ruins, they adopted numerous and intelligent precautions. It was before adorned with lofty structures, upon whose terraced roofs and high projecting galleries the citizens were accustomed to enjoy the evening air. These peculiarities disappeared. Terrace and balcony still were built, but at a more modest elevation, and no house rose above two stories. Projecting timbers, ingeniously disposed, and a solid plan of structure, everywhere resting on a support of tough timber frames, indicated a town in dread of earthquakes. Thus the Spaniards were wise in the East, but they have never displayed a similar sagacity in the earthquake latitude of Central America. Their cathedrals and churches, notwithstanding the warnings given by reiterated calamities, are reared to immense elevations, and their downfall, when the shock arrives, is proportionately fearful. We have spoken of eleven volcanoes in the neighbourhood—they might more properly be described as twelve—and yet the people persist in erecting one city dedicated to ruin, over the fragments of another, every nine or ten years; for it was no longer since than 1854 when they were last overwhelmed, losing human lives by thousands. Repeatedly have they been counselled to build from their magnificent cedar forests rather than from their quarries of friable stones; but a certain pride, or vanity, prevents them. San Salvador stands, or stood, in fact, upon a table-land wholly made up of scoria, volcanic ashes, sand, and pumice fragments, overlying, by

hundreds of feet, beds of lava, which had flowed from the fiery craters around before their ejection. What can the denizens of such a place expect? They must be prepared for the periodical desolation of their homes, upon which, nevertheless, they lavish all the cost of a florid and luxurious architecture. Those who have passed over the scoriaceous heaps covering Pompeii can alone form an idea of the soil whence San Salvador, destined to repeated disasters, arose. Besides, the architects of the city have always been famous in another respect. The soil we have described is washed away, by thousands of tons, whenever a rain-torrent occurs. There is a concentration of deep ravines around, which bring the water in deluges from the mountains, sweeping away the bridges, undermining the shaky foundations, washing down whole streets, and necessitating the erection of prodigious ramparts, when a simple removal might have avoided both the peril and the expense. It was proposed, in 1852, to build all the houses of one story, with thick walls, and an open court encircling each, so as to guard against floods and earthquakes; but the inherent pomposity of the Spanish nature prevented the project from being carried out, and the results were witnessed in 1854, and are witnessed now in 1873. Ten seconds suffice to mingle all this architectural glorification in one mass of *débris*. So it was in 1575, in 1593, in 1625, in 1656, in 1798, in 1839, when the population, for once, began to think of abandoning it, though they speedily changed their minds. The terrible event of 1854 again suggested the idea. On that fatal night, echoes like those of artillery seemed to be breaking from below the pavements, the fountains were instantaneously dried up; the tall towers of the cathedral and the grand façade of the palace fell; the people encamped in the piazzas as wall and roof fell thundering in every direction; and next day the official bulletin recorded, "It is worthy of remark that the structures left standing are old ones; all those of modern construction have fallen." When, indeed, Stephens visited San Salvador, he was amazed by the apathy of its inhabitants. The streets, he said, were heaped with rubbish; houses of enormous size had their fronts cracked, and threatening to totter, from the effects of earthquakes which had driven away the Government and repeatedly depopulated the capital; hundreds lived under roofs of matting, not caring to seek safer quarters; not a door or a window could be shut, so unhinged was the entire state of that which the official documents still persisted in describing as "our happy and beautiful metropolis." Well might a celebrated essayist, after quoting Fitzroy's ecstasies on the subject of a supposed volcanic lake, bigger than the Black Sea, which he assumed to exist, invisibly, beneath the soil of South America, near Concepcion, ejaculate, "A pleasant locality, this, for a building speculation." The Central and Southern Americans, however, appear to stand in little awe of the tremendous subterranean powers by whose outbursts they are daily, hourly, momentarily, menaced. It is worth remembering, by the way, that the ancient people of the country adopted more sagacious and skilful precautions. They either built up ponderous masses of masonry, or contented themselves with light frameworks of wood, such as even an earthquake could scarcely injure—less, at any rate, than the piles of soft and porous stone which your wealthy South American loves to erect for his own pride, disdaining a piece of practical advice which he once had from an acute architect of the North, "Build your house so that it may suit a 'tremblor.'" It may be urged with reference to the principal point we have noted, that, were the population to shun every district liable to these awful visitations, humanity might disappear from the soil, since these tremblings affect sea and land, valley and mountain alike, so that even the terrific

heights of the Andes are shaken by them for days together. But when a particular spot has become fatally celebrated; when it seems as if certain conditions are, so to speak, confluent there; when the residents, generation after generation, have seen their homesteads reduced to ruin by these upheavals of the water or the earth; and when they know that precautions are possible, either by rebuilding their eight-times-ruined city on a plateau of rock not liable to subsidence, although it may be cleft by the convulsion, or by promoting a different style of domestic architecture, then some degree of fatuity is manifest. Notwithstanding that so large a part of the world, with so many cities, and the builders of them, must be directly interested in this question, it is one, nevertheless, to which very little general attention has been paid. The fate of San Salvador may suggest a closer consideration of it.

THE FURNITURE IN THE INTERNATIONAL EXHIBITION.

THE decorative furniture in the International Exhibition is, upon the present occasion, confined to a comparatively few examples, collected mainly in Room XIX. on the eastern side. If, however, the display be small, it may be called concentrated and select, and comprises examples by most of the designers and manufacturers who are giving their attention to the development of this particular branch of household furniture. The facilities for comparison are thus very much greater than last year, when one had to traverse considerable intervening spaces of picture-galleries to get from one group to another of works of the class under consideration. We have now side by side Classic, Oriental, Renaissance, and Gothic, in charming confusion, thoroughly representative of the eclectic character of modern design; and we have also in close juxtaposition English and Continental manufactures, showing the various shades of feeling in the copyism which mainly animates (if animation there be at all) the designers of the day in Great Britain and upon the Continent alike. We have also the whole world laid under contribution for the materials in which the several works are executed. Thus gold, and its substitute, gilding; and precious stones, and marbles, or their imitations; ebony and oak, and woods of a hundred different tints and varying grain; ivory, and pottery, and glass. There is no lack of variety, except, alas, in that of original thought, of which we are compelled to acknowledge the supply is limited. At the same time we do not desire to speak disparagingly of the Exhibition, for it is hopeful and encouraging, and very different to what it would have been ten or twenty years ago. Some men of education and power are bending their minds with zeal to the task, and some manufacturers are devoting capital and energy to its fulfilment in no niggard spirit. Foremost among the former is Mr. S. J. Nicholl, and associated with him is Mr. J. Moyr Smith, who is amusing, if sometimes extravagant. Mr. B. J. Talbert's clever manner peeps out continually, and Mr. C. Bevan follows these artists at no distant interval. Among the manufacturers whose names we would mention with honour are the enterprising firm of Cox and Co., Messrs. Gillow, Messrs. Gregory, and Mr. L. Collmann, while Messrs. Doulton and Watts must not be omitted, since their efforts to introduce artistic work into the designs and manufacture of pottery and terracotta have added to the means not sparingly made use of by the other manufacturers mentioned, of decorating furniture by painted and engraved plaques; and they have besides an ambitious and highly-successful structure of their own in the shape of a chimney-piece and frame over, which occupies the post of honour in the centre of this gallery. No. 2,630 is a very excellent, lofty but narrow, ebonised cabinet, surmounted by a canopy, exhibited by Messrs.

Cox and Sons, and designed by Mr. S. J. Nicholl. The lower part has the centre recessed and enclosed by doors, presenting as principal features four square panels, which are painted on gilded grounds. The paintings are indifferent, and only arrest the eye as relief in colour to the gold, which throws out the ebony of the framing. The central transverse stile only is carved, with the ground of the carving gilt, the upright stiles being plain, and giving space for repose. Some irregular treatment of the front of the drawers over is so obviously Japanese in idea that it was not necessary to set upon the cabinet a little cabinet from Japan, but the naïveté of the confession so set forth is to be commended. The panels of the back of canopied upper portion are partly filled with plate-glass and partly with better and more decorative paintings on gilt grounds; and some shelves—one square and two triangular-shaped—which project from the back, and the canopy above all supported on slender columns, are pretty and picturesque; but the details of this elegant piece of furniture are marred by some ill-placed and ill-carved Gothic features. No. 2,631 is a smaller cabinet, from the same firm, and by the same designer, with Mr. J. Moyr Smith's aid, in which the farcical element is too strong; broad jokes are good for occasional, rather than permanent, contemplation.

Messrs. Gillow have also two small ebonised cabinets sufficiently piquant in form and treatment, by Mr. C. J. Henry and Mr. J. B. Talbert respectively. The columns here depart from the received type, with tiny capitals, multiplied zones and bases, and affect the continuous zone or Elizabethan baluster character, which has little but uncouth novelty to recommend it; and this novelty it has long since lost, being in danger now of being nauseously common. What these cabinets require is better art in the panels and more repose in the framing, as they depend mainly on the quiet tone of their black material for that refinement which, in contrast with ordinary furniture, they undoubtedly possess. Now, the quietness we desire we certainly obtain, but with comparatively little else, in No. 2,642, a cabinet, by Watt, of Grafton-street. It has, in spite of almost quakerish plainness, a much more loveable look than its neighbours. It sets forth, and does not itself detract from, the effect of the objects of *vertu* intended to occupy its compartments, whereas the restless appearance of most of the other cabinets unfits them for shrines for any articles of value. In 2,640 we have a large and ambitious carved-oak cabinet, by Van de Venter, of Brussels, which has all the defects of modern Renaissance compositions, such as used to fill furniture exhibition rooms, but, happily, are conspicuous only by their rarity in this one. Its elaborate trifling is contemptible, though costly. 2,620 (the side-board by Gregory and Co., designed by Charles Bevan) has many nice points, but these seem gleaned from various well-known quarters; the combination is not always harmonious, and the effect is fussy. The material is light oak, and the detail affects Gothic, with a hankering after the flesh-pots of Renaissance, as in the marqueterie lower panels of the pedestal doors. The introduction of the bevelled edges to the glass panels is good in this, as in other pieces of furniture in this department. Mr. F. Dulau has, in 2,624, made many geologic strata contribute to the decoration of his cabinet in the olden style, so that it has as much of mineral as of vegetable material in its structure. As a curiosity it is striking, but overdone and wanting repose. Little repose is to be found in Mr. H. Pourdinois' sumptuous cabinet (No. 2,625). The cameo-like execution of the delicate carving in woods of different tints is remarkable. The taste and refinement is *nil*, and the costly nature of the work excessive; of art commensurate with the labour and expense it has little, but an *objet de luxe* it undoubtedly is.

Messrs. H. Salem and Eg. Vanderschuren have some Renaissance cabinets of amboyna wood and ebony, relieved with delicate ornamentation, which are quiet and refined, but not remarkable for novelty or style. What the cusped arch is doing on the top of the hand-screen by Messrs. Cox and Sons (2,631) it would be difficult to explain; as a handle, it is inconvenient; the painted glazing of the panels is a pretty idea fairly treated. Mr. Nicholl is responsible for this design, as well as the others by the same firm. 2,621A, a painted table in imitation of marbles, by D. Cloake, is wonderfully well-executed, and rich and harmonious in colour. Of the propriety of the character of such work we need not here speak. Another rich table (No. 2,622) is one in marqueterie, by N. Corpataux; but though the material may be more defensible, this example is infinitely inferior in design and effect to the last-named. Mr. Talbert is not happy in his sideboard for Messrs. Cox and Sons (2,638); it is clumsy and inartistic in form, and affects the proportions of a stone rather than a wooden structure. The panels in the back, in blue on white porcelain, are very good, and well-drawn in themselves, but seem out of harmony with their framing. Mr. John Hay's small cabinet (No. 2,626), of painted pine, is pretty and in harmony throughout. The principal panels, with the Fox and Grapes on one side and the Hare and Tortoise on the other, are very cleverly designed, and seem more in place in a wooden cabinet than pottery or porcelain. The flower-stand (2,691) is one among many good specimens of metal-work by Messrs. Cox, and has some pretty and amusing tiles representing the signs of the Zodiac, travestied by Mr. Rossiter; but the open-work gallery above them is of too coarse a pattern to correspond with them. Upon this article Messrs. Doulton and Watts' *tour de force* is placed in the shape of a sumptuous jug in salt-glazed ware, richly embossed with small sculptured subjects and other ornamentation. We have already mentioned their chimney-piece (No. 2,634), which will repay examination, and though the style is not the best, yet the effort made in it is commendable. Some few other examples from Brussels and elsewhere are placed at the top of the staircase to this series of galleries, which are elaborate and eclectic; but whether Gothic, Renaissance, or Louis XV., are indifferent and below criticism; although their rank impurity will doubtless render them favourites with the public, and insure their early sale. But England certainly need not fear the result of the more direct comparison of its works with those of other countries, which the arrangements have favoured upon this occasion. To complete the cosmopolitan character of this collection of furniture, there are three or four examples of Oriental work, lent by the Duke of Edinburgh, placed among the rest we have noticed. Of these, a Cingalese cabinet is mainly remarkable for the striking grains of the wood. The design is unfortunately one that must have been imported from Europe—meagre Renaissance, inferior to any pure type, however barbarous. Other specimens are chairs of Indian manufacture, free from foreign influence, but presenting no beauty of form or general conception, though marvellously wrought in detail, as in the delicate carving in ivory with which one arm-chair is covered. Interesting as are these as curiosities, it is not from them that our manufacturers can glean anything of practical utility.

HISTORIC ART STUDIES.

By DR. G. G. ZERFF.

EARLY GREEK ART.

(For Illustrations see last Week's Number.)

AS we stated last week, the lithographer made a mistake by putting a wrong title to our illustration. Instead of saying specimens of "Early Greek Art," he said "Specimens of Egyptian Art." The follow-

ing observations therefore refer to the illustrations in *last week's* number of the BUILDING NEWS.

The "division of labour," though cherished in most things, is neglected in the realms of Art. Only he who can paint, or rather paints, is to talk on painting. Only he who shapes stones is to know something of sculpture. But this is altogether false. The theory of art has been, from the times of Plato, Aristotle, Lucian, Plotinus, Winkelmann, and Lessing, down to MM. Charles Blanc and H. Taine, an "Art-branch" of its own in Greece, Rome, Germany, and France. The historical critic, the æsthetical philosopher, the teacher of art, and the practical working artist are entirely different beings. The time of the one is occupied with the study of general principles—of the historical evolutions in the different forms of art, whilst that of the other is devoted to acquiring the power of bringing ideas into forms. This power of formal reproduction is partly a gift of nature, partly mechanical skill. The divine gift alone will produce a Phidias, Canova, Rauch, Michael Angelo, Peter Paul Rubens, Holbein, Reynolds, Hogarth, Ary Shæffer, or Doré; but the artist who lives upon art by the mere practice of his "craft" must be trained intellectually by the theoretical and æsthetical master—*technically* by the practical artist. It is an established historical fact that great intellectual and religious movements have always preceded great and striking art-periods, and that a stagnation in the progress of civilisation was everywhere followed by a decay in art. Art has always advanced hand in hand with increasing taste and a more general diffusion of knowledge; and an improvement in art has been, and can only be, the effect of a higher degree of culture. In the illustrations which were given last week of Early Greek Art, we have a tangible proof of the correctness of this statement. We need only look at our public monuments, our streets, or into our jewellers' shops, to convince ourselves of the fact that there is much archaic stiffness in our art productions. As long as we shall foster the idea that a mere knowledge of mixing colours, drawing plans, and copying Gothic or Renaissance patterns make an artist, we shall have no genuine art. We have always had some isolated geniuses amongst us; but, till very lately, we certainly could not compete with either German or French artists in the production of those well-executed, elegantly-shaped, and often original, smaller works of plastic art. If we compare the primitive forms of our antediluvian horses, or our Noah's arks with impossible animals of grotesque shape, looking as though they had been carved by some savage New Zealander—our whiping-tops, and our good old original home-made dolls, with the same toys in Germany or France, we cannot fail to be struck by the poverty of our productions. No half-witted boy ought to be allowed to play with a toy made of a round block, with a thin curved piece of wood inserted vertically in one end, and a few hairs bristling on the other, placed on four square pieces of wood, as the representative of a horse. Look at the frightfully illustrated spelling-books which we provide for our children at a time when we ought to begin to train the tender mind and its budding sense of taste and beauty. We are, in these matters, where the Greeks were when they began, in the sixth century B.C., to struggle against Asiatic clumsiness and incapacity in the reproduction of the admirable proportions of the human frame. Down to the period of the abolition of royalty in Greece, the Aryans of Europe held faithfully to the crude plastic forms of Asia and Egypt. Only when they purified the old myths of their forefathers, when they organised their society on the principles of free individuality, when they gave a more humane shape in the abstract to their gods, were they enabled to improve upon their art. Long before this could happen Homer compiled his songs,

which were sung to the people by the *Homerides*; the *Kyklic* poets brought shape and order into them; the *Rhapsodists* augmented them, and the *Diaskenastes* (Simonides of Keos and Anakreon of Teos) at last gave them their present form in the time of Peisistratus (about 560—528 B.C.). At the same rate as the Epic poems improved and developed into their perfect shape Greek plastic art progressed. Figs. 1 and 2 are Metopes, from the Middle Temple of the castle of Selinus, cut in tufa. Fig. 1 represents a big-headed Perseus, with the cap of Hermes on his head, killing a monstrous Medusa in the presence of a stiff doll-like Athene. The Greek Neith has lost her Egyptian lion's head, but her forms are not yet free from hierarchical heaviness. Herakles, in Fig. 2, awkwardly carries two conquered Kerkopes on his shoulders, but in the treatment of his heavy limbs we perceive a kind of naturalism. This is still more the case in Figs. 3 and 4—reliefs from the temple in the suburb of Selinus. The proportions of the human body are improved, there is liveliness in the movements, and for the first time we have a freer treatment of the drapery. In Fig. 5—a relief from the southern Temple on the eastern hill of Selinus—we have Akteon, who was changed into a stag and attacked by his own dogs. Diana stands by with cool placidity witnessing the fulfilment of her curse. The dogs are full of life; and the desperate position of the hunter is so excellently rendered that we are forced to assign to this relief a later period, and to place it in the middle of the fifth century B.C. The goddess is not free from a stiff hierarchical conventionality. The nude parts of the body of the goddess are in marble; the rest of the group is in tufa. These five sculptures of Selinus are in the Museum at Palermo. Fig. 6 represents a marble throne from Samothrakia, now in Paris. The style of the reliefs is archaic—a kind of transition from Assyrian into Greek. The inscriptions acquaint us with the figures, which represent Agamemnon, Talthybios, and Epeios holding a council of war before Troy. Fig. 7 is the so-called relief of Leukothea, now in the Villa Albani, at Rome. The divinity (with the Romans Lubitina, the Etruscans Matuta, also Anna Perenna) is presented with a little boy (some archaeologists say Bacchus); before her stand three females—the first holding a diadem, the second a fruit or flower, and the third is in a supplicating position. The drapery is in a conventional Egyptian style. The anatomy of the visible forms of the body is more correct, but the laws of perspective are altogether disregarded. In Fig. 8 (a, b, c, and d) we have the western group of the pediment of the Temple of Minerva at Ægina. In the heads, as well as in the bodies, we perceive a marked improvement. The grouping of the figures is faultless. There is action in repose. One sees that Homer has been read and studied—that his spirit lives in the heroic forms who lost and conquered Troy. On the left the Greeks advance under the protection of Athene—Aias the Telamonian, then Teukros, and then Aias, the son of Oileus. They fight for the dead body of Patrokles, which lies at the feet of the goddess. On the right we have the Trojans—Hektor, Paris, and Æneas—and a youth endeavouring to drag away the body of Patrokles; both the corners are filled with wounded warriors. The symmetrical arrangement of the groups around the central figure of Minerva is worthy of the best period of Greek art. These sculptures are probably the work of Kallon, who spared no pains even in working the backs and sides of the figures, which were never to be seen. The statues are now in the Glyptothek at Munich, restored by Thorwaldsen. In *a* we have an enlarged head of Athene, in *b* Patrokles, in *c* Laomedon, and in *d* Paris—from the eastern pediment—probably the work of Onatas. That the human form was already studied with great care may be seen in the excellent anatomical treatment of the bodies. The faces are, how-

ever, stiff, and their expression too uniform; the eyes are too large; and the hair, wherever visible, is conventionally represented in small curls or parallel ringlets. Fig. 9, now in the Villa Albani, is undoubtedly a Minerva of earlier date than the one on the pediment just described. The head was probably adorned with a bronze helmet. Fig. 10, now in the Museum Pio-Clementinum, represents with deep truthfulness a mourning Penelope. Her head, the right arm, and the feet, are modern restorations. The improved drapery deserves a careful study. Figs. 11, 12, and 13, the first an Apollo (in the British Museum), the second the body of a Minerva (now in the Museum at Dresden), and the third the Heraklean Pallas, at present in the Museum at Naples, are of a more recent date, but apparently worked in a prescribed style, according to a settled archaic canon. There is an Egyptian typical quietism in their faces, contrasting with the excellent execution of the drapery and the refined work of the peplos of Fig. 12, representing a combat with giants on ten fields. In Fig. 14 we have reliefs from an altar of the twelve gods (formerly in the Villa Borghese, now in the Louvre at Paris). The drapery justifies us in pronouncing it a work of later date, in the archaic style. The altar had three sides, of which we give one, with Apollo, Artemis, Hephestos, and Athene in the upper row, and the three Horæ, Eunomia (good order), Dike (justice), and Irene (peace) in the lower. That the figures are intentional imitations of ancient works, may be seen in the holding up of the dresses with two fingers, which is also to be observed on very old Etruscan vases. Fig. 15 (now at Tübingen) is the bronze statue of an Amphiaraios (a driver); the body is in the archaic style, but the face has more expression than is usually to be found in sculptures of this time. During the early development of Greek art, we see a close study of the outer forms of the human frame—without any idealisation whatever. To produce a faithful copy of nature is the element of Archaic art—but what an immense improvement on Assyrian or Egyptian sculptures! Man for the first time succeeded, through the Greeks, in understanding man. The riddle was solved; the sphinx dashed to the ground: the forms of heroes and gods were found. We have the universal spirit of vitality in the well-proportioned shape of man. Anthropomorphism begins in marble, to end in the flesh and spirit. The gods suddenly had a civilising influence on man; and since the Greeks gave them a human form, that influence has never been lost.

EGYPTIAN PLASTIC ART.

(With Illustrations this week.)

NOTHING can surpass the interest which the historian feels in approaching Egyptian art. Its antiquity is not less surprising than its monumental grandeur; its lively vigour not less than its deadly stiffness and immobility. We do not intend to treat our subject with notions cast in the "iron-mould" of chronological prejudices, or bow to a kind of literary flunkeyism which is always ready to pervert historical truth for the glorification of some preconceived idea. "He who knows only one language knows not even his own," said Goethe. This apothegm holds good with greater force in reference to religion and art. Our endeavour will be to trace the peculiar forms of Egyptian art to the sources from which they must have naturally sprung. When first we meet the Egyptians in our scanty historical records, we find them far advanced in civilisation. Sciences and arts flourished with them at a period when nearly the whole of Europe was sunk in the Palæolithic age; when the Aborigines on the shores of the Rhine, in the valleys of the Thames and the Seine, sported with mammoths and elks, and other antediluvian animals. Before ever Egypt could have reached her social organisation there must have been a time

when the subjacent limestone of the narrow Nile-valley was bare of the alluvial deposit which alone made it habitable. Then there must have been a savage period during which men entered first the pastoral, and at length the agricultural state. The artists of Egypt must have passed through the phases of the Palæolithic, Neolithic, and Bronze ages before they reached the historical or Iron age. Before the hieroglyphs became phonetic, they must have been mere ideography or pictorial writing. The construction of pyramids and temples, of aqueducts and causeways, presupposes a knowledge of geometry and mechanics. Before Egyptian mythology became systematised into a spiritual worship of the forces of nature, engendering astronomy, and the division of the year into twelve months, and of the month into four weeks of seven days, it must have been first fetish-worship, then zoölatry, and astrolatry. Their admirably organised hierarchy and their sacred writings were the outgrowth of ages and ages of keen observation and study of nature. Diogenes Laertius tells us that in the ten books of the Hierogrammatist were mentioned 373 solar and 832 lunar eclipses—making a total of 48,863 years. The Egyptians possessed ten ceremonial books of the Stolites, and ten books of the prophets treating of religious matters with detailed minuteness. Judging from the mere headings of these works, we may trace in them models and types of Hebrew, Greek, Roman, and Christian symbolism, mysticism, and dogmatism. The Hebrew monotheism and the Greek philosophy can only be understood through a thorough knowledge of Egyptian lore. Whilst the remains of the Asiatic ancient world are mere skeletons, or, according to circumstances, mere colourless fossil shells of a defunct social organisation, once breathing and alive; Egypt has been preserved in its manifold transformations, above and below the surface of the globe, in a thousand forms; like a well-embalmed mummy, with its bright colours, dried-up flesh, and its strange costume; everything is there—but life! Left to themselves, the Egyptians, after having been invaded by an Aryan race, developed their peculiar civilisation literally out of their own inner consciousness. There appears to have been a feudal or heroic period before the hierarchy attained its powerful sway over the land of Mizraim; for after the dominion of the gods, heroes and kings are mentioned, and this epoch is clearly marked in the monumental stone relics, which tell us a history entirely different from that of a later period, when temple-palaces, sacred shrines, tombs, and labyrinths were constructed; when the country was already divided into twelve nomes or regions, and was governed by a well-organised and most learned priesthood. Art and learning were with the Egyptians matters of religion. If ever there was a chosen nation that turned life into one grand continuous religious action, the Egyptians were undoubtedly that nation. When born, during his first period of life the Egyptian was under the direct influence of Isis (Luna, Diana). During his second period he had to devote himself to Toth (Hermes, Mercury)—he had to learn to read and to write, to attend the gymnasium, and to practice music. The third period of his life was consecrated to Hathor (Athir, Aphrodite), the goddess of love. Birth, learning, and love were thus as many mystic and religious evolutions which ripened man into his fourth period under the influence of Ra, or Helios (Apollo), the Sun, leading him to wisdom and a right understanding of the duties of life. During the fifth period man was under the special protection of Mau (Mars, the son of Helios, the brother of Hathor), and was through military activity prepared for the sixth period, when he had to devote himself to Amn, Brahmā, Divespiter, Jupiter (Deus pater), attaining the highest degree of spiritual consciousness. He was then enabled to occupy himself, as administrator and judge, with politics and law, till he

sank during the seventh period into the dominion of Num, or Nu (Vishnu, Neptune) becoming breath again as a glorified spirit, reaching, if he had been virtuous, a state of pure and immortal ideality freed from matter. This mystic spiritualisation of life under the guidance of the invisible gods, led to that symbolic art which in stiff forms embodied the deepest ideas. Net, or Neith, the Greek Athene, was with the Egyptians also the incomprehensible goddess of wisdom, on whose temple stood the words, at a later period used of Javeh (or Jehovah) by Moses, "I am all that was, and is, and is to be," or "I am I." The concrete form for this idea was not found by the Egyptians; but the lion-headed goddess was, in spite of her monstrous outward combination, still the first abstract revelation of God's power—the first grand riddle of creation. Moses succeeded in freeing this Egyptian symbolism from all its grotesque formalism by proclaiming "*One God*"; whilst the Greeks artistically used the human form to clothe this hidden sublime idea. But neither the abstract worship of the "*One concealed God*," with his title "*Hek*" (the ruler) to whom was assigned, by the Egyptians, the first mystic region (the Most High, the Lord of Heaven, the Lord of Thrones), nor the concrete representations of a Zeus or Pallas Athene of the Greeks, can be understood without a correct knowledge of Egyptian mythology. We may even go further, and assert that nearly the whole of Christian symbolism is rooted in Egyptian myths and legends. The Jews borrowed their social and moral organisation from the Egyptians; the Greeks their philosophy; and the Christians their dogmatic mysticism. The Jews learned from the Egyptians to distinguish between clean and unclean animals; and not to sacrifice fishes. The division of the Jews into twelve tribes was in imitation of the twelve signs of the Egyptian zodiac; the Levites took their organisation and mode of living from the Egyptian priests. Circumcision was long practised by the Egyptians, and not by the Jews, until Moses removed this reproach. The arrangement of the Jewish temple was an imitation of those of Egypt. The ark was an imitation of the "*Kistai mystikai*," which were carried about by Egyptian priests in solemn procession. The candlestick with the seven branches was in remembrance of the Egyptian sun and moon and the five planets; the offering of cakes was in imitation of the twelve cakes which the Egyptians offered to the twelve gods of the second order, who presided over the twelve months of the year. On the other hand, the Egyptians had litanies and religious processions, and believed in the incarnation of God like the Indians. Osiris descended into hell and there conquered Typhon (the evil spirit). He was the judge of the quick and the dead. The Egyptians firmly believed in the doctrine of a Trinity. Under the guidance of the hierarchy, Egyptian artists exhausted all nature to express symbolically the mysterious phenomena of the creation. The mineral kingdom with its crystallisations, and the vegetable and animal kingdoms with their variegated incomprehensible forms, were used with technical fidelity to proclaim some religious dogma. Art with the Egyptians was not the outgrowth of an admiration of the well-proportioned human form, as it was with the Greeks, but was the daughter of a gloomy religion, that taught man to use matter in every form to worship the gods. The connecting-link that brought order and union into everything the Egyptians did was their firm belief in the immortality of the soul. This faith induced them to build for eternity, and enabled them to hew rocks into the shapes of temples; to pile up with Titanic grandeur stones into mountains; and to turn endless granite walls into black boards, on which they wrote the deeds of their kings. Rest and tranquillity, stability and eternity, were the elements of Egyptian art; and to these beauty and even comfort had to yield. Life and death with the Egyptians

were so closely allied that their death was an eternal life, whilst their life was in reality an everlasting death. With these general notions, let us consider our illustrations in detail.

Fig. 1 represents the Egyptian trinity—Osiris, Isis, and Horus—from the rock-hewn temple at Girsheh. The mystic formula was the following:—Osiris was the father, brother, husband and son of Isis; Isis was the mother, sister, wife, and daughter of Osiris; and Horus was the son of Isis and Osiris, and was Osiris himself. That the artists, under the guidance of the priesthood, could not succeed in hewing in stone such an unintelligible dogma may be seen in the uncouth and rough forms of the three divinities. This incapacity shows itself also in Fig. 2, basalt figures from the royal tombs at Thebes. A petrified realism distinguishes the two human forms. In Fig. 3 we have a bronze figure in profile and front—from the head-dress, the portrait of a high person, possibly a king, with regular Aryan features. The body, as to its proportions, is well treated. Fig. 4 is a bas-relief from the palace at Thebes. In all that the Egyptians did to record the incidents of public or private life they excelled. Though they sketched only in outlines, there is an historical truthfulness in their works which we cannot help admiring. The lively position of the warrior, the excellently-drawn features, the correct treatment of the body, the shield, the pointed, spear-like weapon, the head-dress, and the short coat of leather, are well executed. In Fig. 5, a bas-relief from El Kab, we have peasants ploughing and sowing, whilst in Fig. 6 we see another soldier warding off a blow with his shield. Whilst the Egyptian artists rarely, or rather never, succeeded in a correct rendering of the human figure, they attained such perfection in drawing animals that a naturalist can recognise the different species of dogs which they possessed, and classify them. This is also to be observed in their drawings of foreigners, especially captives, in which the ethnologist can easily distinguish the three groups of humanity. It is a peculiarity that whilst the Mexicans drew all their figures in profile, the Egyptians drew the heads and feet in profile, whilst the chests were turned to the front. See Fig. 7, a wall-painting from the royal tombs at Thebes, which were adorned with gorgeous splendour. The principal hall, called the golden hall, was decorated with vivid representations of the king's life, especially the life "after death." The richly-adorned figure, with crook and cross, sitting on an ornamented throne, is a judging divinity; whilst Fig. 11 is a bas-relief on the slanting door-post, representing a winged female divinity in a boat hovering over lotus-flowers. Whilst we observe in the divinities a conventional and stereotyped resemblance, especially in the drawn-up, almond-shaped eyes (see Figs. 7, 10 and 11), we have in Fig. 8 (a bas-relief from Thebes) the life-like portrait of a royal youth, treated with great naturalness and fine expression. The group (Fig. 9) representing a warrior in the act of striking down an enemy, one being already slain, is a composition full of spirit. In Egyptian works we must particularly study not only the admirable, though always stiff and severe, conventional treatment of flowers and leaves, but also the Hathor-masks, serpents, feathers winged globes, scarabæi, the ribbon-like frames, on wall surfaces; and above all, the faithful reproductions of animals. Fig. 12 represents a bronze cat from the tombs of Saccarah, and is a model of realism. The hawk-headed human figure, Fig. 13, and Fig. 14, the krio-sphinx, are specimens of the same kind. The sphinx in its various combinations is the real symbol of ancient Egypt. Half brute, half man; half reality, half ideality; half symbol, half truth; it personifies the struggle of the ancient world to command matter through spirit. The sphinx which we give, both in profile and front, has the head of a ram and the body of a lion, and holds a Hermes with the "*crux ansata*" in each hand. The arms are crossed over the chest, and a band, inscribed

with hieroglyphs, depends from the waist. This may be considered a masterpiece of sculpture. Fig. 16, a small lion, in terracotta, from Denderah, and Fig. 17, a sitting female figure, are furnished with rings, by which they can be attached to chains and worn as amulets. Figs. 18 and 19, a child's head, front and profile, are specimens of the high artistic power of the Egyptians when untrammelled by hierarchical canons. The vases, Figs. 20 and 21, and that in Fig. 15, are of the Ptolemaic period. The vase Fig. 15 is a genial masterpiece of modelling. Two bodies of swans are elegantly united, their curved necks forming the base, and the bodies the bowl. They are surmounted by a sphinx, with a woman's head, arms, and hands, and the body of a lion. The whole is undoubtedly the work of a Greek artist. The well-balanced proportions, the softness of the waving lines, and the very position of the sphinx, betray a spirit foreign to Egyptian art. There is freedom in the forms, which freedom was unknown to Egyptian artists. Whether they worked (a) during the monumental period as mere slaves to the lay-power, or (b) during the hierarchic period under the guidance of the priests as mere acolytes, the artists were equally subordinate and fettered. The priest was the Hermes of the people; he read the truth in the stars, wrote the language of heaven, was the physician, lawyer, and judge of the masses; he prayed, sacrificed, prophesied for them, and buried them. In a word, he was *in, through, from, and by* Hermes, the *λογος*. True, the hierarchy of Egypt placed the idea, the spirit, the word, above the form; but this was kept as a deep mystic secret, in order that the masses might be ruled through symbolism—often expressed (as in Fig. 22) in a twisted cord on a green stone, which was supposed to be hallowed. When, during the Ptolemaic period of Egyptian art, under Greek influence, the lay-power proclaimed a new canon that the gods might be sculptured with their legs apart, in freer positions, the terrified priests and people rushed to tie the legs of their gods together with ropes, fearing to see them run away. But their gods did go. The spirit of innovation, the breath of freedom, touched the petrified demon of hierarchical formalism, and with the outer form the hidden idea departed too—it sought and found new forms, and was once more, though in a different shape, revived during the Middle Ages.

THE PAST AND PRESENT OF ARCHITECTURAL ART.*

(Continued from p. 475.)

I AM not going to drag you through all the changes in ancient architecture: you will see for yourselves how the majesty of the Doric Temple was succeeded by the greater refinement and elegance of the Ionic and the richness of the Corinthian, though their developments were not exclusive of one another, like those of Mediæval art, but cumulative and practised side by side.

I confess that, so far as capitals are concerned, I agree with Mr. Ruskin in thinking the first and the last each more reasonable than the second. The moulded capital and the foliated capital are things of all time. The voluted capital was an accidental introduction from the East, and has no permanent meaning, wonderful though it be.

The special features, however, for artistic study in Grecian architecture, of whatever order, are the exquisiteness of its proportions, the purity of its lines, the refinement of its mouldings and enrichments, and the superhuman instinct it evinces for delicacy and almost spirituality in the refinement and perfection of every line; but above all these is the manner in which it welcomes, indeed presses, into its service—or, rather, devotes itself to the service of—the all-glorious sculpture of which it was at once the dutiful handmaid and the loving mistress. Nor need we doubt that it treated the painter's art one whit less lovingly.

* Sir GEO. GILBERT SCOTT's last lecture at the Royal Academy.

As a style, the sentiment of Greek architecture may be said to be a quiet, calm solidity and repose, free from all question as to its stability, because it admits of no pressure but what is vertical. This quality, however, it shares with the Egyptian; but the Greek unites with it the most studied symmetry of proportion, the greatest purity of line, the most refined detail, and the noblest allied art.

When the Greek orders were adopted by the Romans—a most natural alliance, seeing that the Greeks built within a comparatively short distance from Rome on the south, and that the Etruscans in the north borrowed Greek decorative art—we find that they united with it an element in itself discordant with the simple static principle which gave such calm dignity to the Greek. It is, as I have heard, a saying among the Moslem builders in India, that the arch “never sleeps”; it is always night and day pushing outward. Thus, purely trabeated architecture sleeps in safety, while arcuated architecture never ceases to exert force. The one is a static, the other a dynamic style—only becoming static when its abutments are of undoubted sufficiency. Thus, repose belongs of a right to one, but has to be purposely secured in the other.

We know next to nothing of the early architecture of the Romans. Recent excavations show the walls of the times of the kings to have been pretty much like those of Etruscan cities; and it is probable that, like the Etruscans, they early introduced the arch as a leading principle of construction. When they superadded to their own architecture (whatever it was) that of Greece, the latter became in many cases an artistic veil, concealing more or less the actual construction; and even where the artistic effect was purely trabeated, we find arches used behind it to aid the apparent construction. The two systems were thus used together, and side by side, gradually uniting themselves into one. In purely engineering works, the arch became bodily predominant. In purely architectural works, it was often wholly concealed; while, in works of an intermediate kind, the two were used together, naturally and with perfect freedom. Nor were these, or the purely arcuated structures, open to the objection of presenting any apparent instability, for their massiveness was such as to defy all suspicion of want of strength.

It is true that the Romans, from a want of that delicacy of taste and eye which characterised the Greeks, failed to treat their details with the same refinement, though this was not always the case; but, in spite of this defect, the Roman style greatly amplified and extended the capabilities of Classic architecture, rendering it capable of meeting every possible emergency and demand, whether of material or of construction, and giving it a cosmopolitan character suited to a people which had conquered the world, and which, if itself a race of iron, united under its world-wide sway the brass, the silver, and the gold of the older rulers of mankind.

Of Egyptian architecture we have little but of vast tombs and colossal temples; of Assyrian and Persian structures much the same may be said. Of Greek we have little but the temples, and a few public works of a monumental character; while of Roman architecture we have works of every possible description, meeting every demand, necessity, or wish. Such works must have existed during older periods, but were probably on an inferior scale and of ephemeral construction; but those of Rome were marked and permanent in their structure, and have thus been handed down to our own day, so that we may say that the whole range of their architecture is perfectly known to us; and, so far as we are concerned, it is the first of ancient styles which can be called complete.

As time went on, we find the arch, the vault, and the dome asserting, ever more and more, their supremacy. The influence of the Christian church followed this on in the most marked manner; and, when the seat of empire was removed to a new, an Eastern and Christian metropolis, where no great monuments of older or Pagan art existed, this change would appear to have gone on with yet increased rapidity.

We have of late years become better acquainted with the course of this change, through the discovery of the ancient cities of northern Syria, and their illustration by the Count de Vogüé, which show us what the late Roman and early Byzantine buildings of every class were, on a scale united to provincial towns, though influ-

enced by the local tendency to megalithic construction which pervades the old architectures of Syria. I have not time to dwell upon these most instructive remains, which, beginning in Pagan and going on into Christian times, culminate in the vast and splendid dome erected over the pillar of S. Simon Stylites. I, however, commend De Vogüé's work to your attention.

In my lectures on the Dome, I have said almost as much on Byzantine architecture as it is perhaps needful for the purpose of this rapid sketch. I may add, however, that it was a purely or almost purely arcuated style, though yet more pre-eminently a domed style, and most of all a purely Christian style; that it rejoiced in surface decoration, in painting and mosaic, and in marble incrustation and inlay, though, from religious scruples, it discouraged sculpture. It delighted in every form of Oriental splendour, and the representation which its mosaics afford us of its secular buildings, when in full perfection, shows us that, though splendid solemnity characterised its churches, gaiety was a marked element in its more ordinary architecture. It is true that the gradual decay of the Empire caused a decline in the artistic quality of its buildings; yet we must admit its architecture to be one of the boldest and most original of developments; and we owe to Byzantium a heavy debt of gratitude for having kept alight the lamp of art during the long and dreary ages when Western Europe was trampled down by barbarian herds, its arts destroyed, and its civilisation well-nigh forgotten.

It was from this still glimmering lamp that Charlemagne nobly attempted, though almost in vain, to rekindle that of the Western Empire. It was from the same that the three first Otthos made a second and more successful effort; it was from thence that the revived art was further aided at the time of the Crusades; and to this source we, in a large degree, owe our modern civilisation. All thanks and honour, then, be to the unfortunate Eastern Empire, which, having performed its work, has now so long been trodden under foot of the Gentiles!

As architectural art recovered itself, after the ages of darkness, the later works of old Christian Rome, the still living architecture of Byzantium, and the half-living architecture of the day in Rome itself, formed together the groundwork of the revival. This architecture was all mainly arcuated; and the increased difficulty of obtaining and transporting large blocks of stone tended to render this the necessary element in the reviving style. We know the style which thus rose in Italy. I do not believe myself that much of this is so old as the time of the Lombard kings, but that it was in a much greater degree the work of the Otthos—emperors at once of Italy and of Germany—and thus extending the same style from the south of the Alps, across into Germany, and onwards almost to the Baltic. I cannot, in this short lecture, follow up the details of this early Romanesque style; but I beg you to do so for yourselves, and at the same time to make yourselves acquainted with the contemporary architecture of France, in which, subject to many variations, the same feeling will be found to prevail.

I have, in my last lecture, mentioned the introduction of purely Byzantine architecture at Venice, as especially illustrated in S. Mark's and the churches at Forcello, &c. (I may add, in secular buildings). I mentioned also its transference, apparently by the Venetians, into the south-west of France, where and whence it exercised a very decided influence on the subsequent architecture, and I have, in one of my early lectures, shown the extension of that influence at a later date—in the form of architectural sculpture—into the north of France, and thence into our own country. I will here add that parallel, though not exactly similar, evidences of Byzantine influence pervade the Romanesque of Germany, whose rulers were in constant communication with the Eastern Empire—an influence greatly promoted in decorative art by the importation of woven fabrics, metal-work, jewelry, and illuminations from the East into the West.

From such united influences, added to and aiding the earnest strivings after refined and improved art, arose the Romanesque architecture of the eleventh and twelfth centuries, becoming at length a perfectly original, consistent, and artistic development of arcuated architecture.

I have, in my previous lectures, gone much into

detail in recording and explaining the history of the development of this Romanesque into the subsequent pointed-arch style. It is, perhaps, mockery to refer you back to lectures which perhaps no one now present heard; but time will not allow me to do more, and should they be published, you may perhaps think it worth your while to refer to them.

As the Byzantine was the Christian architecture of the East, so was the Pointed style the culminating Christian architecture of our own group of nations in the West; and, while the former had the disadvantage of being developed during ages of gradually-declining civilisation, the young and vigorous shoot which grew from it in the West had the immense advantage of developing itself during the vigorous upstriving of a new and better civilisation.

To ourselves it is incomparably more interesting, inasmuch as it became the architecture *par excellence* of our own and immediately neighbouring countries. It grew up in this country with our institutions; it is of the same age with our constitution and our system of laws, and in many respects with our ecclesiastical polity. It adapted itself to our climate, our materials, and our scenery. In this style are the monuments of our kings and of our forefathers; and, above all, in its original and identical temples do we still celebrate the offices of our holy religion. Well, then, may we say—in common with each nation of Western Europe—that this is our own, our natural and our national style!

And well may we glory in this assertion, for look at the monuments of that style! I have not been stinted or cold-hearted in my eulogy of the architecture of ancient Greece and Rome, so I may call you to witness that I am not narrow or one-sided if I give way to a generous enthusiasm now I come to speak of that which we may proudly call our own.

The architecture which produced our glorious cathedrals and abbeys; our churches of every scale, from these down to that of the humblest hamlet; which produced the colleges of our universities, with their noble chapels and halls; which produced the stately municipal buildings of the great manufacturing cities of Mediæval Europe; with every form of structure needed, for whatever purpose; and united true and appropriate art with every form of building, from the humblest to the most stately. An architecture, too, which decorated its edifices with such a form of art as our ancient painted glass; and which carried on its influences over metal-work, jewelry, painted decorations, and every collateral art in the same spirit of exquisite and original taste, may well claim to stand side by side with the most glorious productions of antiquity; but to ourselves, as the inhabitants of the countries where it prevailed, and the descendants of the artists who produced it, it has pre-eminent claims to our most loving and enthusiastic admiration; while the more closely, constantly, and carefully we study its remains, the more entirely shall we be convinced that our love and admiration cannot exceed what is due to its intrinsic excellences.

(To be continued.)

AMERICAN SOCIETY OF CIVIL ENGINEERS.

THE CHARACTER AND POSITION OF NEUTRAL AXES AS SEEN BY POLARISED LIGHT—PNEUMATIC FOUNDATIONS—THE MANUFACTURE OF PNEUMATIC PILES—SCREW PILES FOR SUPPORTING WATER MAINS.

A REGULAR Meeting of this Society was held at the rooms in New York, February 19th, 1873.

The SECRETARY presented the following discussion of a paper “Upon the character and Position of Neutral Axes as Seen by Polarised Light,” by Louis Nickerson, C.E., of St. Louis, read before the Society December 18th last.

COL. MERRILL: This paper opens a field for examination which promises the most useful results in a matter of vital interest to engineers—the laws of strains in materials used in construction. The plan of using glass to find out these laws brings to mind the practice of physicians in ancient times of determining the laws of the human body by experiments upon those of the lower animals. In examining the action of strains within opaque bodies, the method by analogy seems to be the sole one, aided, of course, by what is visible on the surface, and detected

after fracture. Further experiments will probably enable us to decide with fair accuracy what is the magnitude of an unknown strain on a glass column, by comparison with the observed effects of a known strain upon a similar column. The proposed strengthening of tubes by external rings at regular intervals is a curious result of the experiments, and, if confirmed by practice, a valuable discovery. The whole discussion illustrates the interdependence of all branches of physical science, and that no discovery is to be considered useless, no matter how far it is apparently removed from practical application.

Mr. McALPINE: The civil engineer has rarely to deal with glass as a material of strength; still, evidently, it will be affected in the same way as any similar material—as cast-iron. It is a characteristic of this age, that every discovery in science is made useful to the engineer or constructor. Some years ago, Prof. Airey devised a system of measuring the strains in each member of a truss, with a model in steel, of which he had exact duplicates. When the model was loaded, a member was struck, and the strain upon it measured by the load borne by the duplicate when in accord. There we have *sound*, and here we have *light*, to aid in solving an important problem.

General ELLIS: Wertheim, of Paris, invented an instrument for the determination of strains and pressures by the colours of polarised light. Mr. Nickerson's examinations are in the right direction, and it is hoped he will pursue the matter. What we want to know is, the elastic resistance to tension and compression in any one substance, and the effect of a weight upon a beam of the same substance; then, knowing by experiment the elastic resistance in both directions of other substances, we might reason upon the position of the neutral axes of beams made therefrom. Writers upon the strength of beams err in assuming that equal strains extend and compress the same substance equally (thereby locating the neutral axis of horizontal strains in the middle of a rectangular beam); also that the elastic and ultimate resistances are proportional. How can polarised light show a neutral axis in a glass beam, supported at the ends and weighted in the middle, instead of a neutral point under the weight? Everywhere in the beam, except at the central point, these are diagonal strains, which will, as well as the horizontal strains, transmit the polarised rays. The additional element of strength referred to in the paper is, I think, due to the elastic yielding of fibres, which, in consequence slip upon each other without a diminution of their ultimate strength: otherwise, in a beam under strain, the outer fibres would be ruptured before the others were loaded.

A communication from General Smith, Chairman of the Committee appointed at the Annual Convention, held in Chicago, June 5th and 6th last, to urge upon the United States Government the importance of a thorough and complete series of tests of American iron and steel, and the great value of formulae to be deduced from such experiments, was read, stating that information is required of what has been done in this direction by other governments, as well as by Corporations and individuals here and abroad—of new forms employed—and of new processes of iron and steel making and their products.

A paper by Gen. W. Sooy Smith, of Maywood, Ill., on "Pneumatic Foundations" was read. The first two bridges on pneumatic pile foundations, erected in the United States, were, one over the Santee River, on the North Eastern Railroad, built in 1855; and the other over the Great Pedee River, on the Wilmington, Columbia, and Augusta Railroad, built in 1857. The air-lock used in sinking these piles was invented by Alexander Holstrom. It was a cast-iron cylinder 6ft. in diameter, and 4ft. high, closed at top and bottom by cast-iron plates, through which were man-holes opening downward for entrance, and bull's-eyes of glass for light. Two goose-neck pipes passed through the sides and bottom, one for the introduction of air, and the other for the discharge of water, when it would not escape through the material underneath the pile. A windlass was attached for raising the earth within the pile, all of which was removed by hand. There were four air pumps, set in a single frame, of such excellent construction that they served for sinking of their foundations, those of the Third Avenue Bridge, New York, across Haslem River, and of the Leavenworth Bridge across the Missouri River, and are now being repaired for use for sinking the piles for the Little Rock Bridge, across the Arkansas River. Construction of the pneu-

matic pile piers for a bridge over the Savannah River, on the Charleston and Savannah Railroad, was begun in the fall of 1859. The air-lock used was 6ft. instead of 4ft high, and, to save weight, the cylinder of wrought instead of cast-iron. Two defects were soon apparent, one, practically no natural light was admitted into the pile through the bull's-eyes in the air-lock plates, those in the bottom being covered with dirt most of the time; another, the air-lock was too small to stow the material raised, so that, when discharging the same, work in the pile was much delayed. To overcome these defects, an air-lock was made of less diameter than the pile, so that an annular space was left between the two in the plate covering the top of the latter, into which bull's-eyes were introduced. Through the side of the air-lock was a pipe or trap, inclined at an angle, to discharge readily any material put into it, and arranged for closing at either end; the outer end being closed, the trap was filled with material, the inner end was then closed, the compressed air thus cut off from the air-lock liberated, and the outer end opened, when the material would pass out. By reversing the process, the trap was made ready to receive material again. By this modification, no artificial light was required during the day, and at night it could be reflected into the pile, without the inconvenience of candles or lamps burning in a compressed atmosphere. No detention occurred from this or from voiding the material raised, and nearly thrice as much work was done in the same time as with the Holstrom air-cock. It was soon found that the sandy material through which these piles were sunk could be raised by the escaping compressed air through a discharge pipe, and delivered outside in a continuous stream: For this the mouth of a flexible tube, fitted to the lower end of a fixed pipe, was thrust into the wet sand, and moved from place to place as the material disappeared. The ratio of work done to that with the old air-lock, which before was as 28 to 10, now became as 28 to 1. The improvements thus introduced have been generally used since, by General Smith, in sinking foundations by the pneumatic process. For the flexible tube, one iron pipe sliding into another, with a hempen gasket between, has been substituted with still better results; thereby 7 men have excavated 6 cubic yards per hour for several hours; by hand, $\frac{2}{3}$ of a cubic yard per day per man is about the rate. The late war interrupted this work, and also prevented consideration of a plan submitted to the U.S. Lighthouse Board, in 1860, for the erection of a lighthouse on Frye-Pan Shoals, or a similar position on the coast, embracing the sinking of a caisson, from 30 to 50 feet in diameter, to any required depth less than 100 feet, inside of which a masonry foundation of dovetailed stones was to be laid. Soon after the war the plan was adopted to the repairing of Wangoshance Lighthouse, located at the western entrance of the Straits of Mackinac, upon a rocky reef $2\frac{1}{2}$ miles from shore. It is a brick tower 24 feet in diameter, 84 feet high from water surface to focal plane, and stands upon a foundation 24 feet square, consisting of a crib filled with concrete and rubble masonry; this crib was surrounded by others filled with loose stones, all framed together into one pier 100 feet square. At this time the timbers, put in place in 1848, were decaying under the action of seas, as heavy as any upon the northern lakes, and the ice; the utter destruction of the pier was threatened. It was proposed to protect the tower from waves and ice by surrounding it with a strong sea wall 66 feet long, and 48 feet wide on the outside—8 feet thick, and semicircular at the ends. An annular pneumatic cofferdam of boiler iron was built up in places around the tower, large enough to enclose the walls. It was provided with two airlocks, each having a rectangular trap, through which, material and workmen passed; and a windlass driven by steam. The dam was suspended by chains from beams resting upon the woodwork of the old pier, and, with stones, loaded somewhat in excess of its buoyancy. For 6 feet below the water surface, the crib timbers of pine, 12 by 12 inches, built up solid, and strongly drifted-bolted with round 1 inch iron bolts, had to be cut through. The reef then reached was made up of boulders varying in size from a hen's egg, to 10 tons weight:—the large ones, when found under the edge of the caisson, were first split with plugs and feathers, or undermined, drawn into the caisson, and then split. In some instances where large stones rolled against the dam and kept it from sinking, the dam was allowed to rise, and

the stones were rolled inward. The dam was sunk to a depth of $12\frac{1}{4}$ feet below the water surface, and 6 feet below the foundation of the tower, which, though not upon bed rock, as expected when the work was begun, was, where the boulders (which had lessened in size as the depth increased) were most perfectly compacted together, and below the scouring action of the waves, from which the dam was protected by the remaining portion of the cribs. The bottom of the dam was then sealed with two successive layers of the quickest setting Louisville cement, each 6 inches in depth, and set under water; which, when the air pressure was reduced, entered through holes left for it in the layers. It was found the 12 inches of cement thus laid, would not, after four days' setting, resist the pressure of water outside, hence the first three courses of masonry, each 2 feet thick, were laid in a compressed atmosphere. The stones were doweled together with iron pins $2\frac{1}{2}$ inches in diameter, the end of each pin was drilled 1 inch in diameter, 3 inches deep, and sawn so that when in place, and a taper bolt was driven therein, the dowel was permanently enlarged. When the wall was finished, the space between it and the tower was filled with concrete, and covered with flagging. The coffer dam, which might have been removed for use elsewhere, was left in place. Work could only be done in the six months beginning with May, and frequently it was interrupted by storms. During the first season, the chamber to receive the dam was excavated, the machinery was put in place, the dam built, and sunk 4ft. During the second season, the sinking was concluded, and seven courses of masonry laid; and during the third season, the work was entirely finished. An average force of 40 men were employed. The entire cost, including a new dwelling for the lighthouse keeper, was less than 200,000 dollars. This is the first instance of the sinking of a pneumatic cofferdam or caisson in America. After the completion of this work, General Smith, in 1869, proceeded to put down at Omaha, for a bridge across the Missouri River, the first pneumatic piles sunk west of the Alleghany Mountains, and to a depth greater than ever before reached—82ft. below the water surface. The material was very difficult to penetrate. It consisted of a fine silt, stratified with layers of coarse sand and tough blue clay—the latter not more than 2ft. deep, and with a stratum of pebbles or gravel $1\frac{1}{2}$ ft. to 2ft. deep next to the bed-rock. The first pile went down vertically. The second, after sinking 27ft., took an inclination, which could not be corrected in the next 20ft. by the various means applied—which, although they failed here, in many other cases have succeeded at a depth of from 40ft. to 50ft.

(To be continued.)

ANNUAL REPORT OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE annual Report of the Royal Institute of British Architects, which will be submitted to the annual meeting on Monday next, has been sent to us.

Judged by the increase in its members, the year just completed has been for the Institute a prosperous one. Fifteen Fellows have been elected (five from the Associates), and thirty new Associates. Four gentlemen have been admitted as Contributing Visitors, and five passed candidates in the Preliminary Architectural Examination enrolled as Students of the Institute. By death the Institute has lost Messrs. R. R. Banks, R. P. Browne, E. C. Hakewill, F. Marrable, A. S. Newman, W. Slater, A. B. Denton, N. T. Randall, E. D. Spurr, and its Past President, Sir William Tite.

To prevent any future excess of disbursements over receipts, the Council propose that an annual budget shall be prepared, giving an estimate of the income and expenditure for each year. It has also been arranged that henceforth the Conference and the Architectural Examination shall take place in alternate years; that the Conference shall be open to the public press (by which means the expense of publishing papers read at the Conference may be saved), and that the Architectural Examination shall only be held when an adequate number of candidates present themselves, so that it may be as far as possible self-supporting. With regard to the sum of £50 voted in aid of the Art Classes, the Council are of opinion that in future such grants should only be made when the annual

budget promises an available surplus. The Art Classes scheme has been unsuccessful, and for the present abandoned. A final grant of £30 is to be recommended, to clear off liabilities incurred in connection therewith.

The cost of the Sessional papers is a heavy item in the annual expenses, and the Council scarcely hope to reduce it to less than £250 per annum, though they "have under consideration an arrangement by which the credit given *per contra* for advertisements inserted may be increased."

The General Conference of 1872 brought to a successful issue the deliberations and proposals of the same assembly in 1871. The Schedule of Rules for Professional Practice and Charges was carefully revised, and some clauses advantageously remodelled. A step has also been taken in the direction of effecting a reform in architectural competitions. The Conference Committee, after collecting a mass of opinions on the subject, drew up a series of regulations, which after having been submitted to and revised by the Conference of 1872, are now printed and issued to every committee or private promoter of competitions announced or proposed.

The consideration of the diversity of practice prevailing in the employment of surveyors was practically postponed till 1874, when the Committee will have drafted another report entering more fully into the details required.

The revision of the rules for the Architectural Examination has attracted attention. Five candidates have come forward in the Proficiency Class, and fifteen for the Preliminary Examination in May.

The drawings submitted in competition for the Institute prizes during the year are characterised as of unusual excellence: Mr. Aston Webb, Mr. William Frame, Mr. Ernest C. Lee, and Mr. A. H. Kersey, are especially commended.

The Lord Chancellor has consented to present a petition to the House of Lords, drawn up by the Council, pointing out the inconvenience and expense which at present attend the investigation and settlement of questions affecting the practice of architects and surveyors, and advocating the establishment of such tribunals and powers of reference as are contemplated in his Bill for the constitution of a Superior Court of Judicature.

The Committee for the Conservation of Ancient Monuments and Remains have met on several occasions. At the suggestion of Mr. Beresford Hope, a memorial has been presented to the Parliamentary Committee appointed to consider the subject, urging the advisability of preserving intact such churches as S. Mary Woolnoth, S. Mary-le-Bow, S. Mary Aldermary, and S. Bride's, Fleet-street, or if their removal be inevitable, of re-erecting them elsewhere. The Council were invited to attend the public meeting lately convened to support Lord Elcho's views on the threatened destruction of Northumberland House, and the memorial there adopted was to have been left at the rooms of the Institute for signature. It appeared, however, to the Council too comprehensive in its aim, and they determined to draw up a separate memorial providing for the main objects in view, without committing the Institute to the sanction of any measures likely to fetter the exercise of competent taste in cases where the authority of Parliament is not required.

The Board of Examiners appointed under the Metropolitan Building Act, 1855, have held four meetings during the past twelve months. Nine candidates desirous of obtaining certificates of competency to act as district-surveyors have been examined, and five have received certificates, their names being forwarded to the Board of Works, in accordance with the usual custom.

The appeal in his opening address by the President, on behalf of the Architects' Benevolent Society, has failed to meet with any appreciable response. A proposition has recently been made which, it is hoped, will promote the objects of the charity, while it realises another project that has been entertained. It is proposed to hold an annual Dinner at which members of the Institute and their friends, including amateurs and patrons of architecture, shall be present. The social character of such a gathering will no doubt be appreciated by many who have few similar opportunities of meeting their brethren in Art, and may tend to encourage that *esprit de corps* which is as valuable to architects as to men of any other profession. It will also afford an occasion for enlisting subscribers to the charity by the same means which are adopted in the case of

other benevolent institutions. The 11th of June has been appointed for the dinner this year, and the President of the Institute will be requested to take the chair.

The recommendation of Mr. Thomas H. Wyatt for the award of the Royal Gold Medal of 1872-3, was a step confidently taken by the Council, and as heartily approved by the general body of members. If the accident of his official relation to the Institute when the nomination was made, raised any scruples as to the propriety of his accepting that honour, they were removed by the Council's desire, in the closing year of Mr. Wyatt's presidency, to acknowledge and recognise by one act a twofold claim to their respect. Mr. Wyatt's works and professional position might long since have entitled him to the medal. As President, his impartial judgment, unflinching courtesy, and assiduous attention to the business of the Institute, have earned for him the gratitude of the Council.

In nominating his successor, the Council felt that they were only anticipating the wishes of the members in general. Sir Gilbert Scott's name has been so long before the public, as well as the professional world, that any plea for his title to the presidency would be superfluous. The formal act of his election has yet to be accomplished, but the Council look forward with confidence to the result, believing as they do, that it will place at the head of the Institute a gentleman on whose opinion and ability in the future administration of its affairs all may safely rely.

ARCHITECTURAL ASSOCIATION.

AT the meeting of the Architectural Association this (Friday) evening, a discussion will take place on the much-vexed—and vexing—question of Competitions. The question, "Are architectural competitions capable of being made beneficial to art, to the public, or to the profession?" will be answered in the negative by the opener of the debate (Mr. Thomas Blashill, A.R.I.B.A.), and it is to be hoped that those who defend the competition system on the ground that it often enables unknown men to come to the front, will be present to maintain the affirmative of the proposition. It is hardly possible that the result of this debate will be to eradicate the abuses which almost seem inherent to this competition system; but, although the subject has been written upon and spoken about *ad nauseam*, it has not been thoroughly well considered by the bulk of the members of the profession. Our warrant for saying this is to be found in the fact, too often evident, that numbers of architects, and especially the juniors of the profession, are eager to comply with conditions which are dictated by the parsimony or cupidity of the promoters. Compliance with such conditions would be impossible to professional men possessed of self-respect; and it is to be hoped that, if the discussion which Mr. Blashill is to open to-night does nothing else, it will tend to deter architects, young or old, from noticing such conditions as we have referred to. If they will abstain from nibbling at the choice baits frequently held out to them, one, at least, of the abuses of the competition system will correct itself, for such tempting offers will cease to be made when they meet with no response.

Mr. Edmund Sharpe has offered to meet the members of the Association, on some evening to be fixed, when, by particular desire, he will explain the principle of the cymagraph, and the way in which that useful and ingenious instrument for describing the contour of mouldings is used. On the same occasion there will also be some preliminary discussion with regard to the annual architectural excursion under Mr. Sharpe's guidance. On this occasion the main features of the arrangements—such as the locality to be selected, and the date of the excursion, will be decided upon.

To-morrow (Saturday) afternoon the members will visit some new schools at Bow and Bromley, now in course of erection for the London School Board.

WREN'S CHURCHES.

PROFESSOR DONALDSON recently appeared before the Select Committee on the Union of Benefices Bill in support of the following memorial of the Royal Institute of British Architects:—"The Committee for the Conservation of Ancient Monuments and Remains (appointed by the Council of the Royal Institute of British Architects) have had their attention directed to

the Union of Benefices Bill, recently referred to a Committee of the House of Commons. The measures contemplated in this Bill appear to involve the destruction of certain churches designed by Wren, Hawksmoor, and other distinguished architects, which have long been regarded with interest on account of their historical associations and artistic design; and this Committee, while bearing in mind the important objects of the Bill, the great value of the land on which these buildings stand, and the necessity of providing, with the proceeds of their sale, church-accommodation elsewhere, are nevertheless of opinion that the entire removal of several of the churches referred to would be a subject of great regret among all who value such monuments of structural art. This Committee observe with satisfaction that under clause 15 special provision is made in the Bill for their being rebuilt on the same model elsewhere. Finally, this Committee would suggest that before actual steps are taken by the Commissioners under the proposed Act for the removal of any one of the City churches, the President of the Royal Institute of British Architects for the time being should be permitted to attend and lay before the Commissioners in person such reasons as may appear to this Committee urgent for its preservation or re-erection. And your memorialists will ever pray, &c. Signed, on behalf of the Committee: Thomas Henry Wyatt, President of the Royal Institute of British Architects; Alfred Waterhouse and Horace Jones, Vice-Presidents." Professor Donaldson having given evidence in support of the memorial,

The Rev. B. M. COWIE, Dean of Manchester, and late Vicar of S. Lawrence Jewry, gave evidence, the following being some of the questions put to him:—Q. Supposing it were considered desirable to preserve a church, for architectural or other considerations, the parish itself being united to an adjacent one, do you think the existing buildings could be satisfactorily converted into ward schools? A. I think not; I don't think the churches I have in my eye could be converted into schools at all satisfactorily. Q. Why? A. They are not suitable: in the first place, the light is not very good; the structure is not one to meet the requirements of a school. Looking at the Privy Council requirements, I think it will be very difficult indeed to convert those buildings into schools that would be at all satisfactorily arranged. I should not like to undertake it myself. Q. Would there be any harm in giving the Commissioners the option of so applying them in case one or two might be found available? A. I think it would be better to give the site on which to build a school. Q. Have you at all entered into the question of the respective claims of S. Edmund the King and S. Mary Woolnoth to be preserved? A. I thought S. Mary Woolnoth might have been sacrificed a little while ago, but now Dr. Irons has come there I am rather anxious it should not. Q. You are glad that Hawksmoor's *chef-d'œuvre* has been awakened into life? A. I was not aware of its being Hawksmoor's *chef-d'œuvre*. Q. Professor Donaldson says that "S. Lawrence Jewry is a small, well studied church in every respect. The interior is of a high class of art, and the tower is very effective, from its height of 150ft., and its graceful proportions." Do you agree in that? A. With respect to the interior, I agree with it. I was not aware that the tower was an object of admiration to architects.

The Rev. B. M. Cowie was the last witness examined, the other witnesses being Mr. J. Medwin, C.C., Mr. Ellington, the Rev. A. A. W. Drew, the Rev. Michael Gibbs, Mr. Deputy Burnell, and Mr. Corrie, the Remembrancer.

THE BRONZE HORSES OF VENICE.—These horses were supposed to have been the work of Lysippus, who flourished four hundred years before the birth of Christ. They were (says Mr. J. B. Marsh, in "Venice and the Venetians") made of bronze, larger than life, and were perfect in shape. When Augustus conquered Antony, he brought these horses from Alexandria and set them upon a triumphal arch in Rome. Nero, Domitian, and Trajan each erected arches on the summits, on which the horses were placed at different periods. Afterwards Constantine transferred them to an arch of the Hippodrome at Constantinople, and from here they were removed by order of the Doge to Venice, where they were placed over the western porch of S. Mark's.

Yarmouth proposes to establish an aquarium similar to that of Brighton.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NOTES ON ALBERT DÜRER.

An attentive study of this truly great artist will well repay the architectural student. Some time spent in his company will be found to be most salutary, if it does no more than impress us with reverence for the consummate mastery of technicalities possessed by this patient and noble worker of Nuremberg, or to warn us of the dangers to which we are exposed in these days of rapid work and keen competition, when quality of art must too often succumb to quantity, and lose perhaps its only claim to our attention. In giving a few selections from his works it must not be thought that it is for a moment possible to copy him. That attempt must ever be a failure; but we can perhaps point out what is admirable in him, and by giving a sample or two, taken from some very opposite examples, direct attention to what we consider his excellences.

To thoroughly appreciate him we must dismiss, first of all, those German superstitions and weird imageries, which being alien to our ideas, we are not prepared to understand, looking upon him merely as a delineator of natural or artificial form. Once we can forget his singular inability to produce anything merely "pretty" or winning, we are on the way to enjoy him. He ministered to that faculty in the mind of man that seeks the perfection of truth and exactitude of representation. There is little vagueness, in execution at least, about Albert Dürer; his style, therefore, is one of the best for the student of architectural art to emulate.

Fig. 1 is the *Helmet and Wings from the "Armorial Shield of the Death's Head."* The curvature of the wings radiate in studied gradation within a boundary formed by catenary curves. Like Turner, he saw wonderful things in wings and plumage, and spared no pains in depicting their marvellous construction. The tilting helmet is full of strange and piquant lines, forming a striking contrast to the wings. Figs. 2 and 3 are from *"The Lord and his Lady,"*—the former the lady's head-dress, which would compare well with a modern chignon. The feather is rendered in that thorough manner in which Dürer delighted. No. 4 is a little piece of "distance," almost impossible to render adequately. Some of his short-hand memoranda in this way are indeed wonderful. Nos. 5 and 7 are examples of drapery, in the rendering of which he was peculiarly crisp and almost metallic. Both are, nevertheless, graceful and true to the laws of composition. In the second example we get an area of unwrinkled fold, contrasting with the disturbed surface of the other portion. The tree and bit of distance are very characteristic. Rooted to the earth, the trunk rises in well-knit strength, and seems, as it were, to turn with life. Nos. 8, 9, 10 and 11, give us a little joinery, in which he delighted, with something rather good in the stop-chamfering way; they are from his *"S. Jerome in his Study."* Figs. 12 and 6 have some good architectural composition, in which his drawings are usually very rich. Fig. 13 is S. Jerome's table, of regular German type, with quaint book-rest. Dürer was always glad to construct something, if only a table or a box; perhaps it gave him more food for thought than he could get in mere chiaroscuro or even colour. It is curious to reflect that at this time the Venetian painters were in all their glory and blaze of colour, whilst Albert worked on alone in his Northern home, almost in ignorance of their splendours; for it was not until he was famous that he was able to see Bellini or be astonished by the fecundity and brilliance of his followers. Fig. 14 is a study of a pumpkin or Calabash hanging from the ceiling of S. Jerome's study. The original is full of graphic lines, and is reproduced at a very moderate cost by the Autotype Company. Fig. 15 is a plane from that mysterious *"Melancholia."* Figs. 16 and 17 are also two of the many implements lying discarded. In this picture there is a combination of imaginative power with microscopic realism that is not often met with. Figs. 18, 19, and 20, are bits from S. Jerome's Study, which though very slight in themselves, display great appreciation for distribution of form. As a fitting finale, comes the tail of the lion, also from this drawing. Certainly there is power in its flow of line and swell of curvature.

Few artists have given us more lasting food than Albert Dürer, and any one may rejoice when he can honestly say that he finds pleasure in his

work. Perhaps the best test of a nation's art-progress is its ability to appreciate and delight in abstract form and beauty, apart from vulgar or commonplace associations. Architectural expression is perhaps the most abstract form which art can take, and is the most faithful mirror of the national mind. By the study of the laws or impulses that actuated the hand of Albert Dürer, or men of kindred power, we may one day, perhaps develop a style of art architecture worthy of our position.

But the first thing to do is to tell the people what art is—that it is not a sensual trick to take the eye or lure the feelings merely; though it need never be ugly—that there is in it nothing contrary to the most Stoical ideas of political economy, or that must of necessity undermine our greatness. Bad art alone will do this; good art becomes abused, and has to bear the contumely thrown with good reason upon trash. We shall do well to refresh ourselves occasionally from so pure a fountain-head as that of Albert Dürer.

W. H. L.

BAYHAM ABBEY.

Bayham Abbey, in Sussex, was founded about the year 1200, by Robert, nephew of Michael-de-Turnham, for monks of the Premonstratensian order. He granted them all his land at Begeham to build an abbey to the honour of S. Mary. Kings John and Edward III. confirmed these grants. On the 8th of February, in the seventeenth year of Henry VIII., the abbey was suppressed, under a bull of Clement VII., among the smaller monasteries, which were appropriated to the endowment of Wolsey's two foundations of Ipswich and Oxford. It was valued at £152. 9s. 4½d. per annum. Four years later it again fell to the Crown, and Queen Elizabeth granted it to Anthony Browne, Viscount Montague. In the time of George I., the site was bought by John Pratt, serjeant-at-law, whose descendant, the Marquess Camden, still holds it.

The two drawings show most of the architecture now remaining which is worth attention; that of the present nave is very much later, and of the poorest possible description. The plan is interesting, and enough of the walling remains above the ground to show it clearly. It is given in the *BUILDING NEWS* of July 15, 1870, where may be found some further particulars of the abbey, by the Rev. Mackenzie E. C. Walcott. Our engravings are reproduced from the drawings of Mr. Philip J. Marvin, who deservedly won the prize-medal at the Institute this year.

CHURCH OF S. WILFRID, YORK.

One of our illustrations is an elevation view of the beautiful church of S. Wilfrid, York, as erected by Mr. Geo. Goldie, of Kensington. Next week and the following week we shall give details and description of this church.

SPECIMENS OF EGYPTIAN PLASTIC ART.

We give this week the plate intended for last week, and so rectify to some extent the mistake then made. For *"Specimens of Egyptian Art,"* on plate last week, read *"Specimens of Early Greek Art."* For description of illustrations on both plates, see Dr. Zerffi's articles, p.

GLOUCESTER CATHEDRAL.—THE NAVE.

One of our principal engravings illustrates the Nave of Gloucester Cathedral. The following is taken from *"Murray's Handbook to the Cathedrals of England"*:—

"The nave consists of nine bays, from the west front to the central tower. Of these all are Norman to the top of the triforium, except the two western bays, which are Perpendicular (Abbot Morwent's work). The Norman clerestory was altered, and the Norman portion of the nave was newly vaulted, in the first half of the thirteenth century. (The nave roof was completed in 1242. The monks themselves, according to Froucester's Chronicle, laboured at it—considering, suggests Professor Willis, that they could do the work better than common workmen.) The nave piers have plain bases and cushioned capitals. The arches have the zigzag in the outer moulding and a double cable in the soffit. A cable moulding runs along above them. In the triforium two arches in each bay circumscribe four smaller ones, the tympana above which are quite plain. In constructing the new clerestory, the Norman work immediately above the triforium arches was entirely removed; and only the jambs of the side lights which extended beyond the triforium

arches, with the wall between them, were allowed to remain. The jambs of these Norman lights, with zigzag mouldings, may still be traced in each bay of the clerestory. The windows of the Early English clerestory were filled with Perpendicular tracery, possibly by Abbot Morwent.

"The Norman portions of the nave may have belonged to the church of Abbot Serlo (completed in 1100); but it is impossible to say how much alteration or rebuilding was rendered necessary by the fires of 1122, 1179, and 1190. The red colour of parts of the piers where the stone has become calcined, still bears witness to the fierceness of, most probably, the last of these fires, by which the wooden roof of the Norman church was destroyed. This was replaced during the abbacy of Henry Foliot (1228—1243), by the existing vaulting; which is plain quadripartite, with a central rib and bosses at the intersections. The groining, of a light porous stone, is plastered on the underside. The vaulting-shafts (of the same date as the roof), in groups of three, are of Purbeck marble, with stone capitals of leafage, and Purbeck abaci. These rest on a series of brackets supported by shafts which descend between the pier-arches. The first five of these brackets, counting from the third (the first Norman) bay of the nave, are perhaps Transitional Norman, and the cable-moulding at the head of the pier-arches passes round them. The next three eastward have the cable-moulding cut away for them; and on either side is a shaft of Purbeck marble with foliated capital, from which a moulding is carried round the bay of the clerestory. This part was perhaps more injured by the fire, so that the earlier work required greater alteration. (The peculiar arrangement, suggests Professor Willis, may have been one of the consequences of the monks' amateur workmanship.) The capitals and corbels of the vaulting-shafts were richly coloured; and remains of painting were found on the great piers themselves during the late restorations. Against three of the piers on the north side are Perpendicular brackets, for lamps or for statues.

"The two western bays of the nave were the work of Abbot Morwent (1420—1437), who pulled down the Norman front, which had towers north and south, intending to reconstruct the entire nave—a design fortunately prevented by his death. The contrast between the noble Norman columns and the Perpendicular piers is sufficiently striking. The westernmost bay is much wider than the others; there is no triforium; the clerestory windows resemble the others, all of which were probably inserted by Morwent; and the vaulting is a rich lierne, with bosses of leafage."

THE BISHOP OF WINCHESTER ON "CHURCHES FOR CONGREGATIONS."

—In the course of his sermon on the occasion of the re-opening of S. Mark's, Kennington, on Friday last, the Bishop of Winchester (Dr. Wilberforce) said:—"When this church was built our own land was just beginning to awake to the necessity of building new churches. The result of that youthful ardour was that we were very rash. We were very little disciplined for the work we had to do. Great sums of money were laid out—as was the case on this church—in producing a very undevotional church at least—a place where a great number could be gathered together, it is true, and where we thought they could be preached to with admirable success, although the conformation of these churches, with their galleries so large, is in a certain measure hostile to the more devotional parts of the service. The elevated galleries were a great temptation to young people to stare about the church. Built upon the ideal of those worldly buildings for dramatic shows and exhibitions—where the greatest possible number of people who can be made to see is the one object of the building—our churches built at that time combined the worldly element in them, which serves as a great temptation to those who have not advanced in devotional habits. . . . Now no one in his senses would think of laying out large sums of money in building churches like this."

BANQUET TO THE BOARD OF WORKS.—On Wednesday evening the Lord Mayor entertained the members of the Metropolitan Board of Works and of the School Board for London at a banquet in the Mansion House. In giving the toast of the evening, the "Metropolitan Board of Works and the School Board for London," the Lord Mayor highly eulogised both bodies.

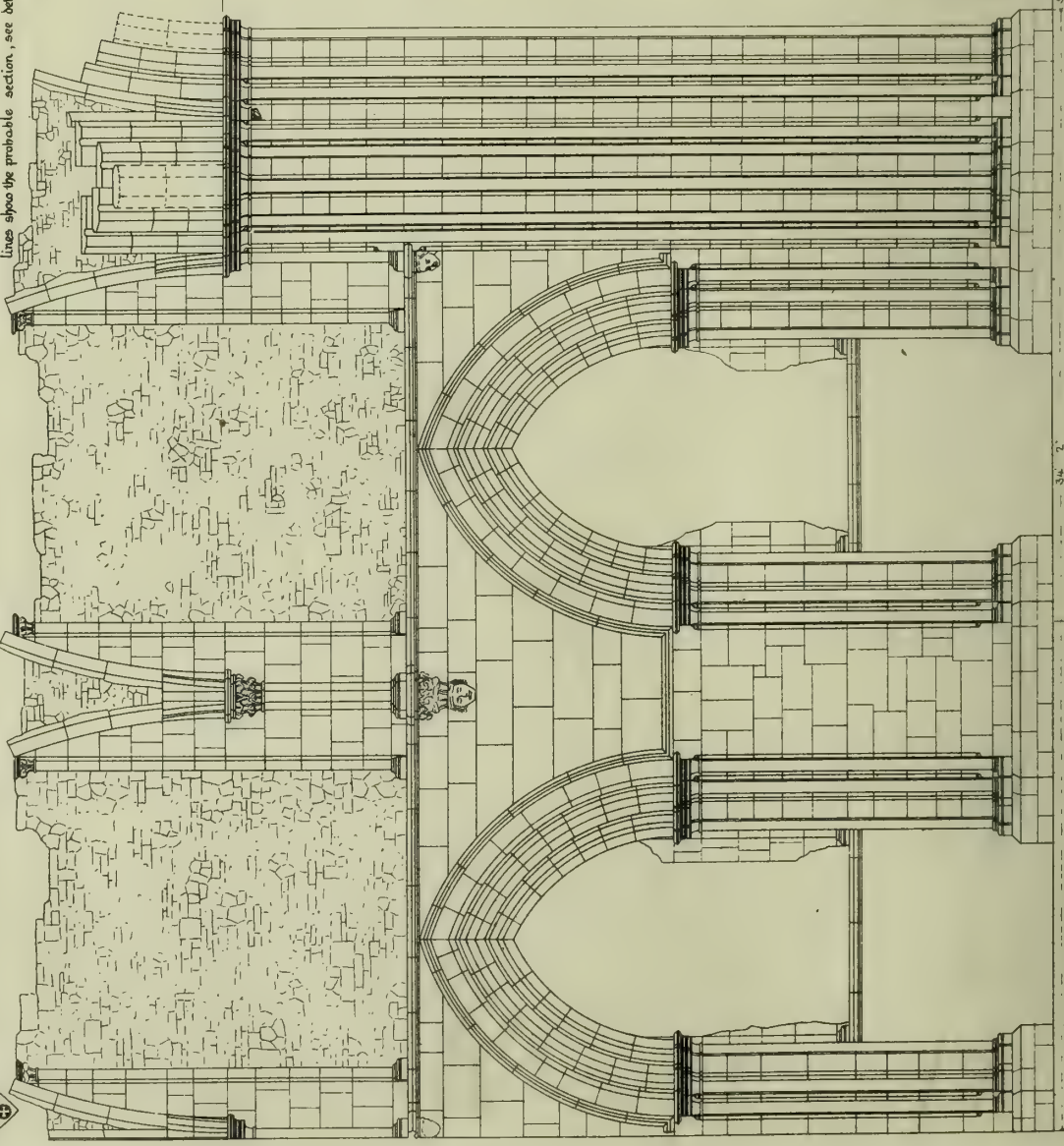
BAYHAM ABBEY, SUSSEX.



Scale 1/2 inch = 1 foot

The spaces between the shafts are now filled in with rubble work as shown.

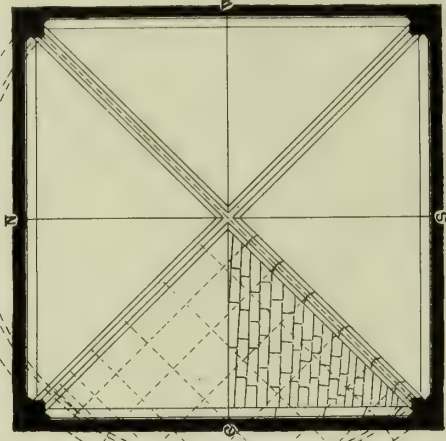
The first order of arch mouldings is gone, the dotted lines show the probable section, see detail.



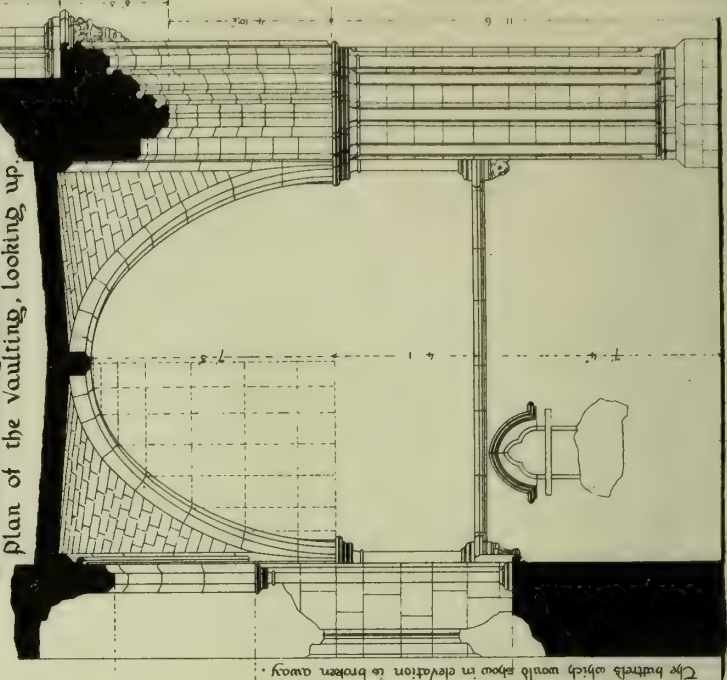
Elevation of East Wall of North Transept.

What remains of the deviation of the South Transept agrees with this. No shafts remain so I have not pointed them, the caps and bases however determine the size.

Drawing No 1



Plan of the vaulting, looking up.



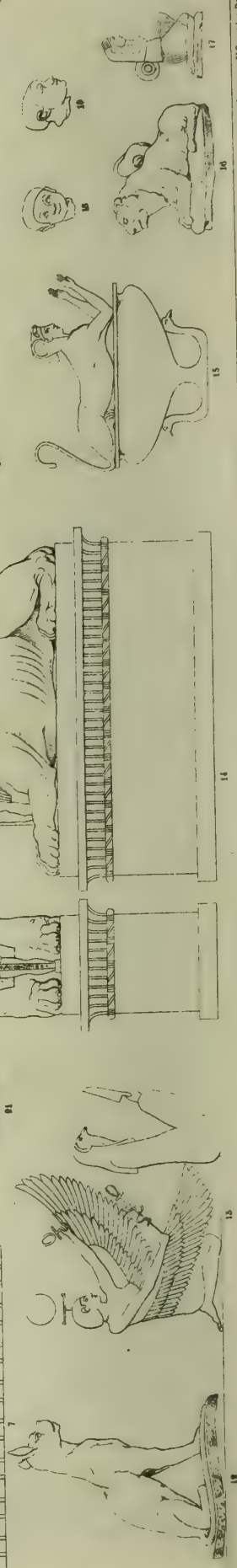
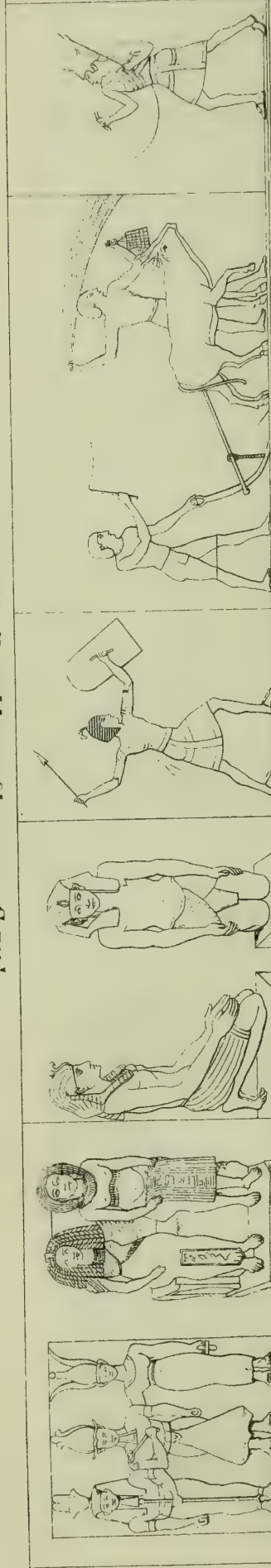
Section of North Chapel, looking South.

Excepting a few details all the four chapels are alike, a wood shop now protects the vaulting.

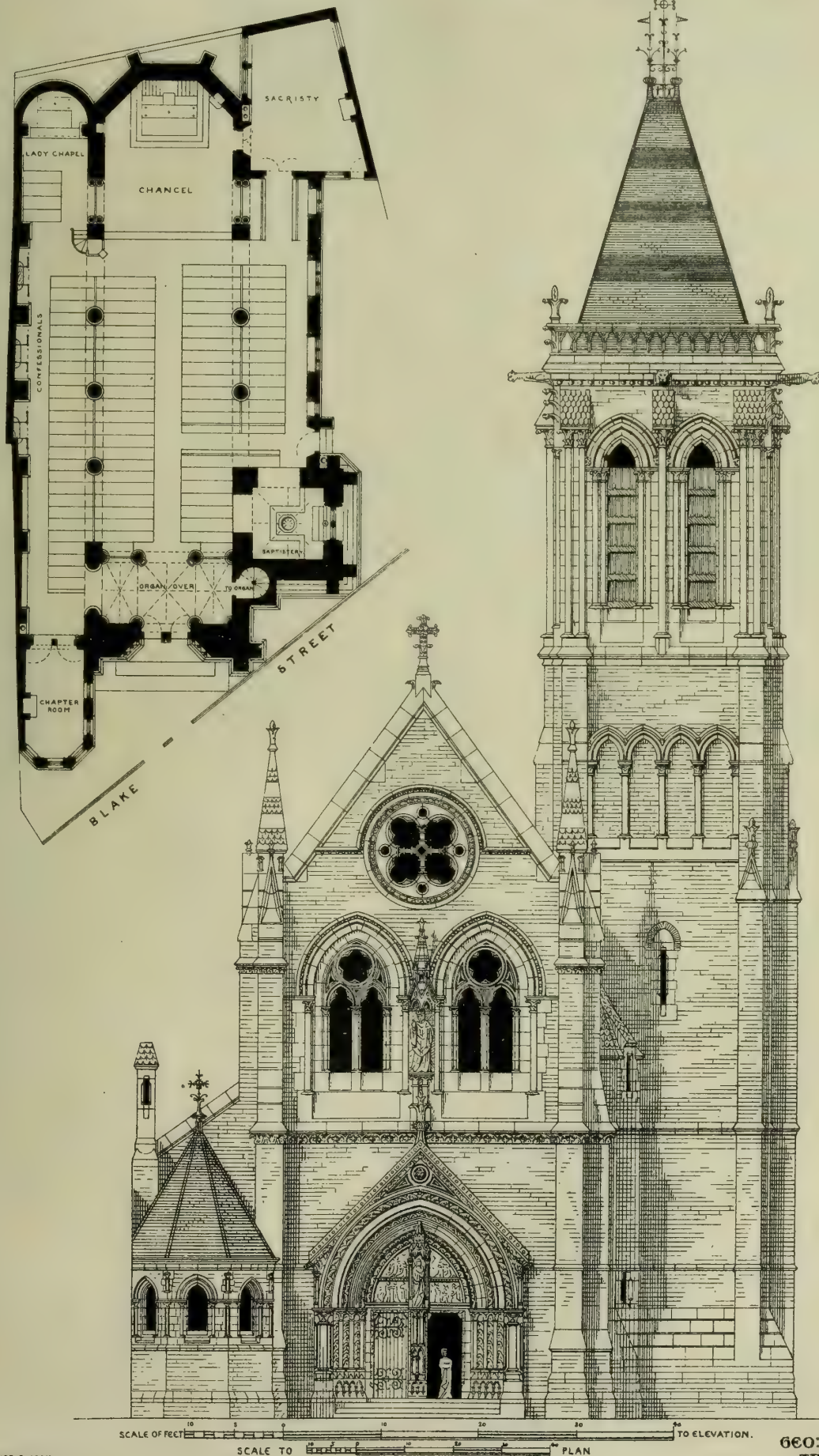


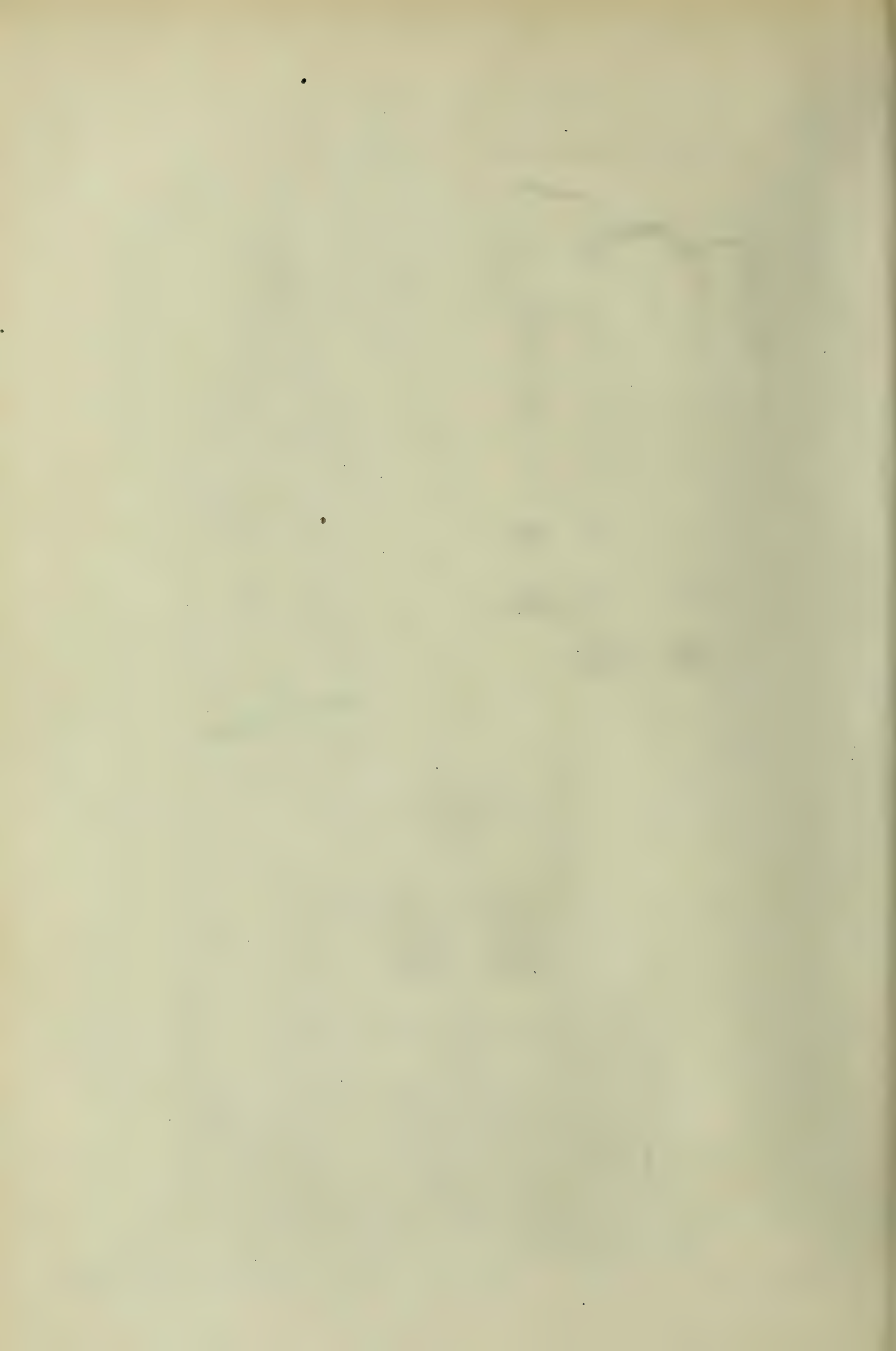
THE NAVE.

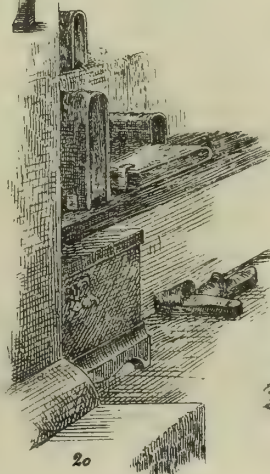
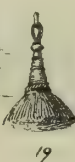
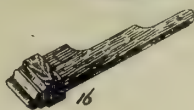
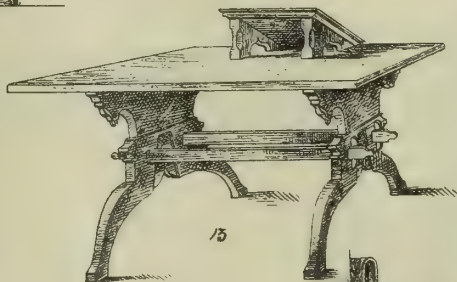
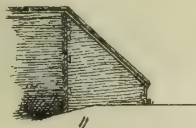
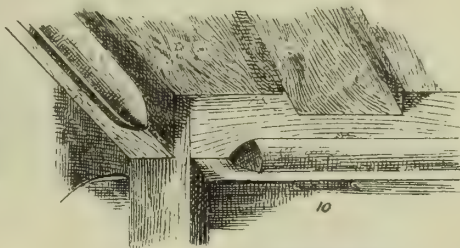
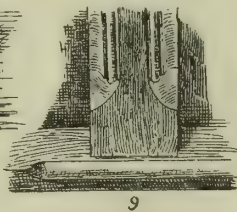
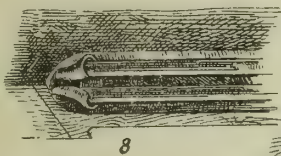
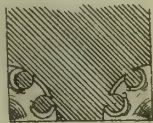
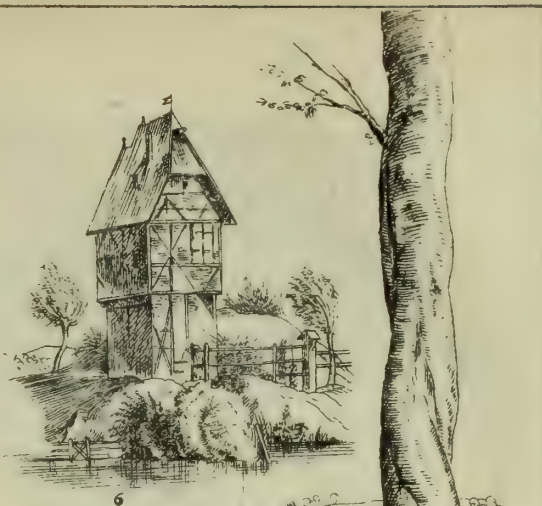
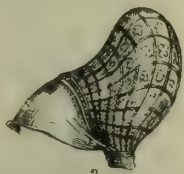
GLOUCESTER CATHEDRAL.



CHURCH OF S. WILFRED, YORK: BLAKE STREET FRONT:





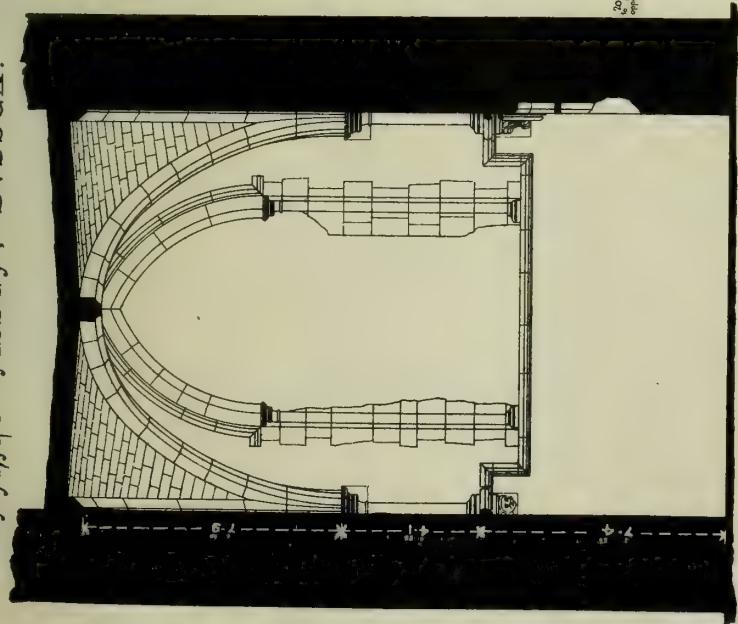


W. LOCKWOOD DEL.

BAYHAM ABBEY, SUSSEX.

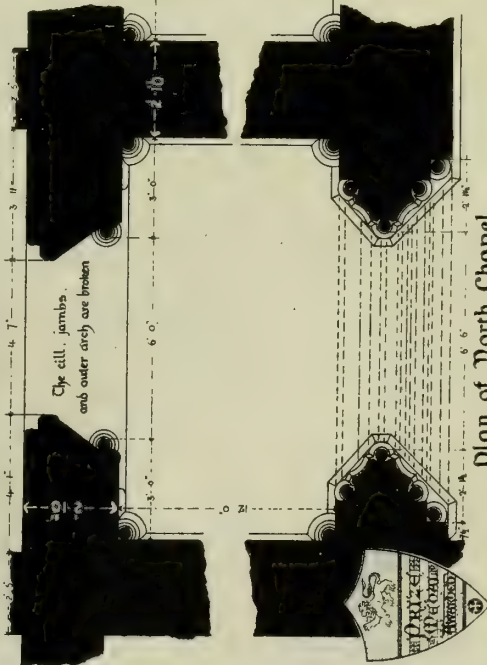
Drawing No 2

Inches 0 1 2 3 4 5 6 7 8 9 10 Feet.



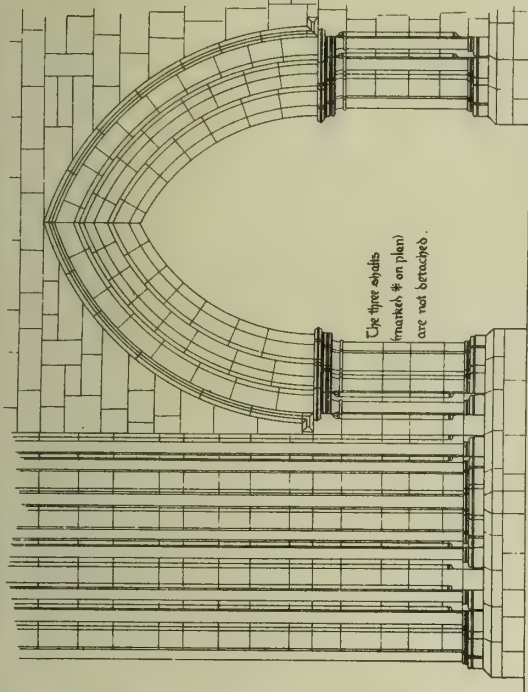
Section of North Chapel, looking East.

The cill, jambs, and outer arch are broken



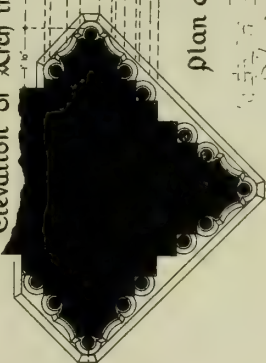
Plan of North Chapel.

This next chapel and both those on the South side of the channel are, excepting a few details, all alike. Each other and the one shown on this drawing.

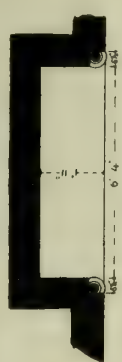


The three shields (marked * on plan) are not detached.

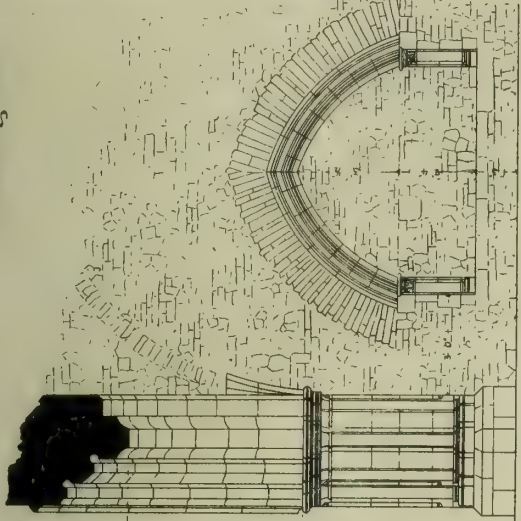
Elevation of Arch in West wall of North Transept.



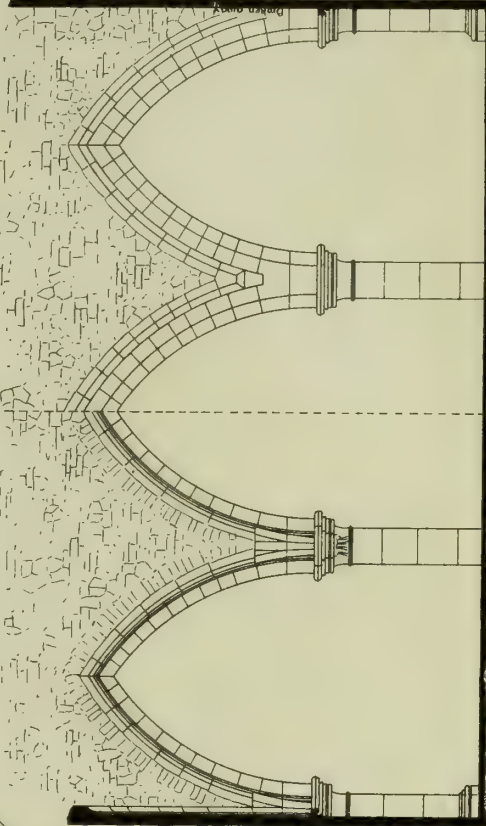
Plan of main pier and side arch.



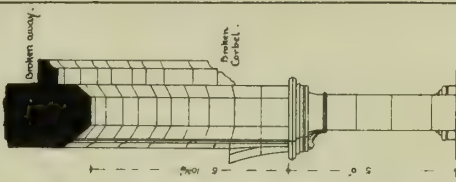
Plan of recess.



Section through Arch showing recess in the South Wall of North Aisle.



Elevation of Arcade in Chapter house. half looking East. Dimensions taken looking East.



Section. Scale of Mason 1873.

LAMBETH SCHOOL OF ART.

THE distribution of prizes won by students of the Lambeth School of Art took place at the School of Art, Miller's-lane, on April 24. The prize-list was of great length, the judges of the works of the students being Mr. Calderon, R.A., and Messrs. Yeames, A.R.A., and Marks, A.R.A. The Rev. Canon Gregory presided, and in his introductory speech, said his connection with this school of art had extended over many years, for it was now some eighteen or nineteen years since it was commenced in one of the parochial schools close by the church of S. Mary. In the early days of the school it was a hard struggle, and there were a great many difficulties to be overcome; but since Mr. Sparks, the head master, had joined them, the history of the school had been a continued success. He then referred to the improved accommodation now afforded in the School of Art, and stated that it was desired to raise the sum of £200 in order to diminish the liabilities of those who had advanced considerably more than that amount. Having distributed the prizes, he expressed his regret that the schools had not this year carried away a gold medal, and incidentally alluded to the service done to Lambeth by Mr. Doulton having pursued the higher walks of art in connection with the development of the porcelain manufactures of the parish. Mr. Leslie, A.R.A., next addressed the students, and the proceedings closed with a vote of thanks to the Chairman and Mr. Leslie, some of whose remarks on the occasion will be found on p. 520 of this impression of the BUILDING NEWS.

COMPETITIONS.

BUDA.—A competition for the execution of a statue of Joseph Eötvös, the Hungarian poet and novelist, is announced. The work is to be placed in the centre of a public garden at Buda, to be about four metres in height, without the pedestal, and in bronze. Competitors are to present models of their designs, in plaster, of about one metre twenty-four centimetres in height, without the pedestal. The Hungarian costume will be preferred. Models must be delivered to the care of the Secretary of the Commission appointed to manage this matter, at the Hungarian Academy of Fine Arts, Buda, not later than December 31st next. The prize is four thousand francs.

CHESTER WORKHOUSE COMPETITION.—Mr. Culshaw's award in the Chester Workhouse competition has been made public, and out of the thirteen designs submitted to him he has awarded the first prize to the design marked "Castrum," the second to "Alpha," and the third place to "Castria." Messrs. William Perkin and Sons, of Leeds, are the authors of the design "Castrum," and Messrs. C. S. and A. J. Nelson, also of Leeds, the authors of the design "Alpha." As neither of these designs could be carried out, in the opinion of the referee, under upwards of £40,000, and as £30,000 was the sum specified by the Guardians, Mr. Culshaw, the referee, selected as alternative designs "Wheat-sheaf" and "Rusticus," both contributed by Chester men. Since the decision an extensive correspondence and negotiation has taken place, and we believe that Messrs. Perkin and Sons, of Leeds, and Messrs. Nelson, of Leeds, have respectively undertaken to do the work for less than £30,000. We are informed that the estimate of Messrs. Perkin and Sons is £29,560, and that of Messrs. C. S. and A. J. Nelson £29,500. The view we take of the matter is a very simple one: "Castrum" having been placed first by Mr. Culshaw, and the authors of that design having satisfied the Guardians that the building can be erected for the sum specified, they ought in fairness to superintend the execution of the work. By doing this the Guardians will set a good example, and probably prevent bitterness of feeling. We always like to see the best winning the best place.

ST. JAMES SCHOOLS, Walthamstow, have been the subject of a limited competition, and the plans of Mr. John Ladds, architect, selected to be carried out. Provision is made for 400 children.

NORTON.—In a competition, confined to local architects, for Board-schools at Norton, near Stockton, determined last week, the plans of Mr. E. E. Clephan, architect to the Stockton School Boards, were selected.

The old parochial chapel of West Harnham, near Salisbury, is about to be restored, at a cost of £1,200.

Building Intelligence.

CHURCHES AND CHAPELS.

BATH.—The foundation-stone of a new church, dedicated to S. Paul, was laid at Bath on Tuesday week. The building is to be of the Gothic style of an early type. It at present consists of a nave, with circular-ended chévet, but provision has been made for future extension, with organ-chamber and temporary vestry. The entire length of nave, including chancel, is about 97ft., the width 38ft. (internal dimensions). The height to the top of the cross is 63ft. 6in., and 28ft. 9in. to the wall-plate, and it is arranged to accommodate 700 persons. The exterior of the walls will be finished in hand-dressed freestone; the interior will be clean-worked ashlar, relieved with strings of red stone from the Bishop's Lydeard quarries. The passages are to be laid with Godwin's encaustic tiles, those of the sanctuary being of a superior description. The whole of the work is being carried out from the designs and under the superintendence of Messrs. Wilson, Wilcox, and Wilson, architects, of No. 1, Belmont, and the contract has been taken by Mr. Joseph Bladwell, at a sum of £3,240.

BIRLINGHAM.—The parish church of Birlingham has lately been rebuilt, all but the tower, in the Geometrical Middle Pointed style, under the direction of Mr. Benjamin Ferrey, F.S.A., and now forms a most substantial, well-arranged, and commodious structure. The previous church had been, for the most part, rebuilt in the latter part of the eighteenth century, and possessed few features of interest besides a Norman chancel arch and a massive fifteenth century tower. The latter now stands at the west end of the south aisle, which occupies the site of the former nave, the enlarged dimensions of the new building necessitating a loftier nave than could have been built in the old position without seriously encroaching upon the height of the tower. The north aisle is narrower than the south, each being divided from the nave by an arcade of four arches, constructed of light and dark-tinted stones, placed alternately. All the woodwork is of oak, the seats being conveniently as well as substantially constructed, and the roofs well designed. The crocketed spirelet surmounting the stair turret at the north-west angle of the tower, though a novel feature in the district, formed a picturesque addition to the old structure, and appears to have been originally intended to serve the purpose of a dove-cot, as well as that of a belfry, the smaller windows below the belfry stage being provided with a projecting ledge for the birds to alight upon. The Norman chancel arch of the old church has been re-erected over the entrance to the well-kept churchyard.

CHEVELEY.—The church of the Blessed Virgin and the Holy Host of Heaven, Cheveley, Suffolk, was reopened on Wednesday week, after restoration by Mr. J. D. Sedding, of Bristol. Mr. R. Tooley, of Bury S. Edmunds, was the contractor. The chancel-walls, except the south wall, have been rebuilt, the east window filled with painted glass by Mr. C. E. Kempe, of London, and the chancel raised above the nave one foot pace. The floor of the nave and transepts has been laid with Peake's tiles, and that of the chancel with Godwin's encaustic tiles. The old Perpendicular screen has been re-erected, and an alabaster reredos has been placed beneath the east window. The church has been fitted throughout with oak benches, and a new font erected. The exterior has also been thoroughly repaired. The plaster which hid the rubble work has been chipped off, and patches of brickwork have been cut out and replaced with flint. The tower has been restored, and new belfry windows inserted.

ETTINGSALL.—The memorial-stone of a new church was laid at Ettingshall, near Wolverhampton, on Tuesday. The designs are by Mr. Griffin, architect, of Wolverhampton, and they will be carried out by Mr. Horsman, builder, of the same town, for £2,760. The style will be Early English. The building will consist of a nave, a north aisle, chancel, and transepts, with an organ chamber and vestry on the north side of the chancel. The width of the nave will be 25ft., the chancel and transepts will be 20ft. each, whilst the internal length will be 90ft., and the width across the transepts will be 61ft. An open timbered roof will spring from walls 20ft. high, and the covering of the roof will be tiles. The material is Gornal stone, and internally there will be stone dressings. It is intended by-and-bye, as soon as

the necessary funds are forthcoming, to erect a tower and spire on the west end of the north aisle, at a further cost of £1,500. The worshippers accommodated will be 354 adults and 147 children.

FRANKTON.—The parish church of Frankton was reopened on Wednesday in Easter week. The building as restored consists of nave, south aisle, tower, belfry and vestry. The old walls, where necessary, have been rebuilt, the chancel-arch set straight, a new rood-screen erected, a new vestry substituted for the old one, the church repewed throughout, and the floor of the chancel laid with Godwin's tiles. The tower has been repaired inside, and new buttresses of ashlar-work added on the exterior. The cost of the restoration has been £2,200. Sir Gilbert Scott was the architect, Mr. Marriott, of Coventry, the builder, and Mr. Geo. Hannaford clerk of the works.

KENNINGTON.—S. Mark's Church, Kennington, was reopened on Friday last by the Bishop of Winchester, after alterations. The pews have been cut down and converted into open sittings, the seats being widened and the doors removed, and at the east end what was formerly an apology for a chancel has been converted into a chancel *de facto*. To do this, the wall at the end had partly to be removed, and a space which was between the former wall and vestry has been thrown into the church, so that the altar is farther removed from the people than before. The floor has also been raised about 2ft., so as to give greater importance to this portion of the church. For the choir two rows of carved oak stalls have been erected, and a handsome tessellated pavement has been laid down. The reredos (designed by Mr. Toulon and executed by Mr. Earp) consists of three panels, separated by alabaster pillars, and surmounted by a carved canopy of Caen-stone. In the centre is a white marble cross on a background of gold, while on either side is a device in flowers. Over the reredos has been placed a painted window of the Ascension, executed by Messrs. Heaton, Butler, and Bayne. These alterations are but part of a more extended scheme, which comprises the removal of the organ from the west gallery to the north-east corner, the lighting of the church by sunlights, and the decoration of the whole of the interior. The whole of the work will cost about £2,000.

KIDDERMINSTER.—The chapel of S. James, recently erected in the parish of Kidderminster, from the designs of Mr. Davis, architect, Birmingham, is a simple red brick building, and consists of chancel, with vestry, class-room, and bell-turret, grouped together on its northern side, with a nave and a shallow porch at the west end. The side windows are couplets, with trefoiled heads of stone, and jambs and containing arches of moulded brick. The nave is seated with plain benches a low open pulpit standing in the south-east angle. There is an ascent of five steps to the chancel, which is separated from the nave by a low wall constructed of brick and pierced stone quatrefoils, and having wrought-iron gates in the centre.

NUNBURNHOLME.—The ancient church of S. James, Nunburnholme, Yorks., was reopened after restoration on Friday week. The church dates from the early part of the fourteenth century, its style being Middle Decorated. The pews have been removed, and new ones in oak, open, were substituted. The flooring has been taken up and relaid in a proper manner, and the sacarium is paved with encaustic tiles. The cost of the restoration has been about £800. The contractor is Mr. T. Grant, of Pocklington, and the architect, Mr. G. G. Scott, jun.

SOUTH SHIELDS.—The foundation-stone of a new Unitarian Church was laid on Easter Tuesday in Derby-street, Westoe-lane, South Shields. The church will be built of brick, with stone facings and ornamental bricks. The basement will consist of a schoolroom, vestry, kitchen, &c., with an open roof. Accommodation will be provided for 250 persons. The building will be erected from the designs of Mr. T. A. Page, and will cost, including the contemplated schools, £1,600.

SYSTON.—The beauty of the restored church at Syston, Leicester, has been increased by several beautiful and costly gifts this Easter. First of these is a wall-painting, executed by Messrs. Heaton, Butler, and Bayne, under the direction of Mr. F. W. Ordish, the architect, whose gift to the church this painting will chiefly be. The

subject is Our Lord as "The Good Shepherd." The figure of "The Good Shepherd" is after Overbeck's well-known picture. The other gifts to the church are a pulpit, which was uncovered for Easter Day, and a rich cover for the altar.

BUILDINGS.

LONDON.—The eastern portion of the City is being fast developed for commercial purposes, and a large block of property, having a frontage of 110ft. in S. Mary-Axe, and 81ft. in Camomile-street, has been planned for the erection of five warehouses, of which four will be at present built, covering an area of about 8,800ft. This property has been taken of the Skinners' Company by a City merchant, who intends to develop a class of building specially convenient for trading purposes, the front portions being planned on the ground floor for offices, and a roomy yard given in the rear for the purposes of loading on every floor to each warehouse. The buildings have been planned with special reference to lighting facilities, and each floor will be fitted with fire-places. The Corporation will effect an improvement by slightly setting back the frontage on a line agreed with the Skinners' Company. The buildings have been designed by Mr. Thomas Chatfield Clarke, F.R.I.B.A.

THE ROYAL EXCHANGE, LEEDS.—A special meeting of the Board of Directors, under the presidency of Mr. O. Nussey, was held last week, for the consideration of the tenders sent in for the completion of the building. The following tenders were accepted:—Mason and bricklayer, Mr. J. Wood; carpenter and joiner, M. W. Britton; slaters, Messrs. Watson and Wormald; plasterer, Mr. H. Orange; painter, Mr. T. Galloway; iron-founders, Messrs. Nelson and Sons; plumber and glazier, Mr. J. Braithwaite. The basement of the building, including the restaurant, kitchens, &c., will be completed in a few days. The remainder of the building will be proceeded with at once. The stone selected by the directors will be supplied from the Brunthwaite quarry, by Messrs. J. Wood and Sons. It has been subjected to a scientific analysis by Mr. O. Pegler, who reports to the directors most favourably, and assures them that the stone will withstand the powerful disintegrating action of the Leeds atmosphere.

SCHOOLS.

CULLUMPTON.—The new National Schools at Cullumpton, Devon, were opened on Wednesday week. The building is in the Elizabethan Gothic style, and has been erected from a design by Mr. W. H. Stafford, architect, Cullumpton. Accommodation has been provided for 500 children; and there are two distinct rooms for girls and boys, and another for infants, the latter being the largest of the three, and adapted for public meetings or entertainments. The builders are Messrs. Moss and Son, of Bishop's Hull, Taunton. The cost of the schools was about £2,100.

HALIFAX.—The new school connected with Harrison-road Independent chapel, Halifax, was opened on Sunday. The building is of stone. On the ground-floor are ten class-rooms. The school-room—a spacious apartment measuring 75 by 35ft.—will accommodate 500 scholars. A novel feature is to be introduced in the shape of a terra-cotta fountain, which will be placed in the middle of the room, and is intended both as an ornament and to satisfy a thirst for water as well as knowledge. The architect was Mr. Dearden.

HARTLEPOOL.—The opponents of a School Board for the Hartlepool towns have withdrawn their opposition during the past week, and the preparatory work of school-building will now be seriously entertained in that district.

JARROW.—On the 21st ult. the new Board schools were opened at Jarrow. The schools are designed to accommodate 400 boys, 300 girls, and 300 infants—a total of 1,000 children. The contract for the whole of the works, except the fittings, has been carried out by Mr. Richard Wylam, of Jarrow, who has had associated with him as sub-contractors Mr. Place, of North Shields, for slating; Mr. Collie, of Newcastle, for iron work and plumbing; and Mr. Holmes, of South Shields, for painting and glazing. Mr. Bowman, of Newcastle, has supplied the wood-work of and fixed the fittings, the standards being supplied by Mr. Somerset, of Newcastle. Mr. J. J. Lish, of S. Nicholas-buildings, Newcastle, is the architect. The entire cost of the whole, exclusive of the cost of site, has been £5,000.

SOUTHAMPTON.—King Edward the Sixth's Grammar School was reopened last week, after rebuilding. The new school-buildings and cloisters have been erected by Messrs. Brinton and Bone, from designs furnished by Mr. R. Critchlow, architect, of Southampton. On the site of the old schoolroom, which was dark and ill-ventilated, being only 9ft. high, there has been erected a room 15ft. high. A class-room has been built, and a porch and a new hat and coat room. The cloisters at the east end of the quadrangle are 45ft. by 25ft., the width being here extended to admit of the place being used as a hand-fives court. The south cloisters are 126ft. long and 10ft. wide, and are terminated at the west end by a handsome Perpendicular window, with three lights, containing iron stanchion-bars with *fleur de lys* heads. The cloisters are formed by a succession of arches, piers, and buttresses, built of red brick; the roof is constructed with beams to admit of gymnastic appliances being fitted, and the floor is of Bishop Waltham glazed red diamond tiles.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements 9d. per line. Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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RECEIVED.—R. L.—G. E. W.—W. N.—T. W. R.—C. F. L. A. J. M.—A. Constant Reader.—W. J.—E. S.—Rev. J. B.—G. S. C.—A. R. G.—E. K. J.—H. B.—J. P. S.—Palaver.—J. A. G.—J. N.—Competitor.—J. M. E. T.—J. V. G.—J. Farrar.—J. J. Johnson.—Geo. F. Lemmon.—J. Bullard.—R. Henry.—J. H. Collins.—F. Piper.

JOHN D. SEDDING.—Bournemouth Church was noticed in last week's BUILDING NEWS.

AN OLD SUBSCRIBER.—Sir W. Chambers's work, published by Lockwood and Co., Stationers' Hall-court.

S. S. TEULON.—Next week.

P. S. CLOSE.—Drawing to hand.

J. H. T.—You should, at least, authenticate such facts or statements.

J. B.—"Intercommunication" is set apart for the mutual education of correspondents, and not as a medium for ad-vertisers.

W. DRESSER.—See "Competitions" to-day. VICTORIA AND ODD MOMENTS.—Drawings to hand.

Correspondence.

THE "BUILDING NEWS."

To the Editor of the BUILDING NEWS.

SIR,—It has been with no little surprise and pleasure that I have seen the efforts made to increase the attractiveness and value of the BUILDING NEWS. The number and excellence of the engravings at the present time, make the paper a MARVEL, both as regards its admirable artistic qualities and its unexcelled and exceeding cheapness. I know no other professional journal in this or any other country which can be compared to it.

The generous efforts of the proprietors, it appears to me, demand a special notice from the subscribers in return, and I beg to suggest a general effort to at least double the sale of the

paper; and this not only as a graceful and due return for favours received, but to assure to ourselves a continuance of the advantages which only a large sale can guarantee. For each of the present subscribers to undertake the securing of one additional would not be difficult, and may certainly be said to be to the advantage of all concerned. Such, I beg to say is my feeling and intention.—I am, Sir, &c.

PHILIP E. MASEY.

24, Old Bond Street, W.

"BUILDERS OF THE HOUSE OF GOD."

SIR,—In Mr. H. W. Brewer's very interesting paper "On the Churches of Brittany," there occurs a passage in which he says that the Curé of Guimillieu told him that the numerous fine churches, calvaries, &c., erected in Brittany during the latter part of the sixteenth century, and the first few years of the seventeenth, were "according to his information, and also to local tradition, all erected by a confraternity called the 'Builders of the House of God.' They were composed of architects, sculptors, and masons, bound by vows of poverty, who went about from place to place, and erected churches and religious monuments wherever they were required, upon the condition that the inhabitants of the places where they went should supply them with food and clothing." Now I should like very much to ask—Is there any documentary evidence extant of the real constitution, &c., of this confraternity? Again, supposing it did exist as stated, did it not also include carpenters as well as "masons" amongst its members? I ask for documentary evidence because "local tradition" is often very misleading—e.g., if we visit Melrose, we are gravely told by the local tradition there, that the extant ruins of its old abbey are what remains of the structure erected in the time of David I., A.D. 1136, by a John Murdo, who was, as this mushroom local tradition tells us, Grand Master of the Masons then. Now, as John himself informs us that he was working at the building about A.D. 1400 (which is corroborated by the building itself), he must have been very early at his trade to have been Grand Master in 1136.—I am, Sir, &c.,

W. P. BUCHAN.

THE ROYAL ACADEMY.

SIR,—I beg to differ entirely from your correspondent "C. B. A." in his estimate of the position and duties of the Royal Academy. I deny that the Academy is, in any injurious sense, "a monopoly." It is not more so than the House of Lords, the Companions of the Order of the Garter, or any other honorary and (necessarily) restricted body. It is but by restriction that its honorary rank is maintained. Increase the number of its members, and you lower the status of the whole body. No real advantage is gained thereby. The men who now hold what is called an "Artistic Monopoly," it must be remembered, obtained their rank by no prescriptive right or vested interest. They at one time exhibited on sufferance, like the great number of present exhibitors, and it is from these as yet untitled but talented men that the ranks of the R. A.'s will be filled up by-and-bye.

"C. B. A." relates an instance of supposed hardship, in which an artist makes a great effort "to complete a picture," yet fails to get it hung. Such cases no doubt are numerous, but fault thereby is not to be fixed on the Academicians. Even if it was advisable to do so, they could not exhibit all that is sent to them. Thoroughly good works the R. A.'s will be glad of, to increase the prestige of their exhibition, and to admit inferior works would be of advantage to no one, not even the artist himself.

In the sense in which "C. B. A." means it, it is simply false to say that the "Hanging Committee" "meet, in reality, not to select or to arrange, but to watch and exclude." In truth, the liberal way in which the Academicians admit outsiders to participate in the advantages of their exhibition is most honourable to them.—I am, Sir, &c.,

P. E. M.

THE ROYAL ACADEMY.

SIR,—The article of "C. B. A." in your last week's issue, deserves to be very attentively read. Unfortunately, the statements he makes therein are only too well known, but a reiteration of them at this particular season of the year, in the pages of the BUILDING NEWS will, I hope, arouse feelings of sympathy for artists who happen not to be able to add to their names the talismanic initials "R. A." or "A. R. A."

It is indeed an iniquitous law that permits the monopoly "C. B. A." points to, and assuming that such monopoly is not likely to be quickly wiped out, it might, I think, be to some extent neutralised in the following manner:—In the same building that contains the works selected by the "Hanging Committee" as those they delight to honour—let there be exhibited the best of those that they have delighted to reject, and which perhaps, by some very remarkable display of artistic ignorance, the public may delight to honour. These latter works should not be hidden away in Bond-street, but should have a prominence befitting the results of perhaps months of hard mental and bodily toil, in addition to that, worst of all, *anxiety*. They should have all the facilities for exhibition that the favoured few possess, and what changes might not be wrought if the "Hanging Committee" were sure that the works rejected by them would be criticised and reviewed by the same men noticing the works of the R.A.'s, and the A.R.A.'s. I venture to assert that strangers would receive more consideration than they have hitherto received, and the public would have an opportunity of judging for themselves whether the decision of the "hangers" was based on justice or favouritism.

[Three years since we were invited to view an exhibition of the best pictures which the "Hanging Committee" of the Royal Academy rejected, and, with one exception, those rejected pictures were scarcely worth hanging anywhere.—ED. B. N.]

Intercommunication.

QUESTIONS.

[2830].—**Goux's Water-closets.**—Any subscriber would kindly oblige by giving particulars or manufacturer's address.—CURATOR, MUSEUM OF BUILDING APPLIANCES.

[2831].—**Custom in Architects' Offices.**—What is the custom with regard to holidays under a monthly engagement? Is there a short term usually allowed without a deduction from the salary, or does the salary cease during the absence of the assistant? Also, what are the most customary office hours?—COUNTRY ASSISTANT.

[2832].—**Sakramentshaus.**—Will any one kindly tell me what it is?—STUDENT.

[2833].—**Laps in Wall Plates.**—Will Mr. Banister Fletcher, or any other London surveyor, kindly inform me what it is usual to allow for laps in wall plates, purlines, and ridges, also in lead gutters, hips, valleys, and flashings?—YOUNG SURVEYOR.

[2834].—**Architect's Charges.**—What is an architect entitled to charge for a design in pencil which would cost, if carried out, £300? The design is for stores, &c., and embraces plans, elevations, and sections. The site and adjoining buildings had to be measured before the plans could be prepared. As the "Professional Charges of Architects," as confirmed by the Institute, overlooks pencil sketches, I should feel obliged by information on this point.—A. B. C.

[2835].—**Tan Pits.**—It is proposed to fill up the floor of a building with pits to make bark liquor, divided into spaces, say about 9ft. square, to the depth of 6ft. Is there any kind of concrete or composition, without having to plaster the surface with cement, with which this could be done, making every space completely watertight, and the divisions to resist the pressure when some of the pits are empty? An answer will oblige.—H.

[2836].—**Party Wall.**—Can an adjoining freeholder build on the whole, or only half, the thickness of a party wall?—C. T.

[2837].—**Lightning Conductor.**—Will some one please inform me as to fixing lightning conductor? One has lately been fixed at my late father's house—copper wire conductor, fixed to the building, by passing through iron stays, not insulated from the iron by a tube of glass or china. I think this must be wrong, but the erector says it is correct. As I now wish to put up a conductor for a chimney over 70ft. high, will you please inform me of what material the conductor should consist, how fastened to the building, what substance, and how insulated; and how should conductor terminate?—RICHARD MARTYN.

REPLIES.

[2826].—**The Liebreich Desk.**—"R. R. R." will find the following particulars of this desk reported in the BUILDING NEWS for March 14 last, p. 314, at the end of Mr. Robin's paper "On Middle Class Schools for Girls," viz.:—"Dr. Liebreich . . . provides the same-sized desk for children and adults of all ages, suiting the desk to the requirements of each child or person by raising or lowering the seat and footboard, and by drawing the back of the seat nearer to or further from the edge of the desk. The desk was sloped at an angle of 208 for writing, and of 40° for reading."—DELTA.

[2829].—**Best Pump for House Use.**—Supposing the depth to water in well to be less than 30ft., and the height of cistern above pump between 20ft. and 40ft., then I would suppose that a good 3in. force-pump, fixed up against the wall, and worked by the hand, and with lead pipe 1½in. in diameter, both to and from pump, would serve the purpose. An air-vessel should be put on pipe leading up from pump as near pump as possible.—W. P. B.

STAINED GLASS.

BOSTON.—An addition has just been made to the number of memorial windows in Boston parish church. The new window, manufactured by Messrs. Hardman, is above the door on the north side of the church. There are four lights in it, in the first of which is illustrated Solomon's prayer; in the second, Hannah praying before Eli; in the third, Simeon receiving the Infant Christ; in the fourth, the Pharisee and the Publican. Above each is a decorated canopy, and at their feet are figures representing the prophets: Isaiah, Jeremiah, Ezekiel, Daniel, Hosea, Joel, Amos, and Obadiah. The top light in the tracery contains a figure of the Lamb, and in those on either side and below are representations of angels.

LLANDRILLO.—A stained-glass window has just been placed in the east end of Llandrillo Church, Colwyn, North Wales. The window is one with five openings and tracery, the subject chosen being that of the Crucifixion, which occupies the compartments of the three inner lights; in the centre is the figure of our Saviour on the cross, with S. Mary Magdalene embracing the cross beneath; on one side are the two Maries; on the other, S. John and the Centurion. The two outer lights are filled in with elaborate ornamentation of the fifteenth-century character. It has been designed and executed by Messrs. Heaton, Butler, Bayne.

KIPPEN.—Recently, the two large windows on either side of the pulpit in the parish church, Kippen (N. B.), have been filled with stained glass. Each window has two upright lights, and a central top shape. In the four lights are represented "The announcement of the Angel to the Shepherds," "The Baptism of Christ," the "Crucifixion" and the "Ascension." The whole were executed by Messrs. Ballantine and Son, Edinburgh.

RIPON.—A stained glass window has just been placed in Ripon Cathedral. The subject is the restoration to health of the nobleman's son at Capernaum, and it has been very ably treated by Messrs. Ward and Hughes, of Frith-street, London. There are three medallions. In the upper one is represented the sick chamber, in the centre one the meeting of our Lord and the nobleman, and in the lower one the recovery.

S. MARY-THE-VIRGIN, GREENHITHE.—A three-light window of stained glass has recently been inserted at the east end of the north aisle of this church. The subjects represented are the Blessed Virgin with Child and S. Joseph, in the middle compartment, and the Shepherds with the Magi, in the divisions on either side. The window was designed by Mr. N. H. J. Westlake, F.S.A., and is the gift of Mr. John A. Sparvel-Bayly, in memory of his father.

STATUES, MEMORIALS, &c.

BRIGHTON.—A Latin cross of white marble, eight feet high, has just been erected over the grave of the Rev. John Purchas, in the Brighton Parochial Cemetery.

BUSTS OF DR. CANDLISH AND DR. GUTHRIE.—Mr. W. Brodie, R.S.A., of Edinburgh, has just completed the models of a bust of Dr. Candlish and of the late Dr. Guthrie, intended to be placed respectively in the churches associated with the names of those ministers. The former work represents the divine in his pulpit gown. The memorial of Dr. Guthrie, which is to be placed in the lobby of Free St. John's, has been arranged as a mural monument. Over a plinth of the simplest possible character, supported on two square brackets, rises a Gothic design, enclosing a panel from which the head and shoulders of the figure stand out in high relief. From the apex of the structure droop branches of palm and olive, while the mouldings surrounding the panel are enriched with a band of forget-me-nots.

FOLKESTONE.—The trio of statuettes have now been placed round the new western entrance to the parish church of Folkestone, the last addition being S. Peter in the act of giving benediction. An extension of the church eastward is in contemplation.

STATUE OF THE LATE LORD DERBY.—On Saturday, a bronze statue of the late Earl of Derby, by Mr. Noble, destined to be placed in Parliament-square, was cast at the foundry of Messrs. Young, in Eccleston-street, Pimlico. The statue, including its plinth, is 9ft. 6in. in height, and represents the Earl in his robes, as if addressing the House of Lords. His left hand holds a despatch, and his right hand and arm are outstretched as with a gesture of demonstration. The preparation of the mould has been a work of much time and labour; and it was buried, in an inverted position, beneath the floor of Messrs. Young's casting shop, so as to be cast in a single piece. A large trough was placed over the base of the mould; and in the bottom of this trough were three holes, stopped by plugs which could all be raised by one movement of a lever handle. When all was prepared, a huge caldron was taken to the furnace, filled with four tons weight of melted bronze, and then conveyed by a travelling crane to the side of the trough. The caldron was then tilted, and the glowing metal poured into the mould. Lady Constance Stanley then ascended upon a platform prepared for the purpose, and, with the assistance of the Duke of Richmond, depressed the lever by which the plugs were raised. The metal rushed down from the three openings

through those prepared to give it entrance into the mould, from which the air was driven out in flaming streams, and, in a few moments, the casting was complete, save for the time required for the cooling of the metal. When completed, the statue will be placed upon a quadrilateral pedestal of granite, each side of which will bear a bronze bas-relief, in commemoration of some leading incident in the career of the deceased Statesman. The subjects selected are—a speech in the old House of Commons, on the Slave question, in 1833; a meeting of the Cabinet, a meeting of the Lancashire Relief Committee, and the inauguration of the Earl as Chancellor of Oxford. On Monday the work of digging out the statue was commenced; and in about a week it will probably be completed and the metal will be ready to receive the finishing touches under the supervision of the artist.

WHIXLEY.—There has been erected in the parish churchyard a memorial cross, from the design of Sir G. Gilbert Scott, R.A., who so successfully restored the church in 1861 and 1862. During that restoration there was disembedded in the S.W. porch a piece of carved stone of Saxon work, which formed probably a portion of the original churchyard cross. To make the restoration complete in all its details has been the main object of this memorial cross. The style of the cross may be described as Saxon of the eleventh century. The material is granite, of an exceedingly deep rich red, of a new variety called Canister, from Inverness-shire, and the stem of the cross, which is one piece, is the largest that has been obtained up to the present time. The cross base and sub-base are all polished, with rich patterns incised and gilt running down two sides of the stem. In the centre of the cross there are monograms of our blessed Lord's name, on one side I.H.S., on the other I.H.C. In the octagon panels at the centre of the shaft there is on one side the Agnus Dei, and on the other our Saviour in Majesty. The height of the cross and the base is about 11ft. These stand on three steps of grey Aberdeenshire granite, fine-axed, the height of which is 2ft. 3in., and the lowest step is 6ft. 6in. square. The weight of the whole is four tons. The above has been executed by Messrs. Farmer and Brindley, of 67, Westminster-bridge-road, London.

WATER SUPPLY AND SANITARY MATTERS.

BRAMLEY.—The Poor-Law Guardians for the Bramley Union having decided to adopt the process patented by Mr. Fulda, of Leeds and Harrogate, for the treatment of the sewage at their new workhouse at Armley Hill Top, the works have just been completed. The apparatus required for the process seems simple and inexpensive, the cost of the plant, including three brick reservoirs or tanks, an agitator, and a two-horse engine, being under £320. The plant has been constructed under the direction of Messrs. C. S. & A. J. Nelson, of Albert Chambers, Park Row, Leeds, the architects of the workhouse. The building has about eighty inmates, and the whole of the sewage is passed along drainage tubes into a receiving tank about 30ft. long, 6ft. wide, and 6ft. deep, at a point about 150 yards from the south-west corner of the infirmary. From this tank it flows into a well, where by means of an "agitator," worked by the engine, which is in an adjoining shed, lime and sulphate of soda in certain quantities are mixed with it. The sewage thus prepared flows into a second long and narrow tank, and again into a third. In both these tanks the process of precipitation is carried on, and the effluent water is passed off into a watercourse at the corner of the estate, whence it flows through a neighbouring farm.

BROADSTAIRS, KENT.—Private waterworks are about to be erected in this rising watering-place, by a gentleman who owns a large amount of property, and who intends to supply his own houses with water, the present company having refused to do so. The main pipes are laid and the well sunk, and in the course of two or three months the works will be finished. Messrs. Owens and Co., of London, are the contractors for the engine and tank.

WARWICK.—Mr. E. Pritchard, Surveyor and Engineer to the borough of Warwick, has completed a report on the new works to be carried out for supplying the town of Warwick with water. The cost of the scheme he estimates at £15,000, affording a supply of 25 gallons per head per day. From a catchment area of about 1,500 acres the rainfall is to be collected and stored in two reservoirs capable of holding over 23,500,000 gallons, which, after allowing for evaporation, gives about 81 days' supply, assuming all flow in the reservoir to have ceased; but as a number of springs flow into a stream from which a large part of the supply is to be drawn, it is calculated that more than six months' storage can be secured.

LEGAL INTELLIGENCE.

BAWDEN v. ENGLISH.—ACTION FOR ALLEGED FALSE REPRESENTATIONS ON THE SALE OF A BRICKFIELD.—At the recent Kingston Assizes, the action brought by a brickmaker and patentee of brickmaking machinery named Bawden against the Rev. W. G. English, vicar of Emmanuel Church, Camberwell, and formerly vicar of Milton, in Kent, was decided. This was the fourth time the case had been tried, and it was altogether of a remarkable character. The details have been more than once given in the BUILDING NEWS. The jury gave a verdict against the defendant with £1,000 damages. The jury were only brought to an agreement by an intimation from the judge that they could not be discharged.

COMPENSATION CASE.—HAND-IN-HAND INSURANCE COMPANY V. THE CITY COMMISSIONERS OF SEWERS.—In this case (heard before Sir T. Chambers, Deputy Recorder) the Hand-in-Hand Insurance Company sought compensation to the amount of £88,868. 10s. from the Commissioners of Sewers in respect of No. 1 New Bridge-street, taken by them for public purposes—i.e., the formation of the new Ludgate Circus. The claim of the company chiefly unfolded itself in the evidence of Mr. Benjamin Blenkinsop, the secretary of the company. The company had been in the office in question since 1783; the premises were freehold, and from time to time considerable sums of money had been expended upon them. The notice to treat for the premises was received on the 3rd April, 1872. Within the last few days the directors had entered into an agreement for a site in the same street for their new offices. Mr. T. Williams, builder, had taken the plot of the Corporation for eighty years, at a peppercorn rent for the first year, and a yearly rent of £513 for the residue of the term. The society had to pay Mr. Williams £1,200 for his bargain. Mr. J. Griffiths, architect and surveyor to the society, was examined by Mr. Lloyd on behalf of the claimants, and he said that £12,000 would have to be laid out on the site. He charged the Commissioners £8,000 of that. The society claimed only for the cost of a building of the same value as that of the old premises. They were going to erect a building larger than the old one, and of greater architectural pretensions. Mr. Currie valued the freehold of the old premises at £14,862. Mr. Vigers estimated the rack rent of the present premises at £700 a year, and said that the old site was better than the new one. The company claimed £5,000 for the loss of business by removal. The Deputy Recorder, in summing up, placed the value of the old premises with the 10 per cent. for forced sale at £15,000, and the removal expenses at £1,700. Then there would be the loss of the rent of the premises the company were now occupying, which was estimated at £1,575. These figures added together would amount to £18,275. The jury gave a verdict for £18,775.

HARRIS V. LUCAS BROTHERS.—This was an action brought last week, in the Newport County Court, to recover the sum of £19. 18s. 6d., balance of account for stone supplied from a quarry let by plaintiff to defendants, who are railway contractors. From the evidence it appeared that 3,214 cubic yards of stone had been supplied, valued at £119. 18s. 6d., out of which amount £100 had been paid, leaving a balance now sought to be recovered of £19. 18s. 6d. After a number of witnesses had been examined, his honour gave judgment for £15. 18s. 6d.

THE ATTORNEY-GENERAL V. THE CORPORATION OF BIRMINGHAM.—It may be recollected that the Corporation of Birmingham are under injunction in two informations—one brought at the relation of Sir Charles Adderley to prevent the fouling of the River Tame, the other at the relation of certain inhabitants of Gravelly-hill, a suburb of Birmingham, to prevent the continuance of a nuisance created by sewage works at Salfrey; and the Court being of opinion that the Corporation had been guilty of delay in carrying out new sewage works, writs of sequestration were subsequently granted to enforce the injunctions, which, however, it was ordered should not be put in force till now. Motions were made on Thursday week before V.-C. Malins, at Lincoln's Inn, on the part of the Corporation, to extend the time during which the writs should be suspended till the second motion day in Trinity Term. The relations in the second information consented that the execution of both writs should be suspended; but as Sir Charles Adderley did not consent, the Vice-Chancellor ordered the matter to stand over for a fortnight to enable the evidence to be completed.

THE ATTORNEY-GENERAL V. THE CORPORATION OF BURNLEY.—This was an application somewhat similar to the last. In March, 1871, the Court granted an injunction to restrain the Corporation of Burnley from discharging their sewage in such manner as to pollute the rivers Brun and Calder, the decree, which was made by consent, providing that the injunction should not be put in force till January, 1873. The Corporation of Burnley now applied for an extension of the time allowed, on the ground that they had exercised all due diligence in providing a mode of disposing of their sewage, inasmuch as they had already constructed a main intercepting sewer, and it would require more than a year to construct the necessary subsidiary sewers and connect existing sewers. The relator offered that the time should be extended to the 1st of April, 1874, if he was allowed costs as between solicitor and client. The Vice-Chancellor said if the Corporation did not accept the offer they might renew their application on the following Thursday, when the relator would be at liberty to oppose the granting any extension of time.

THE POPLAR WORKHOUSE.—HILL AND ANOTHER V. THE GUARDIANS OF THE POOR OF POPLAR UNION.—This case was tried before Barons Bramwell, Pigott and Pollock, on Thursday week, in the Court of Exchequer; it had been previously tried before the Lord Chief Baron at Guildhall, when a verdict was found for the plaintiff for £7,000. Mr. Prentice, Q.C. (with whom was Mr. English Harrison), in pursuance of leave reserved at the trial, now moved for a rule to enter the verdict for the defendants, or for a rule for a new trial on the ground of misdirection by the learned Judge, and also on the ground of rejection of evidence. The action was brought to recover a balance of £7,000, for building the Union Workhouse. The contract,

which was under seal, was to build the house for the sum of £32,000. Large sums, it appeared, had been paid on account from time to time, and the plaintiff sued on the deed to recover the balance of £7,000, for which sum the architect had given his certificate. There were pleas denying the £7,000 to be due, and that the certificate relied upon had been given for extra works, which were not ordered in writing, or the orders given by the Board of Guardians. Mr. Prentice stated that the defendants were most anxious to pay to the plaintiffs all that was right and just, but if their architect had acted imprudently in giving a certificate for some thousands of pounds more than he ought to have done, the defendants were not bound by it, and were at liberty to reopen the question as to the amount due. After considerable discussion, Mr. Prentice obtained a rule nisi, on the ground that the certificate was not conclusive on the defendants, as it included the value of works and sums for which the defendants were not liable; that some of the extra work was not ordered in writing by the defendants' architect, or for a rule for a new trial on the ground that the learned Judge misdirected the jury on the above point, and in telling them that the certificate was binding and conclusive on the defendants, and that they could not contradict the same.

Our Office Table.

MR. LESLIE, A.R.A., ON UNIVERSALITY IN ART.—In the course of an address to the students of the Lambeth School of Art last week, Mr. Leslie, A.R.A., said he had been told that he made a mistake in considering students in those schools of art as artists, or as intended to follow the regular profession of artist or painter for a livelihood, and that, in fact, the main object of these schools was not to educate painters and sculptors, but to spread a knowledge and taste of art amongst the manufacturing and working classes. The modern idea seemed to be that the artist proper should be kept in his proper place, that the painter should be confined to canvas and square gilt frames, and be hung like a felon by ropes and chains to the wall. He was not to be allowed to climb round vases or spread himself out on carpets, and the man who had luxuriated on carpets and china was forbidden to touch canvas or paper. Everyone was fatally "stuck down to a speciality." He maintained that this ought not to be, and argued that every man who possessed a love and taste for artistic beauty was an artist in some degree or other. Mr. Ruskin had most truly observed,—"He paints nothing well who thirsts not to paint everything," and he (Mr. Leslie) was happy to say that that was, to a certain extent, beginning to be felt, and that we had amongst us several distinguished artists who were spreading their knowledge and skill over wider fields of art than mere picture making. A very conspicuous instance of this kind of artist was his friend Mr. H. S. Marks, for there was hardly any branch of art proper or art decoration on which he had not exercised his skill and talents. His friend had designed for stained-glass windows, he had painted on china and on wooden cupboards, and he had also made designs for furniture, costumes, and embroidery; in his pictures he was quite as much at home in oil as in water colours, in landscape or in figure subjects, on the limited canvas or in large wall painting. That was his idea of what a thorough artist should and ought to be, and in old times the great artists were men of this type. After some interesting allusions to the great masters, and the influence of their works, he expressed his regret that the great thing that was lacking in the present day was individuality.

REMAINS AT DALTON.—For some time past a number of men have been engaged removing earth from the limestone which exists at the Butts, Dalton, about two miles from Furness Abbey, with the view of quarrying it. While thus engaged recently on the edge of one of the embankments of a small stream, which runs through this part of Furness, they came upon a large block of stone, weighing nearly a ton, and on removing this they disclosed a large vault or grave, about 6ft. long, 4ft. wide, and rather more in depth. On descending into this vault a number of bones, some human, others those of an animal, probably those of a horse, were found, and at either end of the grave a bronze pike head and a double-edged sword, also bronze, were discovered. The pike head is in the most perfect state of preservation, but the sword (which was bent when picked up, and broke in the operation of straightening) is very much corroded for about three inches from the point. The blade of the pike is about 10in. in length, and nearly 2½in. in width at the broadest

part. The socket is 2½in. in length, and 3in. in diameter. The sword is 25in. long, measures 2in. across the widest part, and is about the thickness of an old penny piece in the centre. The hilt and guard were almost intact when found, but on exposure to the air they crumbled to powder. After making these discoveries, a large slab of stone, completely covering the landward side of the vault, attracted the attention of the workmen, and on removing this they revealed a small semi-circular crevice, leading inwards; but it was too small to admit of its being explored. It is expected that in a few days it will be laid bare, when other discoveries will be made.

STREET LIGHTING.—A paper was read at a recent meeting of the Society of Arts on the "Practical use of lenses and reflectors in artificial illumination, with especial reference to street-lighting," by Mr. T. A. Skelton. The author dealt chiefly with the various artificial modes and means of concentrating the light of street-lamps and lighthouses, tracing in the case of the former the course of invention, beginning with the mere flame, and in that of the latter with the simple beacon-light, and passing through the stage of the parabolic and other reflectors behind the flame, into the use of the various forms of dioptric lens. In the lighthouses perfection in principle has been reached by the addition of the catadioptric or reflecting prisms to Fresnel's dioptric or refracting lenses. Seeing the excellence of these results, Mr. Skelton has worked out a principle for street work, which has already been described in these pages. This system of street-lighting was introduced upon one side of Waterloo Bridge in November, 1871, and so satisfactory were the results, that soon after the whole of the road was thus lighted. Lamps of the same pattern are in operation in Moorgate-street, and many other parts of the metropolis, and in the town of Southampton, the High-street, ¼ mile in length, is entirely lit with them. Numerous other towns have also made adoption of this system after trial. The question of cost was further satisfactorily dealt with by the author of the paper, and the audience was challenged to observe the differences in the burning of the various lamps exhibited to the meeting. These were each burning 5ft. of gas per hour, except in the Skelton catoptric lamp, which had a flame burning at the rate of only 4ft. of gas per hour. The great increase of light was apparent; and it was asserted (without contradiction) that at least double the lighting power was given by the catoptric lamp. A discussion followed, in which Mr. Skelton's lamp was very favourably reviewed.

THE LATE SIR WILLIAM TITE.—Mr. Shirley Brooks, in the *Illustrated London News*, says: "The lamented death of Sir William Tite, who will be best known to posterity as architect of the Royal Exchange, will have produced befitting tributes to his memory, and we shall here note only one little anecdote, which, though connected with his life, is illustrative of the kindness of the Sovereign. We met Sir William at an antiquarian dinner a very few days after his title had been given him. He was suffering from gout, and said that when he had presented himself for the accolade he looked with dismay at the cushion on which he was expected to kneel, doubtful whether he should be able to do so, and still more doubtful whether, if he did, he should be able to rise again. Her Majesty instantly perceived the difficulty, and desired him not to attempt to kneel, and the aged architect merely bent his head to receive the knighthood."

THE PRESIDENCY OF THE INSTITUTE.—As was stated in the *Building News* a fortnight ago, the annual general meeting of the Royal Institute of British Architects will take place on Monday evening next, the 5th inst., when the election of officers and Council will take place. Sir George Gilbert Scott, R.A., has consented to be nominated as President, and, as there is no other nomination, will be elected by acclamation. Messrs. John Gibson, Horace Jones, and George Vulliamy, are proposed as Vice-Presidents.

THE REMOVAL OF PRIVATE SLAUGHTER-HOUSES.—This subject was discussed at a meeting of the Bartholomew Club on Tuesday week. Mr. Webber believed that slaughter-houses, under proper regulations, were not objectionable. He thought that the Government, in 1844, saw the dangerous consequences which would arise from meddling with the food supply of the people, and he considered that the metropolis was not so

well prepared for the consequences which would follow the abolition of slaughter-houses as it was thirty years ago. It would certainly diminish the supply. A system of abattoirs was desirable, but who was to provide them? There must be a well-constituted authority to look after them, and he thought that it was unwise to legislate hastily upon the subject, considering that four millions of people had to be provided for. He moved the following resolution, viz., "That until some constituted authority is created competent to legislate for the entire metropolis, and provide a system of abattoirs, it is unwise to legislate for the abolition of private slaughter houses." Mr. Twite, as a butcher, said that the consequence of abolishing slaughter-houses would be that it would become almost impossible to get fresh meat in London in hot weather. He thought that slaughter-houses, under the inspection of sanitary commissioners, tended to reduce the price of meat, and that where there was good drainage, they were no evil. The motion was carried.

TRAMWAYS IN THE CITY.—On Friday last, the Committee of the House of Commons appointed to consider the Bill for confirming the provisional orders granted by the Board of Trade for several proposed lines of tramways in the metropolis met, under the presidency of Sir F. Goldsmid, and gave their decision upon the proposed lines from Blackfriars-road over Blackfriars-bridge, through Bridge-street, and on to the Viaduct, the line from Blackfriars-bridge, along Victoria-street, to the Mansion House, the extension from Moorgate-street to the Bank, and the line from the Obelisk, Blackfriars-road, along Waterloo-road, across Waterloo-bridge, to the Strand. Mr. Corry, the City Remembrancer, was examined previous to the decision being pronounced, and said that the Court of Common Council voted by a majority against the present Bill. There was no tramway within the City, and, as far as the Corporation was concerned, there was no intention of permitting one to be laid down in the City. The Commissioners of Sewers had assented to a small extension in the City, but had remitted their resolution to the Court of Common Council for approval. The Corporation were decidedly opposed to the line proposed to be laid across Blackfriars-bridge, passing the bottom of Ludgate-hill, and so on to the Viaduct, and had passed a resolution to that effect. The room was cleared, and on the re-admission of the public, the Chairman said the following resolution had been come to:—"The committee are of opinion it is inexpedient that a construction of tramways in the City (including Blackfriars-bridge), or over Waterloo-bridge, should be sanctioned by Parliament, more especially having regard to the fact that no consent has been given to it by the Corporation of the City of London, or the Trustees of Waterloo-bridge."

CHIPS.

Mr. Phené Spiers's paper "On the Palace of Scaurus," with its accompanying plan, will appear in the BUILDING NEWS for next week, together with other articles for which we have not space this week.

In our notice last week of the life of the late Sir William Tite, we stated that he was elected a Fellow of the Royal Institute of British Architects in 1843. We should have said 1842—a year earlier.

A new Congregational School was opened at Halifax on Low Sunday. The cost was £2,000, and the building accommodates 500 scholars.

A bazaar and fine art exhibition have been held at Wakefield, in aid of funds for the restoration of the parish church.

At an ordinary general meeting of the Institution of Surveyors, held on Monday, April 21st, the following names were read and passed to be balloted for on May 19th, 1873:—As members—Dryland Haslam, 17, Friar-street, Reading, and John Wimbles, 2, Walbrook, E.C. As Associate—Spenser W. Gore, 16, Whitehall-place, S.W.

On St. George's Day the foundation-stone of a new church was laid near Wakefield. It will accommodate 300 worshippers, at a cost of £1,200. Mr. J. T. Micklethwaite, of Westminster, is the architect, and Messrs. Thickett, of Horbury, the contractors.

Mr. Meakin, senior partner of the firm of Meakin and Sons, railway contractors, of Chester, was killed on Wednesday week at Watford station. He went to Watford a few days since, and undertook a personal supervision of some works in progress. He had executed many large works upon the London and North-Western Railway.

Lord Russell will lay the first stone of the Rev. Newman Hall's new church on the 26th of June.

The Grocers' Company, at the court held last week, voted the sum of £20,000 to build the new wing at the London Hospital, Whitechapel-road, to contain 200 beds, now urgently required.

The will of the late Mr. C. T. Gabriel, timber merchant, of Lambeth and of Streatham, has been proved, the personal estate being sworn under £200,000.

The foundation-stone of new parochial schools at Hindley, Lancashire, was laid on Saturday. The building is to cost £5,000.

Mr. Escott, heretofore borough engineer of Burnley, has been elected borough engineer of Halifax, at a salary of £400 per annum.

The boring of the S. Gothard tunnel was commenced on the 1st of March, in the presence of M. Favre, the engineer.

Tar paving is about to be largely used in the parish of Camberwell. Its cost is said to be only one-third the cost of York paving.

Mr. Edwin Edwards announces an extensive series of etched illustrations by him of the fast disappearing old inns in various parts of London and the provinces.

The new Corn Exchange at Doncaster, which has been erected by the Corporation of the town at a cost of £25,000, was opened a few days ago.

The Rev. Henry Solly presided on Saturday week over a conference at the Artisans' Club, Newman-street, Oxford-street, which had been called with a view of assisting in the establishment of a trades' guild of learning. After some discussion a resolution was passed hailing with satisfaction the proposal to form such an institution, and a committee was appointed to co-operate with the Syndicate of the University of Cambridge and with all other bodies willing to aid in the education of the people.

The annual congress of the National Association for the Promotion of Social Science will begin at Norwich on October 1st. About £800 has been raised to cover the expenses, but £500 more is required.

Tiffield Church, Towcester, was reopened on Easter Tuesday, after restoration, at a cost of £1,000.

The parish church of Cheveley, near Newmarket, having been thoroughly restored and the chancel rebuilt, was consecrated on Wednesday week by the Bishop of Ely. The works have been carried out at a cost of £3,000, under the direction of Mr. Sedding, architect.

The death is announced of Major-General Alfred George Goodwyn, R.E., for some years Under-Secretary to the Government of India in the Public Works Department.

Extensive business premises in Horsefair-street, Leicester, for Messrs. Jacobs and Kennard, were opened on Monday last. Messrs. Millican and Smith are the architects of the buildings.

A new church was consecrated at Betts-y-Coed on Thursday week. The cost has been £5,000. Messrs. Paley and Austin, of Lancaster, are the architects, and Mr. Gethin Jones the builder.

Six catoptric lamps have just been placed on the terrace in front of the National Gallery, Trafalgar-square, by Mr. T. A. Skelton, the inventor. The same burners are used as in the former lamps, and the increased light contrasts favourably with that given by the former arrangement. A new and exceedingly simple sliding arrangement for opening the lamp is also introduced, which almost entirely prevents any shadow from falling on the pavement, and facilitates cleaning the lamp and lessens its liability to breakage.

Mr. Warren having resigned the Presidentship of the Institute of Painters in Water Colours, Mr. L. Haghe has been elected in his place, and Mr. W. L. Leitch as Vice-President. Mr. E. M. Wimperis, a landscape painter, has been elected an Associate of the Institute. The private view of the exhibition took place on Saturday, and the gallery was opened to the public on the Monday.

We are informed that Messrs. Blyth and Sons, of Chiswell-street, have registered an ingenious wash-stand back to prevent the paper on the wall behind the wash-stand being soiled. It consists of a neat pattern framework protected by glass.

A movement has been set on foot with a view of presenting Mr. Newton, a leading member of the Metropolitan Board of Works, with a recognition of his valuable services in relation to the great local improvements which have been taken in hand by the central authorities.

A new organ has just been erected by Mr. Nicholson, of Worcester, in the parish church of Felmersham, near Bedford.

A gratuity of £25 has been voted to the widow of Mr. W. Wilkins by the Camberwell Vestry, as an acknowledgment of the long and valuable services rendered by him whilst in their employ as clerk of the sewers works.

The memorial stone of the "City Temple," now being built on a site abutting on Holborn Viaduct, for Dr. Parker and the congregation formerly worshipping at the Poultry Chapel, is to be laid on Monday, May 19th, by Dr. Binney.

Trade News.

WAGES MOVEMENT.

BRISTOL.—Between 700 and 800 carpenters and joiners in Bristol struck yesterday for an advance of a half-penny per hour.

EDINBURGH.—The dispute between the master builders and masons of Edinburgh, which at one time threatened to result in a strike of the latter on the 5th instant, has been amicably settled. The subject of dispute was the rate of wages. At present the operative masons receive 6½d. per hour, and a demand was made for 7½d. To this very considerable increase the masters long demurred, but as the men had intimated that unless their demand was conceded they would cease work to-morrow, the employers at last consented to grant the rise of ½d. per hour.

LIVERPOOL.—The matters in dispute between the Liverpool operative joiners and their employers not having been amicably adjusted, the workmen struck work on Wednesday. The strike will have the effect of stopping many building operations in the district, and it is feared that if the disagreement is not speedily settled the strike will be of a protracted nature.

SHIELDS.—The house painters of North Shields have given notice that they will come out on strike unless they obtain an advance of 3s. per week and a reduction of 2½ hours per week.

ASHTON & GREEN,
Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.
24 by 12 22 by 12 20 by 10 18 by 10 14 by 9
420s. 370s. 235s. 215s. 222s. 6d.
16 by 10 16 by 8 14 by 10 14 by 8 12 by 8
222s. 6d. 170s. 212s. 6d. 130s. 77s. 6d.
Per m of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

ALDERSHOT.—For new club-room, &c., at the "Sir Colin Campbell," Aldershot. Mr. Henry Peak, architect. Martin, Wells, and Co. (accepted) £187 0 0

BIRMINGHAM.—For vaults under market hall, fish-stalls, and other works, for the Corporation of the Borough of Birmingham. Mr. W. Hale, Architect. Quantities supplied.

NAME.										
	Jeffery and Pritchard	Handwick and Son	Davies, Bros.	Holmes	Collett (too late)	Webb	Briggs and Son	Mountford	George	Gaile
Vaults under Market Hall.	£4,430 0	3,640 0	3,640 0	3,640 0	3,640 0	3,640 0	3,640 0	3,640 0	3,640 0	3,640 0
Fish Stalls in Market Hall.	£283 0	557 10	557 10	557 10	557 10	557 10	557 10	557 10	557 10	557 10
Fish Stalls in New Fish Market.	£275 0	525 0	525 0	525 0	525 0	525 0	525 0	525 0	525 0	525 0
Superintendent's Office.	£210 0	197 0	197 0	197 0	197 0	197 0	197 0	197 0	197 0	197 0
Total.	£5,618 0	5,425 0	5,425 0	5,425 0	5,425 0	5,425 0	5,425 0	5,425 0	5,425 0	5,425 0

CRANLEIGH.—For large room and other additions at the "Onslow Arms," Cranleigh, Surrey. Mr. Henry Peak, architect. Holden and Son (accepted) £355 0 0

LIPHOOK.—For additions to the "Railway Tavern," Liphook, Hants. Mr. Henry Peak, architect, Guildford. Triggs (accepted) £267 10 0

LONDON.—For repairs at the "Plough," High-street, Notting-hill. Mr. H. J. Newton, architect.
Surrur £179 0 0
Taylor 167 13 0
Mears 160 0 0
Brindle and Co. (accepted) 160 0 0

White dry	"	0	0	0	0
" ground in oil	"	0	0	0	0

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 9, 1873.

ART AT INTERNATIONAL EXHIBITIONS.

IN order that an International Exhibition shall be really instructive, its visitors must take with them, if not certain distinct principles, at least some tests of the quality of that which they are about to see; otherwise they are necessarily confused, and their minds are obscured by the variety and difference of the objects represented. Confining ourselves, for the moment, to the art galleries now newly opened at Kensington, we would point to a few topics of study, useful to thoughtful persons in relation to them. By "art" we now mean painting;—not doors of sculptured malachite, gates of beaten bronze, coloured glass, gold and silver plate, or architectural fountains; but the genius so powerfully illustrated at Leeds, at Derby, at Dublin, at Manchester, at Paris, and at London heretofore, which has illuminated Christian history. There are many examples of it, bad and good, at South Kensington, indicating most of the typical events—the Fall of Lucifer, the Creation, the great dynasty of Prophets, the Life and Passion of our Lord; and so forth, to the Last Judgment itself. These, when first put upon wooden or canvas squares, were, as Lady Eastlake once wrote, "the Books of the Simple;" they taught the Scriptural history. Of many, still cherished, the artists are utterly unknown. Glories of colour, prowess of anatomical delineation, dignities of form, and beauties of face have descended to us from the hands of men whose names are as dead as the martyrs themselves. Well, let the wanderer through these galleries—after passing among a thousand miscellanea which can be better inspected at the British Museum—fix his glance upon the works purporting to set forth the annals of our faith. First, the ideal heads of the Saviour. Originally, it will be remarked, they were suggested by the Classic mould; but the examples here are rare and poor, room being made for modern rubbish to their exclusion. It is earnestly to be desired that, in these great rivalries of genius, less favour should be shown to mere marine and cattle-pieces, and more to those works which distinctly set forth the ideals of successive ages. Thus, as we have suggested—and the matter is of importance to all fresco-painting, window-staining, and altar-illustration—the question—How should the Divine Head be depicted?—in the Byzantine fashion, with the divided and falling hair, the elongated features, the forked beard; or as Angelico conceived it, less lovely in expression (if the term may be permitted) and more human? That magnificent period which brought forth such a magnificent efflorescence of Art—the fifteenth century—left us few ideas upon this subject, towards which the entire Christian heart was yearning. The easels of that epoch were bright with the Madonna, the Infant, the Entombment, and the Ascension—the Cross, and Crown, and Tears; but they seldom idealised the preaching Christ, and so Da Vinci won the foremost place, even though Ghirlandajo, Mantegna, and Raffaele himself contended. The Venetians, as will be evident to the most cursory critics, make the countenance too earthly, while the Dutch uniformly degrade it. Even Vandyck, though powerful, is coarse; while Rembrandt, with all his piety of tone and touch, scarcely rises into the resemblance of a truly holy expression. Of course, all Art borrows tints from the era to which it belongs, and, therefore, makes the past, in a certain degree, contemporary with itself; but it has been truthfully said that

the earlier works of Art are as full of dates and natural sequence of formation to the Christian archaeologist, as are the strata of the earth to the practised eye of the geologist. Both have their laws, never departed from; and we may as soon look for a *motif* of the sixteenth century in a work of the eleventh, as for modern remains in an ancient deposit. In point of fact, those who study pictures as endeavouring to elicit a meaning from them, must remember that there is a childhood in all things. When Christian art first arose, Pagan art had been debilitated, disgraced, exhausted, though its traditions lingered long upon the earth. Yet the young school was embarrassed and bewildered by the old teachers. These old teachers had revealed the utmost magic of human beauty to man, and it was not easy to allure earthly natures to portraits of agony and sorrow. The art exemplified in the Roman Catacombs, intensely interesting as bearing upon the earliest records and relics of our faith, is a mystery which no scholarship has ever unravelled. It was a work done amid labyrinths properly belonging to the dead, and above these buried fragments still rose the proud triumphs of a sculpture, never excelled unless at Athens. The "Columbus of the Catacombs," as he was called—the Maltese Antonio Bosio—who compiled the first volumes entitled "Roma Subterranea," gave to the world a mass of those dark mazes, and preserved for us innumerable treasures, besides providing a clue for all future explorers. From him we gained our earliest knowledge of those wonderful mural paintings which are so singularly paralleled by the pencils of Giotto and Cimabue. They are perishing now. Air and smoke have done their worst upon colours designed for secrecy and darkness; photography cannot reach them. Yet zealous decipherers have sought among them for historical phases which every one who looks at a picture of any of these schools should also seek—the tree with the serpent twined round it, identical with the Greek scene imagined from the Garden of the Hesperides—yet this was not, in its essence, Paganism; it rather represented a wish to endue the fresh and higher faith with form. These identities and similarities might lead us far astray were they loosely, or only conjecturally, construed. However, the squalidness of the International Exhibition at the Albert Hall is nowhere more pitifully displayed than in this department of art.

But it may be questioned whether, after all, exhibitions are—at all events, at first—very genuine or useful schools for the study of art. Even the glowing display at Vienna can scarcely be regarded as much better than a dazzling and bewildering show; while all who have had experience of our own Royal Academy confess that its displays count rather among the fashionable festivities of the season than as opportunities of teaching. Nor is this unnatural. Even the more exclusive exhibitions in Pall-Mall are little more than excuses for elegant afternoon lounges. They all, indeed, do bring together, in contrast, the art types of different countries, so that the tyro who cares to understand a little of the subject may distinguish, in time, between a French and a Flemish, a purely Dutch and an English master—possibly between English, Italian, French, and German sculpture. But, in order to do this, he must pay little attention to the buzz and rustle about him. Italy appears somewhat shy of telling to strangers, unless they visit the beautiful peninsula, the history of her marble art; but there have been glimpses of it in successive International Exhibitions—in London, Paris, Amsterdam, and now at Vienna—with a few illustrations, also, at South Kensington. In Italian sculpture, mythology ceases, which is one grand distinction to be borne in mind. We have no more gods and goddesses, nymphs and naiads, Greek philosophers, or Roman emperors and generals. The Vatican alone relates that narrative in all its completeness. True, the statue of Bartolomeo Coleoni de-

serves to be ranked among antique trophies, as do the monument of Montorio, the Moses of Michael Angelo, the Three Marys in the Certosa at Pavia; and the sepulchral figure of Gaston-de-Foix at Milan. Still, the two classes of works bear no comparison one with another. They speak, so to express it, various languages. We are alluding, however, more particularly to national rivalries in art. Since 1862, the different schools of Europe have been vaguely endeavouring to learn from one another. The French, strange to say, have manifested a decided fascination, inspired in them, notwithstanding their orthodox traditions, by the wayward Northern genius. Even so early as 1855, when our pictures were first seen in Paris (Frenchmen rarely travel abroad, or across the Channel at any rate, to see such things) they excited general surprise. Before that period the French mind was in that state of uncertainty about the very existence of English art which was represented by the Parisian lady who exclaimed, "So you English actually have painters among you!" But thence until 1862, French critics had no means of assuring themselves that they had not been astonished into a degree of admiration which further knowledge would not sustain. Thus it was at first a wonder, next a collision, and finally an alliance. The Exposition on the Champ de Mars introduced them again to our artists, whose reception, if equally respectful, was less favourable; they were accused of employing violent crudities in colour, strange contrasts in composition, and vulgar moralisings on canvas. They discovered, however, an identity between the ideas of Mr. Ruskin and those of M. Proudhon, a comparison the justice of which will be admitted by those who remember Mr. Ruskin's "Notes on Art" and M. Proudhon's remarkable pamphlet on "Pre-Raphaelitism." The French, moreover, as critics will remember, were absolutely startled by Holman Hunt's "Light of the World," but they have since assiduously endeavoured to emulate its manner, with more or less success, notwithstanding their still unrevoked protest against the principles upon which it is painted. In fact, nothing is more difficult than for one nation to comprehend, in its essence, the art of another. We may be charmed by Meissonier, and could equal him in our own, but not in *his* way. Every eye is struck by the fire and candle-lights of Schindel, yet we may see them in fifty exhibitions without detecting the secret, or rather instinct, which illuminates a square of wood or canvas with them. So with Fisk's "Last Evening of Jesus at Nazareth;" the Parisians confess themselves unable to understand it; and yet more so with "The Afterglow in Egypt;" they complained of it as in itself a sphinx and a riddle. Thus, again, when the gorgeous galleries of 1867 were opened, nothing perplexed the French critics more than Millais's "The Romans Leaving Britain," "Eve of S. Agnes," and "An Enemy Sowing Tares." They regarded our landscapes as being far too much preoccupied with accessories; for our historical painting they had little or no respect—indeed, they do not believe that the tradition known as "High Art," in much of this variety, and in most of its prejudice, is shown. With respect to our portrait-painting, their criticisms were severe, but frequently just. It is, almost without exception, defective in design, composition, and colour. Reynolds and Gainsborough were masters; but they had sat at the feet of Holbein and Corregio, while our portrait-painters, as a rule, never study at all, in the true sense of the term. In the great European movement of Art, which France has followed, England has scarcely shared at all. The English are content with mere academical tuition. Will the splendid examples now displayed at Vienna stimulate our artists to nobler ideas? The Belgians became conscious of their own decadence in 1815, and did not disdain to learn from David, the exile who was flying from the brother of the man for whose execution he had

voted. From the days of Rubens and Van-dyck, Flanders had produced nothing splendid in the form of art; but a foreigner unfolded his genius, and the Flemish spirit was revived. David aroused their ambition; he drilled and disciplined them in the driest and most masculine of schools; during fifteen years his influence continued supreme, until another impulse came from Paris. The Classic style, as it was called, disappeared; Gallait arose; after him, Henri Leys, of Antwerp, who sought his inspiration among the works of Van-Eyck, Memlin, and Holbein, thus proving the effect which even a foreign suggestion might have were our artists to travel less as critics or copyists and more as pupils, whether to International Exhibitions or to galleries abroad. Some of our younger race do attempt to penetrate the mysteries of the Italian genius; but their emulation generally results in a kind of decorated grace, rather than in pure beauty, and there lies the difference. The Flemings committed, perhaps, a fault when they restricted themselves to the study of German examples; nevertheless, the results have almost justified the preference, and hence we may hope that, as these art-rivalries mingle, art-inspirations may mingle, though it might be regretted were all the schools and manners fused in one. It would be a pity, for instance, to lose the distinction between such painters as Henri Leys and Alma-Tadéma. The latter is not to be named in the same day with the former in point of either the technical or the sympathetic artistic qualities; while the former is, in an equal ratio, superior to the latter in large and varying appreciations. Yet the one was the pupil of the other. Not to delay, we may note in the assemblage at Vienna, the great academical school of Munich, with Kaubach at its head, contrasted with the more popular Düsseldorf band, from which it might derive some lessons calculated to confer a warmth and flush upon its now cold and rigid art. The teachers of Düsseldorf were pre-eminently French, as those of Denmark were German. Therefore, though we doubt the immediate influence of International Exhibitions upon the art of Europe, it is nevertheless reasonable to believe that as they multiply and succeed one another, their lessons will not be entirely lost, since they, at any rate, expand the student's vision, and show him the heights to which he must aspire if he be ambitious of doing work which shall make his name memorable.

ARCHITECTURAL DRAWINGS AT THE ROYAL ACADEMY.

(FIRST NOTICE.)

THE exhibition of the Royal Academy, notwithstanding all drawbacks, may be looked upon as the nearest approach to a representative display of the work of the year compressed into the limits of a single gallery we have. True it is that there are many important works which are never sent for exhibition, and which, but for the illustrations given in such journals as the *BUILDING NEWS*, would be known only to a limited section of the public; and true also is it that were a tithe of the work deserving publicity offered to the Academicians the meagre space given up by them to architecture would not admit of one-half being seen. Still, a great deal of public opinion is formed upon specimens not more relatively adequate to represent the whole class of works of art to which they belong than ninety-eight drawings hung in the lecture-room of the Royal Academy are to represent the architecture of the year 1872; and we may find a good deal of such work and such change as has been going on hinted at, if not epitomised, on these walls. Draughtsmanship hardly seems to be on the advance, judging from the great proportion of harsh, inartistic line-drawings, and of weak, pale water-colours, displayed. A few drawings, it is true, are submitted which leave little or

nothing to be desired, and a fair proportion are tolerably successful; but the standard of merit is decidedly below that of last year. The work is pretty equally divided between sacred and secular subjects and Gothic and Classic styles; and most of the old favourites are exhibitors of fair specimens of work. One novelty, at least, has to be noted, and it is well worth remark. The curious and growing passion for Late Elizabethan work which has developed itself among a certain set of "advanced" architects has come to the front in this exhibition in a way which has not been hitherto customary, and several of the most striking drawings are specimens of this manner, and as such are, perhaps, more than ordinarily noteworthy.

The place of honour at the Academy is given to Sir Gilbert Scott's design for Edinburgh Cathedral (1156), shown by a large, rather tame, pen-and-ink perspective drawing of the exterior. We feel it less necessary to criticise this and the rival designs, so far as they are shown here, than it would have been had not illustrations of them been placed so fully before our readers. It is impossible, however, to avoid saying that, fine as many points of Sir Gilbert Scott's design undoubtedly are, it is (the thin spires notwithstanding) a magnified parish church rather than a cathedral. The interior is shown by a hard if powerful pen-and-ink drawing (1119) and though the fine monumental character of the vaulted architecture, and the general dignity of treatment, dissipate the feeling raised by the exterior, it is not possible to feel thoroughly satisfied by the effect which this view produces.

Two other competitors have sent in their designs, Mr. Burges and Mr. Street. Mr. Burges's design resembles his Cork Cathedral in many respects, and is remarkable for the beauty of outline given to its exterior (1133), by the fine spires and still finer central *flèche* which adorn it, and for the largeness due to the use of simple windows of comparatively small size. The interior is shown by a drawing (1148) which in our opinion is the most attractive coloured drawing in the collection. It is thoroughly true to the French originals which have been consulted as precedents, and full of fine feeling for proportion, dignity, and colour. Mr. Street contributes a pen-and-ink view of the exterior of his design (1143) hardly up to his usual mark, and a tinted interior (1132) which rivals Mr. Burges's in beauty of execution, and exhibits finely the attractive features of Mr. Street's very excellent composition; dignity and brightness seem combined to a remarkable extent in this view, which shows to great advantage the groined eastern end and a portion of the nave also.

Sir Gilbert Scott exhibits no other building. Mr. Street sends a very picturesque and well-drawn half-timbered rectory-house (1183) and reminds us that he is at work upon the Law Courts by a beautiful pen-and-ink interior of the great vaulted central hall of that building—an artistic drawing in his happiest, freest manner, full of beauties, and giving good promise that those who live long enough will see London enriched with a gem of architectural art when this hall is completed. Mr. Barry does not exhibit, nor does Mr. Smirke; but Mr. Norman Shaw sends two drawings. One of these, the design for a new church at Bournemouth (1170) is simple and vigorous, but we venture to think a little bald; the other drawing (1167), a view of new offices now in course of erection in Leadenhall-street, is perhaps the most remarkable of the series of semi-Elizabethan contributions to which we made reference in our opening remarks. A front divided into bays by means of enormous brick-piers, between which the projecting windows of an Elizabethan façade are formed, is here shown. It has no doubt been cramped by the requirements of the Building Act, but in the main it is faithful to the letter of the style chosen; large coved cornice, impressed plaster, small square panes, all are there, thoroughly truthful, very clever, but combining to form an anachronism of the most startling quality.

This Elizabethan phase of revival is shown by Mr. Brydon's drawing (1134) of a proposed dining-room, quaintly arranged, powerfully drawn, in the main cleverly designed, faithful to precedent, even to the extent of reproducing the old original chimney-corner in bold defiance of the present price of coals; this design is one which causes more regret than pleasure; for a revival of a debased, though picturesque phase of architecture, can hardly be called progress. Another contribution to the same group by Messrs. Woodzell and Colclutt represents some business premises to be erected at Ludgate-circus (1136), and though a certain hard formality in the drawing tells against it, this design, like Mr. Norman Shaw's, which it somewhat resembles, is undoubtedly telling and clever. We doubt whether the large pointed arch in the centre is the proper treatment of the crowning gable, and in all probability the design would gain in consistency and effect if this feature were abandoned. Something of the same taste for debased Renaissance runs through Mr. Bodley's successful competition design for the offices of the London School Board (1158), though a good deal of Continental feeling has been imported into the design, and the building will closely resemble Late Renaissance buildings in towns of France and Switzerland, having a profuse amount of window space, a little red-brick and stone dressings; it is three stories in height, surmounted by an attic with an elaborate dormer window, almost rising to the size and importance of a gable. Mr. John Scott exhibits his competition design for this building (1141), a work somewhat below the good level which other designs by the same architect have reached. His brother, Mr. Gilbert Scott, jun., sends a most interesting and elaborate drawing, which has been hung cruelly high. It represents a new reredos for Boston parish church, and is evidently full of learning and skill. The reredos is filled with coloured figure-sculpture, surmounted by elaborate tabernacle work. Richly painted folding-doors stand thrown open on either nave, and an elaborate altar-frontal is shown. Such a drawing ought unquestionably to have been hung at the level of the eye, and we can only hope that Mr. Scott will send it in a future year to the South Kensington Exhibition, where space is plentiful, and, consequently, most of the elaborate drawings can be well seen.

A striking, we had almost said a specious, drawing (1155), by Mr. Brewer, of Mr. Penrose's proposal for decorating S. Paul's, hangs immediately above Sir Gilbert Scott's Edinburgh design. It simply shows the ceiling, gilded and coloured in a way which is safe because common-place, but which would not in reality produce even the degree of effect Mr. Brewer's drawing has obtained for it, for with great cleverness he has suppressed the stonework of the nave piers and arches, and has contrasted the ceiling with the heavy masses of wood-carving belonging to the organ. This is not as the public would see the ceiling from the floor of the Cathedral, were these decorations carried out; and however such treatment might enliven the roof, it is not decorating S. Paul's.

SCHOOLS.—No. II.

THE CLEVELAND DISTRICT.—DARLINGTON, AND SUNDERLAND.

THE architect of the Middlesbrough School Board, Mr. W. H. Blessley, of Middlesbrough, is erecting schools possessing the rare merits of being most surprisingly cheap, sound in construction, and clean, cheerful, and convenient in their interior arrangements. The total cost of a new school now in course of erection in Fleetham-street, Middlesbrough—comprising three departments for 800 children, two teachers' residences, covered playgrounds, outbuildings, walls, fences, drainage, approaches, and including fittings, furniture

architect's commission, and cost of superintendence—will not exceed £4. 5s. per head! The departments are for boys, girls, and infants; each has a large room, two class-rooms, front entrances, and back entrances from the playgrounds serving as cloak-rooms and lavatories. The whole of the schoolrooms are upon the ground-floor; the teachers' residences are two stories in height. The back entrances are required in consequence of the petty thefts which occur when the children's clothing is left in a more accessible lobby. The principal rooms in the boys' and girls' departments are 64ft. by 22ft. The floor area per child is 8 superficial ft. throughout, and the average seating per child is 18in. The large rooms have four groups of 12ft. desks (to be temporarily divided for class-work), lighted from the back; the infants' department has two large galleries. The main walls are built in 14in., and the gable walls in 18in., brick-work, with stone dressings of good Gothic character. The infants' department occupies the central portion, and stands upon the front building line. The principal rooms in the boys' and girls' department stand left and right of the centre, showing their gable-ends; the class-rooms of these departments, with intermediate entrances, are at the back. The walls inside are lined to the height of 4ft. with white glazed bricks upon a stone skirting; above that height they are rough-stuccoed. The Manchester school-grate is used for the heating; perforated panels with flaps in the ceiling afford means of ventilation into a triangular air-chamber about 12ft. in width, fitted in the ridge with square louvred ventilators. Perforated bricks in the outer walls admit fresh air under the floors; pivoting casements, about 10ft. above the floor, admit cold air into the rooms. The other glass of the windows is inserted in the mullions and jambs, without frames. The fittings will be fixed desks. With the exception of the minimum floor area and seating space, no portion of the arrangements has been cut down, nor have any of the works or scantlings been reduced to obtain the low cost per head; while the interior lining of white glazed bricks (which cost £10. 10s. per 1,000 in Middlesborough) indicates that parsimonious considerations have not prevailed over the wiser economy of incurring an extra first cost where necessary.

Some considerable schools, erected by the same architect in Boundary-road, Middlesborough, show the effect of three years' occupation upon interior arrangements similar to those in course of formation at the Fleetham-street Board School. Nothing can be more satisfactory than the appearance of the principal rooms in the Boundary-road Schools. The walls are lined to the height of 4ft. with white glazed tiles, finished by a simple bordering with a continuous blue ornament, under a wood capping. The walls are rough-stuccoed, and jointed. The roof is ceiled at the collar; the principals, rafters, and the ceiling joist, running longitudinally, are exposed, stained and varnished. In the centre of each bay in the ceilings is a perforated panel, about 20in. square, fitted with a flap for ventilation, worked simultaneously with a corresponding flap in a roof ventilator. The windows in this school have sashes. The heating is by means of hot water, and the admission of fresh air is obtained by means of sliding valves, about 5ft. from the floor, in connection with an air-chamber in the thickness of the walls behind the glazed tiling. These schools, in the principal rooms, are models of cheerfulness, cleanliness, and comfort, to which qualities the tone of the white-glazed tiles chiefly contributes. With the interior arrangements praise must cease. The closets are fitted with Macfarlane's iron troughs, without any flushing apparatus. They can only be flushed occasionally by hand, in consequence of the restrictive regulations of the local water-company. The troughs are covered, in each compartment, with a hinged

flap, which is the only distinction made between these school latrines and the abominations in the dirty bye-streets and on the quays and docks in Scotland. This "convenience" is not peculiar to the Boundary-road School; unfortunately, its cheapness has caused its general introduction into Middlesborough. Retrogressive and abominable as it is, its application is extending with the growth of this, the most rapidly-increasing town—next to Barrow-in-Furness—in the kingdom. The School Board would confer an incalculable benefit upon their district by making terms with the water company, or introducing a proper kind of sanitary appliance as an example for general adoption.

The current prices of materials in Middlesborough are: Common bricks, £1. 10s. to £1. 15s. per thousand; pressed bricks, used for face-work in the Fleetham-street Schools, £2. 5s. per thousand; Swedish and Norwegian deals, mixed, yellow and white, average £12 per standard; white glazed bricks are £10. 10s. per thousand; white glazed tiles cost 9s. per square yard. The glazed materials are manufactured in Leeds, and are supplied in the district by Messrs. Brown and Son, of Luton, Beds. Wages are fully up to the North of England standard, and competition is said to be not in excess. With such conditions and prices it is difficult to account for the extraordinary low price per head at which Mr. Blessley's schools are being erected. A considerable number of schools will be required to meet the wants of the town. Two years ago it was estimated that school-accommodation for over 5,000 children was required, and that number continues to be augmented.

The school furniture in the future schools at Middlesborough will consist of fixed desks, having slots for slates in the top, and shelves for books. The difficulty of constructing a fixed desk and seat at which children can both stand and sit, will be overcome by the introduction of the "gangway seat," patented by Sidebotham, of Stretford-road, Manchester. This seat is attached to the ordinary cast-iron standard by means of two short arms, exactly like those upon a parallel ruler, whereby the seat can be brought close to the desk for a convenient sitting position, or be moved back to give space for standing, and allowing the master to pass, if necessary. It gives in a different manner, but with equal ease, the same facilities as those obtained in the desk with a hinged flap, introduced in the London schools, combining the advantage of leaving the desk and its contents intact.

A Board school, containing three departments, opened during the past week in another town in the Cleveland district, is an example of ventilating, heating, and other arrangements to be avoided. It has pointed-headed windows, fitted with sashes to open for about 9in. immediately in a line with the heads of the children, and at their backs, while in the roofs, directly open to the rooms, there are triangular apertures fitted with louvre boards covered inside with flaps, quite useless for excluding draughts. The schools, moreover, are in an exposed situation, and the windows to which the infants will be exposed face due east by the vane upon a central bell-cote—the only agreeable feature in the building. For the heating, detached stoves, capable of producing a high temperature, are provided in the large rooms. The class-rooms have Leamington bars. Lavatories, arranged in passages with a through draught, where the water-pipes must freeze; closets upon a purely primitive plan; infants' galleries constructed as so many level steps, without backs or indication of the front portion of each step being a seat; and a general aspect of cheapness without actual saving of cost; are points to cause regret, and afford another proof that school-building is not mere bricklaying and carpentry, but a complex and scientific art, not universally understood at present.

Darlington is one of the few places wherein

the School Board, finding sufficient schools already erected, has only to improve those which become transferred to its jurisdiction. There are some good examples among the more recent school-buildings in the town and outskirts. One of these, at Middleton, designed and carried out by Messrs. Ross and Lamb, architects, of Darlington, is tastefully constructed in brickwork, with bands and stone dressings, and well considered in all the details of heating, lighting, ventilating, and furniture. The accommodation is for 200 children, with residence for a teacher; and the cost, including residence and schools, amounted to about £8 per head, or £6 per head for the schoolbuildings alone. The floor area for each child is 8 superficial ft., the seating 18in.

At Sunderland a design for a school by Mr. G. A. Middlemiss, architect, of Sunderland, selected in competition, is being carried out. The site is a narrow strip of land, with a frontage to James Williams'-street of 452ft., a depth of 65ft. at one end, and 56ft. at the other. Upon this frontage Mr. Middlemiss has placed a range of schools 318ft. in length, providing accommodation for 1,050 children—350 in each department of boys, girls, and infants, all upon the ground-floor. The infants' department, occupying the centre of the block, has a large room, 64ft. by 32ft., square on plan, 25ft. high to the ridge, furnished with three galleries and one large class-room. The boys' and girls' schools resemble the letter **E** on plan, with the central portions elongated and widened to form with the longer portions **T** shaped principal rooms. The other projections form the two class-rooms of the departments. This arrangement gives windows on both sides of the rooms, essential to a very ingenious and effective method of admitting fresh air, which is one of the distinctive features of Mr. Middlemiss's plan. He accepts as an established fact that windows of irregular dimensions opened to irregular widths cause a perceptible draught in a room, although there may be no through direct current; while a series of windows of uniform size opened uniformly on the leeward side of an apartment can be so regulated as to neutralise the effect of each separate current, and diffuse an agreeable change of external air. In the clerestory-windows of the new church of S. Peter, in Sunderland, Mr. Middlemiss has acted upon that principle with great success. He carries it out in his schools by first of all determining that all the casements of his windows to open shall be above the plate-line of the roofs, 12ft. above the floor-level. The casements are of uniform size, placed in gables of the roof, which is open inside to the ridge. Running the whole length of the walls under the range of casements to be opened, is a duct formed with common agricultural drain-pipes, containing an iron shaft or rod, to which connecting rods from each of the casements are attached. The bottom of each casement has a projecting hinged bracket, upon which it opens, and the casement itself is hinged with a slight inclination forward, so that it falls naturally into the rebates of the frames. By means of a handle at one end of the wall-shaft the whole of a range of casements can be opened simultaneously, and regulated to give a gentle circulation of air without draught. Apart from the method of ventilating, this plan for opening and closing the windows is a great improvement upon the ordinary system of attempting to work cords over pulleys. Cords rarely answer the purpose; they are always wearing out, and frequently administer a sharp pinch to the fingers of a novice who attempts to use them. The boys' and girls' rooms in this school are 81ft. in length on the longest side of the **T**, and 52½ft. in the central length, by 20ft. in width, and 21ft. in height to the ridge. The class-rooms are 20ft. by 15ft., fitted with galleries. There is a teachers' room, with lavatory and w.c., and a children's cap-room

and lavatory combined, to each department. The heating is by open fireplaces. Great care has been taken to prevent the escape of heat through the roof, by giving the slates an additional lap, pointing them on the inside, and by felting and boarding to the soffit of the rafters. The principals have iron tie-rods. Macfarlane's fittings will probably be used for the latrines, and the furniture will be the best that has yet been introduced. The desks will be in long lengths, three in depth; the seating, with backs, allows 20in. for each child, and the floor area for each gives eight superficial feet. Each class-room is calculated to hold one-eighth of the number of children in a department. A movable division across the short stem of the T-shaped rooms would give a larger class-room, when required. The cost of the schools, inclusive, will be, almost to a fraction, £6 per head. The walls are brick, with stone dressings, plastered inside. Other Board Schools, in E-shaped departments, transposed and reversed to meet the exigencies of other sites, are about to be carried out by the same architect.

QUANTITIES.—XV.

MASON (continued).

HAVING treated of the accustomed method of measuring Yorkshire stone, I have now to treat of Portland, Bath, and the other building-stones, which are in more general use on account of their being more adapted for building purposes, and their being capable, owing to their texture, of receiving a greater amount of decorative treatment than the stones already mentioned.

In dealing, then, with these stones, it is customary to take the cubical contents of the stone first, and then the various labours executed upon it, keeping the stone and labour separate. There is, however, an exception to this rule in the case of ashlar work, which is measured by the foot superficial, including all beds and joints, stating the average thickness of the stone, as shown in the Table. With this exception, the stonework must be measured by the foot cube, and the labours upon the various faces taken separately, according to the execution. It is better to measure the labours in a particular order, and it is recommended that the inferior be taken first, beginning with the half-sawing, then taking the beds and joints, plain face, sunk face, moulded face, &c. Such a system enables the student to find any dimension afterwards without difficulty. Commence at the lower portion of the house, and work from left to right, as recommended in "Bricklayer." All stonework 3in. thick and under is to be measured superficially; over that thickness to be taken at per foot cube. Proceeding, then, to the measurement of the stone, it is also advisable to keep to one uniform method of taking the dimensions of the several blocks to obtain the cubical contents. That generally adopted is to take firstly the length, then the width, and lastly the height. All labour and material in hoisting and setting the stones is included in the item for the cube stone. Where the stonework is raised above 40ft. from the ground, it must form a separate item from that below that height. I have already, in a previous article, given the definitions of the ordinary labours upon stonework, and I will now endeavour to explain the methods of measurement I adopt, and give examples in illustration of my own practice, because I am sure my readers will consider that examples of actual practice are far preferable and easier to understand than theoretical principles, which, even if carefully read, are not thoroughly understood, and are therefore soon forgotten.

As I have before observed, the stone is to be measured as it is actually intended to be worked, and the net surfaces only to be taken. I will speak of the labours in the order already prescribed.

Half-Sawing is taken upon all sides of the stone upon which no other labour is to be executed, the other labours including this item. It is generally applied to the backs of stone, which would require no additional labour, but it must also be taken on every side when the stone is laid upon or against brickwork. Of course when certain faces are left rough as it comes from the quarry, no sawing or other labour would be taken.

For the instruction of those of my readers who may be yet quite novices in quantity surveying, and who consequently need information not necessary to the more advanced, I would mention that by taking half-sawing to each stone, we equalise this labour upon the several stones which are sawn, as the sawing itself would apply to two stones, both being sawn together. After the whole of the half-sawing, however, is brought into the Abstract, it should be divided by two, and billed as "sawing," though many surveyors would keep it and bill it as "half-sawing." I prefer the former, as sawyers are paid according to the amount of the "sawing," not "half-sawing," which they execute. This point, however, is very unimportant.

Plain Work in Beds and Joints is taken to stones laid upon or against other blocks of stone; otherwise, as I have just observed, they would be taken as half-sawing. Take as an example the case of a stone quoin to a brick building, the beds of which would be taken as plain work in beds, the stones being laid one on another, whilst no joints would be measured, the ends being simply measured as half-sawing. Should, however, the quoins be set against stonework, as in the case of a stone building, the joints would have to be measured similarly to the beds of the stone, and abstracted with that item as shown in the Table. Some surveyors measure only one plain bed and one plain joint to each stone, with certain exceptions (piers, pilasters, columns, &c.), but I think it a much better plan to measure the whole of them, and state in the bill that this has been done. Where the work, however, is continuous, it is customary to allow for joints to every 3ft. of stone only.

Plain face is taken to all external faces of the stonework which are not otherwise worked. It is also taken to the faces of stones, where it is necessary to be executed for the purposes of setting out other work. In cases of elaborate detail this is frequently the case, and also in tracery.

Sunk work is taken where it occurs; and must be described as it is executed, whether rough sunk, sunk work in beds and joints, sunk work in rebates, in weatherings, &c.; and if circular it must be taken separately. Measure the whole of the surface of the sinking: that is, take the girth. In the case of a rebate, the dimension for the width would be 6in., and the ends (if any) would be numbered. No deductions would be taken to any joints which might occur, and the plain faces to top and side would be measured the full width and height of the stone, the rebate being executed afterwards. This description of work is further explained in the examples to be hereafter given.

Moulded work is measured by the foot superficial, taking the length by the girth, care being taken to add for all returns to the length. Girth the work for the width, but simply the moulding, the weathering being taken as sunk work and not moulded—the moulded being of greater value.

Grooves, throats, rebates under 3in. girth, chamfers, splays under 3in. wide, reeds, flutings, joggle-joints, cutting and pinning to landings, &c. &c., are measured by the foot run.

Number chimney-pieces, giving full description of workmanship and material, though many surveyors prefer to measure plain chimney-pieces by the foot superficial, taking labours to edges, and numbering rounded

corners. If numbered, state the prime cost value, exclusive of the fixing.

Paving, Landings, &c., would be measured as described to York stone.

Enumerate all mortices for door-posts, balusters, iron railings, cramps, plugs and dowels; also all cutting and pinning to ends of steps, notchings, letting in coal-plates and air-gratings, sink-stones, sinks, pipe-holes. Also all mitres, stating whether internal or external, and giving the girth of the mouldings, &c., to which they refer; stops, whether to moulding chamfers, &c., stating size, and whether square, splayed, moulded, or as case may be. Also number any items for carving, &c., as shown in the accompanying Table. In taking cramps and plugs, state the sizes and the metal, which should be reduced to weight: the labour of letting in and running with lead should be taken separately.

Carving.—Measure strings, parapets, or where the work is continuous, by the foot run. Number all single items. I have given examples of different descriptions of carving in Table X.

In conclusion, I would observe that if I have omitted describing any particular class of work, I believe the reader will be able, from the general remarks which I have made, to apply the rules laid down to each individual case; but, at the same time, I shall be happy to afford any additional information to those who may require it, by way of illustration, if they will supply me with any examples for measurement, which, after all, is the most comprehensive, and will the better convey to the mind of students the correct methods, and eradicate any false notions. Following Table X., I give a few general examples, and as I have just said, I shall be happy to give replies to any queries of my readers.

In prefacing Table X., I would observe that therein I have laid before my readers briefly the various descriptions which customarily come under the notice of the Quantity Surveyor, but of course there will be many others, every job varying in some particular: but I think sufficient has been given to illustrate the principle of the measurement of stonework.

TABLE X.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement:—

LOCAL STONE WALLING.	
Rubble stone in walling in random courses in foundations, well bonded and well flushed with mortar and grouted with hot lime and sand every three courses—average 2ft. thick	At per yard s. per.
Do. above foundations, average 18in. thick, do., do.	"
Extra to rough hammer-dressed arches 16in. high, with radiating joints.	At per foot run.
Do. labour to external quoins.	"
Do. internal do.	"
Do. to forming openings for air gratings (12 x 6) in 18in. wall	At per number.
YORKSHIRE STONE.	
Tooled paving, laid in regular courses, and bedded and jointed in cement	At per foot super.
Do. shelves	"
Rubbed hearths	"
Tooled one side landings	"
Rubbed one side landing, tooled the other side	"
Tooled steps and risers to specified sizes, including tooled edges	At per foot run
Solid rubbed steps	"

Feather-edge tooled coping, set in mortar and throated, including all joints	At per foot run.
Weathered and throated rubbed window cills	"
Rubbed curb	"
Cutting and pinning to 3in. landing in cement	"
Labour to back joint	"
Do. to fair edge to 4in. landing	"
Do. circular do. do.	"
Joggle joint and cement to 4in. landings	"
Tooled templates and setting in cement	At per number
Do. corbels for plates primed in cement	"
5-hole dished sink stone	"
Tooled and dished sinks, with rounded corner, and hole cut and rebated for bell trap	"
Ends to steps cut and pinned	"
Fair ends to steps	"
Quadrant do.	"
Extra to corner stones in coping	"
Mortice holes	"
Do. and lead	"
Rebated holes for coal plate	"
Double notches in hearths	"
Plain joints and lead plugs to steps	"
Caulking holes and lead for grating	"

PORTLAND, BATH, AND ALL BUILDING-STONES.

Portland stone, including hoisting and setting	At per foot cube.
Do. do. above 40ft. from ground	"
Sawing	At per foot super.
Plain work in beds and joints (all faces measured)	"
Circular do.	"
Plain face	"
Circular do.	"
Rough sunk work	"
Sunk work in beds and joints	"
Do. in arch stones	"
Do. in rebates for frames	"
Do. rubbed	"
Do. do. circular	"
Circular face to shafts of small columns	"
Circular circular plain face	"
Moulded work in cornices, &c.	"
Circular do.	"
Do. do. in small caps and bases	"
Circular circular do.	"
Portland stone ashlar, average 6in. thick, including bonders, joints, and faces	"
Groove for iron tongue	At per foot run.
Do. for iron frame to revolving shutters	"
Do. for lead flashing and burning in	"
Sunk splay, 1in. wide	"
Do. rebate, 3in. girth	"
Stop chamfer, 2in. wide	"
Mouldings under 6in. girth	"
Stopped ends to sinkings	At per number.
External mitres	"
Internal mitres	"
Splayed stoppings to 2in. chamfer	"
Moulded do. do.	"
Mitres do. do.	"

Stopped-ends to moulding 9in. girth	At per number.
External mitres do.	"
Internal mitres do.	"
Intersecting mitres, do.	"
Returned, mitred, and stopped ends to do.	"
Housings for ends of steps 14in. x 6in.	"
Fair sinkings, 2in. wide, 3in. high, and 2in. deep, to form dentils	"
Do. 2in. x 6in. x 4in. deep, to form small moulded trusses in cornice	"
LABOUR: working and carving, including boasting, for ditto:—	
Scroll ornaments in panels, 18in. by 9in. extreme size, as sketch	At per number.
Quatrefoil sinkings, 8in. by 8in. and 1½in. deep, as sketch	"
Head to keystone, 12in. by 9in. on face, as sketch	"
Truss, 12in. face, 9in. profile, and 2ft. high, as sketch	"
Terminal, 3ft. high, and 2ft. 6in. wide, as sketch	"
Caps to columns 6in. diameter at necking, and 12in. high, in bold relief, including moulded abacus and necking	"
Do. to ¾ columns, and do. do.	"
Do. to pilasters, 18in. wide at necking and 9in. high, with two 10in. returns, in bold relief	"
Carved boss terminations, 5in. by 5in. to moulded string	"
Do. 4in. diameter on face of moulded string	"
Enrichment, 9in. high in cornice, in bold relief, as sketch	At per foot run.
Mitred angles to do.	At per number.
Stopped ends do.	"
Perforated ornamental parapet, 10in. high, through 6in. stone	At per foot run.
Next week I will give the few illustrations I propose, to explain more fully the method of stone admeasurement.	
B. F.	

THE ROSARY.

AT the rooms of the Society of Arts, Adelphi WILLIAM TAYLER, Esq., late Commissioner of Patna, read on Friday the 25th of April, a highly interesting paper on Rosaries; Sir DIGBY WYATT in the chair. The lecturer apologised for introducing a subject which in reality was only a question of a certain number of beads hung upon a string for the purpose of being passed, devotionally or mechanically, as the case might be, through the fingers of a worshipper. The subject, however trivial and eccentric it might appear, had claims to the passing attention of the modern cosmopolite, whether artist, savant, or socialist. If any lady or gentleman here present, said the lecturer, were to open any work of established authority, the "Imperial Dictionary," or "Encyclopædia Britannica," and turn to the word rosary, he would find it described as a "chaplet of beads, used during worship by the Roman Catholics;" this was about as much as if the word "hat" were to be described as a "species of head-dress worn by cabmen in Piccadilly." The rosary, instead of being confined to the Roman Catholic Christians, was to be found in the hands of Hindoos, Mahomedans, and Buddhists, constituting about three-fourths of the entire human race. It was among those religionists who, above and beyond all others, are distinguished for the calm and contemplative

character of their religion, that he was inclined to believe the rosary had its origin. He wished he could conscientiously believe that sufficient interest were taken in the ancient history of India to make it superfluous to say that some 500—some assert 1,000—years before the Christian era, there was a real living being, called Goutama Buddha, being of royal race, who actually left his regal palace and his father's dominions, of his own free will exchanged the luxury and magnificence of a court for the privation and hardships of a wilderness, and by the force of his own exertions and example entirely subverted the national religion of the Brahmans. Whatever the difference of opinion might be among the learned as to the character, extent, and origin of the Buddhist religion, one characteristic was admitted by all—"quietism." Buddha himself was ever at rest; the highest merit attainable in this world was abstraction and quiescence; the highest final beatitude "Nirvāna," or absorption in the Divinity. Now the man, especially in a warm climate, who conceived it to be his first duty to sit or stand for hours together, would be rather disposed to fall asleep, unless in some way or other aided in his devotional exercises by some material adjunct. This was the rosary, with the additional charm of coolness in the beads as they passed through the hands on a hot and oppressive day. It was worthy of remark, that the Buddhist rosary was almost always made of smooth material—stones, coral, amber, or seeds, the most common being the seed of the Tootsee plant. The rosary of 100 beads, according to Sir John Davis on "China," was part of the ceremonial dress attached to the nine grades of official rank. But whether the rosary owed its origin to Buddhists or Hindoos, the latter had carried the system of artificial prayers to an extent which was simply ridiculous. This was seen in the adoption of the whirligig or prayer-wheel. The lecturer went then on to describe the Buddhistic worship, drawing attention to its similarity with the Roman Catholic ceremonies, and showed a trumpet used on such occasions, made of human thigh-bones, which were often mounted in silver. In endeavouring to trace the origin of the rosary, he had been much puzzled by failing to discover any historical traces of it during the earlier ages of the Buddhist reformation. We had Buddhist feet, the wheel, the dorge (or thunderbolt), the trident, relics of all kinds, including hairs and toe-nails, but nowhere the rosary, and this had led him to the conclusion that it was only in the latter days of Buddhism, when the enthusiasm and earnestness of the new creed had given place to a condition of listless indifference, that the rosary had been introduced. This would account for the absence of all traces of it in the earlier days of the system. The lecturer then passed from the Buddhists to the Brahmans. The Shastras told us that the advantages gained by counting beads were four:—1, Asth (riches); 2, Dhurm (piety); 3, Kam (sensual enjoyment); 4, Mosh (salvation). So that all the beatitudes, temporal and eternal, were attainable by this simple exercise. The variety in the size of the rosary, and the number of the beads among the Hindoos, constituted a difference between their chaplets and those of the Buddhists. Moore said he saw a rosary of one hundred thousand beads. Marvellous efficacy was ascribed to Sādhama; it was the only thing necessary in an age of sin and vice for the attainment of future felicity. The most favourite material for the Hindoo rosary was the roodrack, an extremely rough and rugged seed. He thought that the rosary or prayer-bead owed its earliest origin among the Hindoos to the sacred necklace or Māla. It was easily conceivable that such necklaces were connected with some religious idea. Passing to the Mahomedans, Mr. Tayler observed that the daily occupation of a true believer was to say fifty prayers, later reduced to five. The beads of their rosaries were ninety-nine, in three divisions called *Tusbech*. The division were sometimes marked with a stone or bead of different shape, sometimes by one or more tassels called "shumsas," which were made of gold, thread, and silk of divers colours. All the rosaries of Mahomedans were of elegant and ornamental materials—as agate, cornelian, onyx, and even emeralds. The lecturer exhibited a large number of these rosaries, and showed one of peculiar sanctity to the Mahomedans called "Khak-i-Shufa" or earth of Healing, being made of the sacred earth of Kurbala, where the martyr Hossein had been slain. After an account of the touching legend of the death of Hossein, and some most interesting

remarks about the intense and overpowering piety with which the Soonees looked upon earth—whilst the Sheabs were indifferent to this feeling, which the Wahabees altogether ridiculed, the lecturer took up the use of the rosary amongst ourselves. It was in general use at the present day among Roman Catholic Christians, in connection with the five joyful, the five sorrowful, and the five glorious Mysteries of Our Lord's life, death, and resurrection. The introduction of the rosary among Christians was generally attributed to S. Dominic, in the thirteenth century: some maintained that it was much earlier introduced by S. Benedict, about the sixth century, when the Buddhists were driven out of India by the Brahmans. It might perhaps be new to some that the word "bead" was the past participle of "*biddan*," the Saxon word for "to pray." But whenever and by whomsoever introduced among Christians, beads very soon had assumed considerable importance in Europe from the times of the Crusades. In England the beadsman was a very prominent personage. The universality of the custom established the one great fact which was of interest to us all—the world-wide conviction of the existence of a God to be worshipped by prayer. In conclusion, the lecturer remarked that the somnolent party of the present day, who snored during the sermon, was remarkably like the sleepy Buddhist or dozing Brahman, and would probably be saved from indirect exposure, if he had some beads to pass through his fingers, and were possessed with the idea that his future state depended, to some extent, on the number of these revolutions. He earnestly hoped that the observation and facts he had ventured to offer, though neither learned nor scientific, might not be considered altogether unprofitable.

Dr. CAMPBELL in opening the discussion on the paper, remarked that it had been the intention of the lecturer to show the members of the Society a Lama in full dress, but the materials did not arrive from the Crystal Palace in right time. He had very little to add to the exhaustive remarks of Mr. Tayler. He ascribed the power and success of Buddhism to its principle of kindness, and above all, tolerance. No peculiar ceremony was required, no special profession necessary to become a Buddhist—all that was wanted was to live a contemplative and pious life.

Dr. HYDE CLARKE said that Mr. Tayler's paper was not less important from an archaeological than from a commercial point of view. He hoped that the paper would draw the attention of some of our manufacturers to the immense amount of wares that were wanted in this direction amongst Buddhists, Brahmans, and Mahomedans. The manufacturers might convince themselves through this excellent paper what amount of higher kind of historical and even theological knowledge was wanted, to carry on a trade in mere beads and chaplets. He would be informed to send rough beads to the Brahmans and to provide smooth ones for the Buddhists. What might be done in a small matter he experienced through a friend who was once called in to make eyes for dolls, and was highly incensed at the request; but when he was shown over the manufactory and saw tens of thousands of eyeless dolls, and received an order to the extent of a thousand pounds, he changed his mind, and became a wealthy manufacturer of dolls' eyes. The same might be done with the beads for rosaries. A brisk trade might spring up in that article; it was a well-known fact that most of the Hindoo idols were manufactured in Birmingham. (Laughter). The Society of Arts might be really grateful for the highly instructive paper which had been read by Mr. Tayler.

Sir DIGBY WYATT remarked that he should have liked to hear some more details on the use of the rosary in ancient times, and called on Dr. Zerffi to give some information.

Dr. ZERFFI thought himself rather out of court after the excellent paper he had the pleasure to listen to. As far as he had studied the chaplet and its use, he found traces of it in Egypt, where chaplets of beads at intervals divided by scarabæi were in use. The same kind of sacred strings he recognised on the divinities in Mexico and Peru, which altogether had a great resemblance to those of India and Egypt, especially in their details of ornamentation. On plate No. 7 to Layard's "*Nineveh*," female figures might be seen holding chaplets in their hands. Du Chœl had found traces of chaplets on some medals amongst the Romans. That the Christian monks had adopted the use of the

chaplets from the Buddhists could not be doubted. In the "Forty-two Points of Doctrine," by Buddha, Chapter X., these words might be found: "The man who, in the practice of virtue, applies himself to the extirpation of the roots of his passions, is like one who is rolling between his fingers the beads of a chaplet. If he continues taking hold of them, one by one, he arrives speedily at the end; by extirpating his bad inclinations, one by one, a man arrives at perfection." This proved what a high moral had been connected with the use of the chaplet by the Buddhists. With reference to the introduction of the chaplet amongst Christians, the Virgin Mary was first mentioned, and the "Paternosters" of her chaplet might be seen amongst the relics in the church S. Maria, Campitelli; then the apostle Bartholomew; and, amongst the fathers, Nazianzenus, Hieronimus, and S. Augustine. The old Saxons used at least a similar instrument for prayers, but only for "Paters," as was mentioned in a canon of the Anglo-Saxon Council of Chalk-hyth, 816 A.D. He had to protest against one expression in Mr. Tayler's paper, who had called his essay neither artistic nor scientific. But as the paper treated of the general basis of all art and science—religion, in the highest sense of the word—it was therefore artistic as well as scientific; that it was of great commercial importance had been proved by Dr. Hyde Clarke.

After the usual thanks to the Lecturer proposed by Mr. GEORGE BROWNING, and to the Chairman, the proceedings terminated.

THE PAST AND PRESENT OF ARCHITECTURAL ART.*

(Continued from p. 501.)

THIS, architecture, though a lineal descendant of those of the old world, was, when in the fullness of its development, so absolutely diverse from them that they can in no way be compared by likeness, but only by contrariety. It was an absolutely new phase of art, bearing no kind of resemblance to its early progenitors. Where their characteristics were horizontality of line, directly downward pressure, a clinging closely to mother-earth, and an imperturbable repose, we may almost say an eternal sleep, those of this new creation wear an upward soaring, an apparent inversion of gravitation into a striving towards heaven, and a vivacious wakefulness in every feature. Constructively, instead of the mere support of dead weight, its principle is the systematic balancing of an infinity of diagonal pressures; yet this, though a constructive fact, is not an artistic characteristic, for in its more spiritual effects, weight and thrust seem to be annihilated, and converted into upward striving, so that the arch-volt, the flying buttress, and the ribs of the vaulted roofs, seem rather the medium of upward than of downward pressure. In elegance and expressiveness of detail, no previous style had surpassed it; in endless variety of imagination or spirituality of sentiment none had ever approached it. It was the greatest marvel that architectural art had produced, and it united all these magic qualities with a gravity and solemnity in the temple, a stern solidity in the castle, an asceticism in the monastery, a quiet, retiring sentiment in the seat of learning, a cheerfulness in its civic and domestic structure, and a deeply touching expression in its sepulchral monuments which no style could possibly go beyond, and none have yet equalled.

It presented, too, during its course a beautiful series of variations. Its earliest phase stern and precise, with details rivalling the Greek in the studiousness of their contour; in its second, lighter and less severe; in its third, branching off into an infinity of charming lines, suggestive almost of vegetable growth; and in its last, while returning rather to early rigidity, indulging in new developments scarcely foreshadowed by its earlier forms. Thus, at Glastonbury, at Salisbury, in the choir of Westminster, in the naves of York and Winchester, and in the chapels of King's College and of Henry VII. we have a series of works, all belonging to the same general type of architecture, yet presenting diversities the most marked, and beauties the most varied.

Nor was it alone in its successive periods that varied phases were produced. Each country in which it flourished had its own series of national

and provincial types. Thus in France, in England, in Germany, in Spain, and in Italy, and even in far-off Scandinavia, we find it adopting ever-changing forms, though all belonging to the same great stem.

Mr. Fergusson, though an opponent of its revival, thus speaks of Gothic architecture:—"Not even the great Pharaonic era in Egypt, the age of Pericles in Greece, nor the great period of the Roman empire, will bear comparison with the thirteenth century in Europe, whether we look to the extent of the buildings executed, their wonderful variety and constructive elegance, the daring imagination that conceived them, or the power of poetry and lofty religious feeling that is expressed in every feature and in every part of them."

And again, while speaking of its sculpture, which is not usually considered as its strongest point, he remarks:—"The great cathedrals of Chartres and Rheims even now retain some 5,000 figures scattered about or grouped together in various parts, beginning with the history of the creation of the world and all the wondrous incidents of the first chapter of Genesis, and then continuing the history through the whole of the Old Testament. In these sculptures the story of the redemption of mankind is told, as set forth in the New, with a distinctness and at the same time with an earnestness almost impossible to surpass. On the other hand, ranges of statues of kings of France and other popular potentates, carry on the thread of profane history to the period of the erection of the cathedral itself. Besides these, we have, interspersed with them, the whole system of moral philosophy, as illustrated by the virtues and vices, each represented with an appropriate symbol, and the reward or punishment its invariable accompaniment. In other parts are shown all the arts of peace, every process of husbandry in its appropriate season, and each manufacture or handicraft in all its principal forms. Over all these are seen the heavenly hosts, with saints, angels, and arch-angels. All this is so harmoniously contrived, and so beautifully expressed, that it becomes a question even now whether the sculpture of these cathedrals does not excel the architecture."

Noble and exquisite, however, as it was, it at length ran its course; and, by some uncontrollable movement of the human mind, it gave way to what the world had, till then, never witnessed—a resuscitated style.

I will not attempt to philosophise on this new phenomenon in art. It seems to have originated in a double cause; firstly, the very natural pride felt by the Italians in the antique monuments of their own land and their own race; and, secondly, in the appreciation of these antique monuments which was engendered and fostered by the revived love of Classical literature.

It is not difficult to understand how this tended to the revival in Italy of old Roman art; and, once revived there, the centre of ecclesiastical and, in a great degree, of literary influence; the centre, too, of the revival of painting in its highest form, it need not be wondered that it spread itself as a fashion into more northern countries where the same literary tastes had taken root. However this may be, the fact is undoubted, that from this time forward original art ceased, and borrowed or resuscitated art took its place.

My predecessor, Mr. Smirke, in one of his lectures, gave a highly interesting description of the noble enthusiasm which inspired the early architects of the Renaissance in Italy; and I can quite appreciate this feeling in a land where the Mediæval styles were less deeply rooted, where Classical traditions had never been extinct, and where the reminiscences of ancient Rome were a subject of national exultation. The revival of the noble literature of their mighty ancestors could scarcely fail, in such a country, to prompt a wish to revive their arts; and I am convinced that such a revival became a spontaneous and irresistible movement, wholly unconnected with any premeditated plan.

Anyhow, whether for good or for ill, the revival was a great and potent fact; and its results have now lasted as long as the whole period of the ascendancy of Pointed architecture, and have extended their sway to all parts of the globe where European influence is felt; nor can its opponents deny that, on its native soil especially, its productions were often of the most masterly description and exquisite beauty; enriched as they are by decorative painting which has never

* Sir GEO. GILBERT SCOTT's last lecture at the Royal Academy.

been excelled; by sculpture of which antique artists would not have been ashamed; and by other arts of proportionate merit. In other lands, it has produced works of which no one would venture to dispute the merit; and, though a borrowed style, it has developed anew many marked chronological and national varieties, and has produced, as we have seen in my last lecture, works and types scarcely even foreshadowed by its antique originals.

Nevertheless, in the opinion of at least of many, it had, by the close of the last century or early in the present, so far run its course, at least in this country, so as to have lost its old artistic power. Art had become enfeebled, while art-history had risen more prominently into view; and the decay of the one was promoted by the distraction of thought occasioned by the other.

The revived knowledge of the architecture of Greece rudely disturbed the vernacular style derived from Rome, so that by about the year 1830 the old state of things seemed almost hopelessly damaged; and every architect, instead of working on the traditions handed down to him by his predecessors, seemed to do just what was right in his own eyes, though with a special rage for not very practicable reproductions of Greek, coupled with a conviction that Roman and its derivatives were little short of barbarous. All the traditions of the past appeared to be broken up. Our every-day architecture, as exhibited in ordinary houses, had become mean and contemptible in the extreme; and, though things have since greatly mended, it has been from a purely eclectic and not in the least degree from a traditional point of view; whilst the untutored housebuilder, left to himself, even now disports himself in reminiscences of these first decades of our century—the halcyon days of Gower-street and Tavistock-place. It was just at this juncture that, by some occult influence, the public mind was brought back to view—first with interest, and then with admiration and love—the long-neglected architecture of our own country and our own race (a group of kindred races). At first this was with no intention or thought of revival; it was only interest, admiration, and love. Writers on this subject, whether friendly or hostile, affect to systematise the movement; but it was wholly unsystematic. It arose from the inmost feelings of the heart, and in no degree from premeditation or plan.

It is now the fashion to speak contemptuously of revivals; and truly they do seem strange and inconsistent after following the more natural history of art from the dawn of civilisation to the Renaissance. Yet I cannot but agree with Mr. Smirke that the Classic revival was, in the land, at least, of its rise, a natural, spontaneous, and unpremeditated movement of the human mind. That the Gothic Renaissance was so too, I know, for it was my own happy lot to be a humble agent in it, and I am old enough to have watched it, I may say practically, if not literally, from its commencement. People talk of Horace Walpole, of Sir Walter Scott, or of any one else they like, as the early promoters of the feeling which led to the revival. I do not know how it may have been with others, but, for myself, I know that my love for Gothic architecture was absolutely spontaneous, and that I had no kind of incentive for following up its study other than the delight I took in it, before I knew a word about other architecture, or was acquainted even with the published works on our own, and that without a thought of its study ever becoming practically useful to me. I am convinced that the revived love for our old buildings, followed as it was subsequently by a desire to imitate their architecture, was as spontaneous and as irresistible a movement of the human mind as those which had originated either Classic or Mediæval art, or that which, two thousand years after its first rise, had led to the revival of the former. It is true that its results have not yet been so all-pervading as those of the Classic Renaissance, yet they have been very great; out and away the most marked feature in modern architectural history, inasmuch as it, almost alone, has resulted from ardent and genuine enthusiasm, and from the inmost recesses of the heart.

As one of the survivors from among the more active of the earlier agents in this great movement, I may claim a right to dilate a little on my reminiscences of it.

In writing respecting it, nearly nineteen years ago, when my memories were more fresh, I made the following remarks:—

I described the movement as “being the development of a new and vigorous style upon the foundation of the glorious architecture of our own country and of our own forefathers, in the place of one at once alien to our race and our religion.”

“This,” I went on to say, “I need hardly tell you is a mighty and most arduous undertaking—so mighty indeed, and so arduous, that I doubt whether, if it had been in the first instance fully appreciated, any body of men could have been found with sufficient daring to set about it. The strength, however, of the movement lies in the fact that it was not deliberate nor preconcerted, but was the involuntary working out of a deeply-seated mental revolution. It was not that a body of men deliberately banded themselves together to carry out and propagate particular tastes or opinions; such would have been but a feeble, or at best an ephemeral and merely local movement; it was rather that a number of persons, in different neighbourhoods and countries, and without any concert, had been led by their own unbiased and unguided instincts to an appreciation of the long-neglected beauties of our own indigenous architecture.” This (with other feelings), I proceeded to say, “had led them first to study, then to imitate, and ultimately to attempt the revival of the style which had thus involuntarily approved itself to their natural perceptions of what is right and beautiful.

“There is here no conspiracy, no organised movement, no preconcerted effort. Not one of those engaged in it ever thought of its being a movement at all; few of them knew in the first instance that others were affected by the same feelings with themselves, nor perhaps were conscious of any external causes which had given rise to such sentiments in themselves. Yet all, from some internal impulse, seem severally to have been impelled in one and the same direction; and, having at a later period discovered the concurrence of their feelings, their efforts have since assumed the form of a united movement, though originating from the individual and unbiased feelings of persons wholly unknown to each other.”

(To be continued.)

ETCHINGS.

AMONGST the increasing number of artistic publications which deserve the serious consideration of the art-critic, we may conscientiously mention the etchings of the three brothers Slocombe, published by Messrs. Paul and Dominic Colnaghi and Co., Nos. 13 and 14, Pall-Mall, East. These etchings are in two sets, of a larger and a smaller series, of twelve plates each, printed on India paper. From the time that Albert Dürer first practised etching, down to our own days, England, Germany, France, and Italy have made considerable progress in this art, which serves especially to record striking effects. There is a great power in all the three brothers Slocombe, but we give unexceptional preference to the artistic handling of the needle by Mr. C. P. S. Slocombe. Sixteen out of the twenty-four plates are his; he excels his brothers not only in quantity, but undoubtedly also in quality. The twelve plates of the smaller series are mere sketches of views, taken on the spot—memorandum of what the artists have seen.

The views at and around Rouen, the Chateau of Dijon, and especially the Clock-tower at Bern, are all done in an effective style; so is the Lane at Penmaen-Mawr, North Wales, with its luxuriant foliage. The sharpness of light and shade, the variety of tints are really praiseworthy in these landscapes. The twelve larger plates, however, are of greater artistic value. We have in Plate I. “A moonlight scene, St. Ives, Pilchard-boats unloading.” To etch a sky with transparency and lightness is, in itself, a great difficulty; but Mr. C. P. S. Slocombe has overcome all harshness, and succeeded in giving us a “chiaro-oscuro” landscape, with all the power of a Lebas, who knew how to arrange light and shade. Brought out in full relief by the bright moonshine, we see in the foreground two brigs and several fisher-boats—whilst in the hazy distance stands, like a spectre, the light-house without light, as the water is low and no lamp is lit, so as to keep the ships in deep water. A fine contrast forms Plate II.—“Tintern Abbey and Valley of the Wye.” The treatment is light and sketchy, corresponding in character to that of Plate III.—“Worcester, from the Diglis Locks on the Severn.” A fine effect is produced

by the smooth and broken waters in the foreground. Over the whole landscape hovers a serene English High Church quietism. The long horizontal lines are symmetrically interrupted by the vertically rising steeples of the churches, pointing up to the infinite in a different direction than the unlimited plain. Plate IV. “Sylvan Shades, High Beech, Epping Forest,” has a depth and woody look which is charming. The plate is a powerful protest against the idea of depriving the people of a genuine airing in a real forest, in order to forget their dusty town-cares. We then have Plate V.—“Stonehenge by Moonlight,” a perfect masterpiece, of which a “Callot” need not have been ashamed. A dreamy mysticism is poured over the plate. The moon, as if anxious to have a glance at the huge, giant-like, hoary stones piled up by supernatural means, peeps out from behind a heavy curtain of clouds. The stones stand out in black silence, pointing upwards, loudly proclaiming man’s yearning from time immemorial to know something of the unknown. The silvery seams with which some of the stones are fringed by the moon’s sudden appearance produce a magic effect. We were struck by the power of this etching, and still we would hesitate to pronounce it better than Plate VI.—“In the New Forest—The Knightwood Oak.” Mr. C. P. S. Slocombe’s talent comes out most powerfully in this group of trees. It is a “Claude Lorraine” in black and white. Every leaf trembles in the forest silence, and proclaims nature’s grandeur. The sharpness, depth, and power of this glorious dome, built of oak-leaves, is very imposing. The remainder of the plates, except one, are by Mr. F. S. Slocombe. There is some geniality in his use of the etcher’s needle, but at the same time a kind of restlessness which mars the artistic effect of his landscapes. Even if the artist chooses a stormy sea, the charm lies in his having fixed on canvass or paper one grand moment. So it is with the ever-changing sky, full of fleeting clouds. Plate VII.—“The Thames at Chiswick” on a quiet evening, with a few barges on the limpid waters, is good: but the sky is apparently in Albert Dürer’s harsh, wood-cut style. This is still more the case in Plate X.—“Shipping in the Pool—Port of London.” We do not doubt that the clouds sometimes assume extraordinary shapes. We may see with Hamlet in them a camel, or a weasel, or a whale, but the artist has no right to play the Polonius, and to imitate what Hamlet saw. Therein lies the great mistake of the followers of our modern realistic schools—that they are too slavishly bent upon a mere reproduction of nature. If they see a sea-green or indigo-blue sky, they will paint it; they go in for all sorts of tints, without sense and harmony; for all sorts of shapes, without symmetry and proportion. The artist is never to be a mere copyist; art has to use nature to express some artistic thought. In our times this becomes still more peremptory. We have our excellent photographic apparatuses, and do not want the unsteady hand of the artist to perform the duty of registering with accuracy what nature pleases to show us outwardly; the artist has to rectify the shapes and to give us nature’s inner soul. For there is a soul in tints and forms. To understand this soul, to reproduce it—as the musician catches the harmony of the spheres, without imitating a piping finch, crowing cock, or bellowing bull—is the artist’s province. We feel it our duty to throw out these hints, as Mr. F. S. Slocombe undoubtedly leans towards too great a realism. His “Lane Scene, Pinner, Middlesex—Evening,” is in a different style, and deserves hearty praise. To say that an artist knows perspective is in our times very little. Scene-painting has reached a great perfection with us, only we like to show our mathematical skill rather too often. Mr. E. S. Slocombe has a pretty little sketch—Plate XII.—“Below London Bridge.” We recommend these plates to lovers of art. We are well aware of the advantages of photography; but we should not like to see a branch of art altogether neglected, though had once a Mortimer, a Baillie, a Rowlandson, and a Howitt amongst its votaries. We may admire what the rays of the sun are capable of producing on paper, but we still keep a higher veneration for what the rays of human intellect can do with the help of some inert copper, a resinous mass, a lifeless needle, and an arm through which shoot our brain’s phosphorescent sparks. Man, when he comes to do consciously what the great luminary performs unconsciously, is by this very fact, in all his microscopic smallness, so much greater than our great master-photographer—the Sun.

G. G. Z.

OUR LITHOGRAPHIC ILLUSTRATIONS

A MADONNA AND CHILD.

One of our chief illustrations represents "A Madonna and Child," ascribed to an English artist of the early part of the fourteenth century. It will be a surprise to most of our readers to see, probably for the first time, such a novel announcement. This, however, need not be, if we reflect upon the innumerable proofs, still left to us, of the brilliant talent and indefatigable labours of our native artists of this period. Architects, painters, and others well acquainted with the school of art, have unhesitatingly asserted the work of this master to be equal, if not superior in many respects, both in design and execution, to the Madonnas of his Italian cotemporary, Giotto. On a future occasion we propose giving other illustrations of the work of this same master, and references to those persons who have either written upon or illustrated his works. For the present we will content ourselves by observing that this subject is taken from an illuminated manuscript forming one of the national collection in the British Museum, and generally known as "Queen Mary's Psalter."

CHRISTON CHURCH, SOMERSET.

The following is an extract from "Rutter's Somerset":—"Christon Church is a small building, having a low ancient tower between the chancel and the nave, but without transepts. The nave and chancel-arches beneath the tower are of Norman structure, as is the interior doorway in the porch, the latter being richly ornamented with the chevron moulding, though now much disfigured with whitewash. The font is plain and circular, of the Norman character. The roof is formed of ribs of oak, with a row of ornamented bosses down the centre." The disfigurement by whitewash, mentioned in the foregoing extract, extends also to the chancel and nave arches, as well as to the doorway of this quaint and interesting little church. Indeed it has been so ruthlessly plastered on as to render it a matter of impossibility to discover the jointing of the arch-stones. The font is square on plan, the form of its shaft doubtless having given rise to the expression "circular" applied above.

REREDOS, ALL SAINTS' CHURCH, CLIFTON.

The figures represented are Our Lord in Majesty in the centre; David, S. Mary Magdalene, S. Paul, S. Peter, and the Blessed Virgin Mary on one side; and Isaiah, S. Jerome, S. Augustine of Canterbury, S. John the Divine, and S. John the Baptist on the other side. The whole has been executed in Caen stone, by Mr. Redfern, of Queen Anne-street, W., and very richly painted and gilded.

CORMAC'S CHAPEL, CASHEL.

The additional space we have this year devoted to illustrations has enabled us to give several of the Institute prize drawings. Four weeks since we gave Mr. Frame's exquisite drawings for which he obtained the Soane Medallion prize. Last week we gave specimens of Mr. Marvin's drawings of Bayham Abbey, and this week we give specimens of Mr. Arthur Hill's measured drawings of Cormac's Chapel, Cashel, for which he was awarded a medal of merit.

Cashel, county of Tipperary, was from the earliest times a place of great importance. The commanding situation which the present ruins occupy on the top of a limestone eminence, that rises steeply on every side, must have made it, in addition to its ecclesiastical reputation as an archiepiscopal see, a place of great strength as well. And we find frequent mention of it in ancient Irish MSS. as early as the 9th century. "A.D. 1101.—A meeting of Leath-Mogha was held at Caiseal, by Murchheartach Ua Briain, with the chiefs of the laity, and Ua Dunain, noble bishop and chief senior, with the chiefs of the clergy; and on this occasion Murchheartach Ua Briain made a grant such as no king had ever made before, namely, he granted Caiseal of the Kings to religious, without any claim of laymen or clergymen on it, but the religious of Ireland in general."—"Annals of the Four Masters." "A.D. 1134.—The consecration of the church of Cormac MacCarthy, at Cashel, by the archbishop and bishops of Munster, and the magnates of Ireland, both lay and ecclesiastical."—"Annals of Innisfallen." This church, known as Cormac's Chapel, is one of the most interesting buildings in the country, both from its artistic and architec-

tural peculiarities. It consists of a barrel-vaulted nave and a groined chancel—which latter is curiously placed as much to the south of the central axis of the building as possible. It is surmounted by high pitched stone roofs, which contain apartments over the vaulting; that over the nave is provided with a fireplace at the west end, and was divided by a wooden floor carried on corbels. At the east end a few steps descend to a similar apartment over the chancel. The external appearance of the building is enhanced by the picturesque grouping of two square towers placed at each side of the east end of the nave; one of them still retains its pyramidal roof, while the southern one, which contains a stairs to the crofts, is capped by a parapet of evidently modern date. The masonry throughout the building is ashlar work of great excellence, the material used being a hard sandstone, carefully squared and laid in courses with very close joints, which has on the whole stood seven centuries' exposure in a trying situation very well. The decoration, both inside and outside, is very rich, belonging to the "Hibernio-Romanesque" or "Celtic" style, though nowhere are sloping jambs to be seen, which is a characteristic feature of other buildings of this class. Immediately adjacent to Cormac's Chapel there is a Mediaeval cathedral, differing from it many degrees in orientation; and also a round tower, a cross, and some domestic buildings. And there are many other ruins in the neighbourhood. Altogether Cashel would well repay a visit.

CHURCH OF S. WILFRID, YORK.

As promised, we give this week other illustrations of this church. Next week we shall give additional sheets of details, and full description from Mr. Goldie, the architect.

THE ARCHITECTURAL ASSOCIATION.

At the ordinary fortnightly general meeting of this Association, held on Friday last, at No. 9, Conduit-street, the President in the chair, it was announced that Mr. Edmund Sharpe had promised to attend the next meeting of the Association, at six in the evening, and they would then have the opportunity of discussing the route to be taken this year on the occasion of their annual excursion. Mr. Sharpe had also promised to explain the use of the cymagraph. His interest in the Association continued unabated, and he had written a kind letter expressing his approval of the proposal for extending the advantages of the Association to members of the profession residing in the provinces. Desiring also greatly to see the means and usefulness of the Association increased, Mr. Sharpe offered to place in the Library ten duplicate copies of each of his published works of which he possessed the copyright, and to do the same in the case of every future work he might publish. He also offered to place at their disposal a considerable number of valuable diagrams.

A vote of thanks to Mr. Sharpe for his promised handsome donation having been passed,

The PRESIDENT stated that according to annual custom the present meeting, being the first one held in May, was set apart as a special business meeting. With respect to the Architectural Alliance, about which there was formerly much discussion, he had now very little to say. When the Architectural Conference took place last year, a meeting of the Alliance delegates was held, and it was then thought the conference would leave them very little to do, but a resolution was passed authorising the officers of the Alliance to convene a meeting if occasion called for it. The Alliance therefore was not yet dead—at all events it could be recalled into existence if occasion required, as its organisation still remained.

A COUNTRY MEMBER asked whether a question could be put to the Institute upon the prospect of obtaining an architectural diploma, as the condition of the profession, especially in the country, was deplorable. He instanced the case of a carpenter who became a builder and afterwards an architect, and another case where a journeyman bricklayer set up as an architect. Such a state of things ought not to exist, and was derogatory to the profession. If an architect went down into a strange place without proper credentials, he might be looked upon merely as one of those intelligent artisans who thought they were inspired to raise the tastes of the community. He thought means should be devised for making architecture a recognised profession.

The PRESIDENT said that the Institute, by establishing classes and inviting students to come up for examination, was doing what it could to achieve the object the last speaker had in view. The matter was in their own hands, and if they were backwards in availing themselves of the examinations, they could not expect a diploma.

The MEMBER said he only wished to convey his opinion that it would be very desirable to render a diploma necessary to an architect before he began to practice.

Another MEMBER asked whether it would not be as well to take the education of the public in hand. He deprecated any tendency towards architectural trades unionism, and hoped it would not go forth that the Association endorsed the idea that architects should have a diploma. (Hear, hear.)

Mr. BLASHILL then opened a discussion on competitions, a report of which will be found on another page.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the annual general meeting of this Institute, on Monday evening last, the report and balance sheet for the past year were received and adopted, and the officers and council for the ensuing year elected. Sir G. G. SCOTT having been unanimously elected president, was formally inducted to the chair of the Institute. In addition to the loss which the Institute has recently sustained by the death of Sir William Tite, it was announced that three other members of the Institute were dead, viz., Mr. S. S. Teulon Fellow; Mr. George Ledwell Taylor, Hon. Fellow (whose paper on Rome was recently read at the Institute); and M. N. de Caumont, hon. and corresponding member, and a distinguished archaeologist, long known in connection with the *Bulletin Monumentale*. The following resolutions were, after some discussion, adopted:—1. "That the council be empowered to invite past vice-presidents of the Institute to attend the meetings of the council, and to take part in the deliberations, but without a vote." 2. "That the sum of £30 be granted out of the funds of the Institute towards liquidating the liabilities incurred by the Art Classes Committee in their endeavour to carry out the scheme originally proposed." The council was also requested for the future to lay before the annual general meeting a budget or statement of the estimated income and expenditure for the year. It is stated that Sir William Tite has bequeathed a legacy of £1,000 to the funds of the Institute.




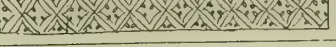
COMPETITIONS.

GOWTS.—Designs for the new Wesleyan Chapel, St. Peter's at Gowts, Lincoln, to be called the Hannah Testimonial Chapel, have been submitted by Messrs. Bellamy and Hardy, architects, Lincoln; Mr. Watkin, Lincoln; and Mr. Botterill, Hull; and those of the first named have been selected. The works will be proceeded with without delay.

CHORLTON-ROAD CONGREGATIONAL CHURCH, MANCHESTER.—The design submitted by Mr. H. J. Paull, of Manchester and London (Paull and Bickerdike), in a limited competition for this church, has been selected by the Committee for execution. The site adjoins the present church, which was erected 12 years ago; and the two buildings will be connected by an open arcade. The new church is to accommodate 1,200 adults, and the present buildings are to be wholly devoted to school purposes. The style is English Gothic of the Geometrical period.

SWEEPING MUD INTO SEWERS.—A USEFUL HINT TO LOCAL BOARDS.—The Metropolitan Board of Works have reduced the reward to persons who give information as to mud being swept into sewers from £2. 10s. to 10s. It appears that the former sum was really the means of putting money into the pockets of the offender, because the fine inflicted was but of small amount. For instance, two men would arrange between themselves, one undertaking to be the offender, and the other the informant. The case was of course heard; a fine of 10s. paid by the former, and a reward of £2. 10s. paid to the latter, consequently leaving a profit of £2 to be shared between the two! By equalising the amounts of the fine and the reward, this abuse will be put a stop to.



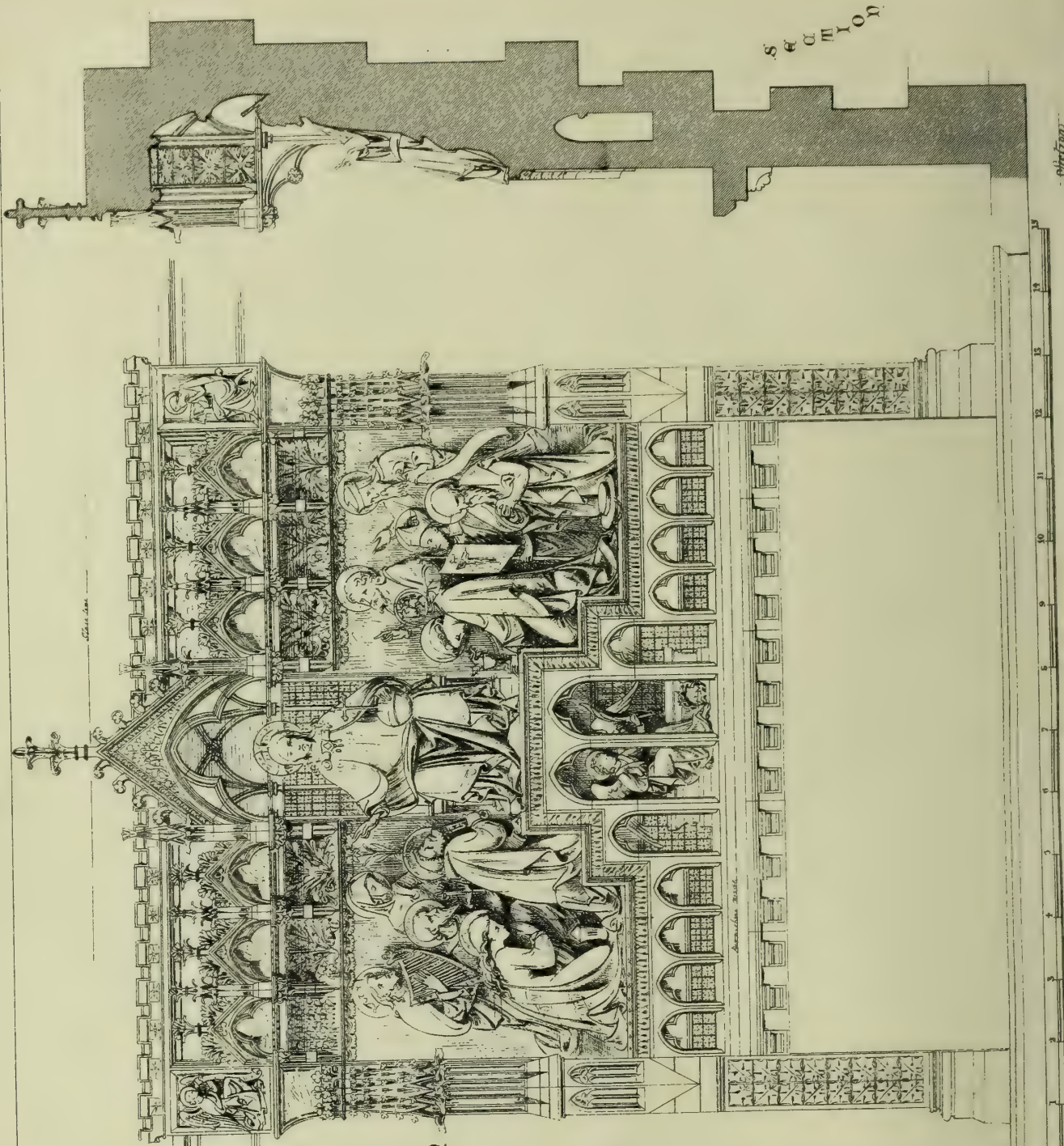
Sancta maria: ora pro nobis.
Sancta dei genitrix.  or.
Sancta uirgo uirginum  or.
Sancte michael  or.
Sancte gabriel  or.



Printed by Watema, A. Bass 236 Holborn

A MADONNA - 14TH CENTURY.
 IN FAC-SIMILE - BY MR PURDUE.

THE BUILDING DEWS. MAY. 9. 1873.



St. Edmund's

REVERENDS
 All Saints Church Clifton

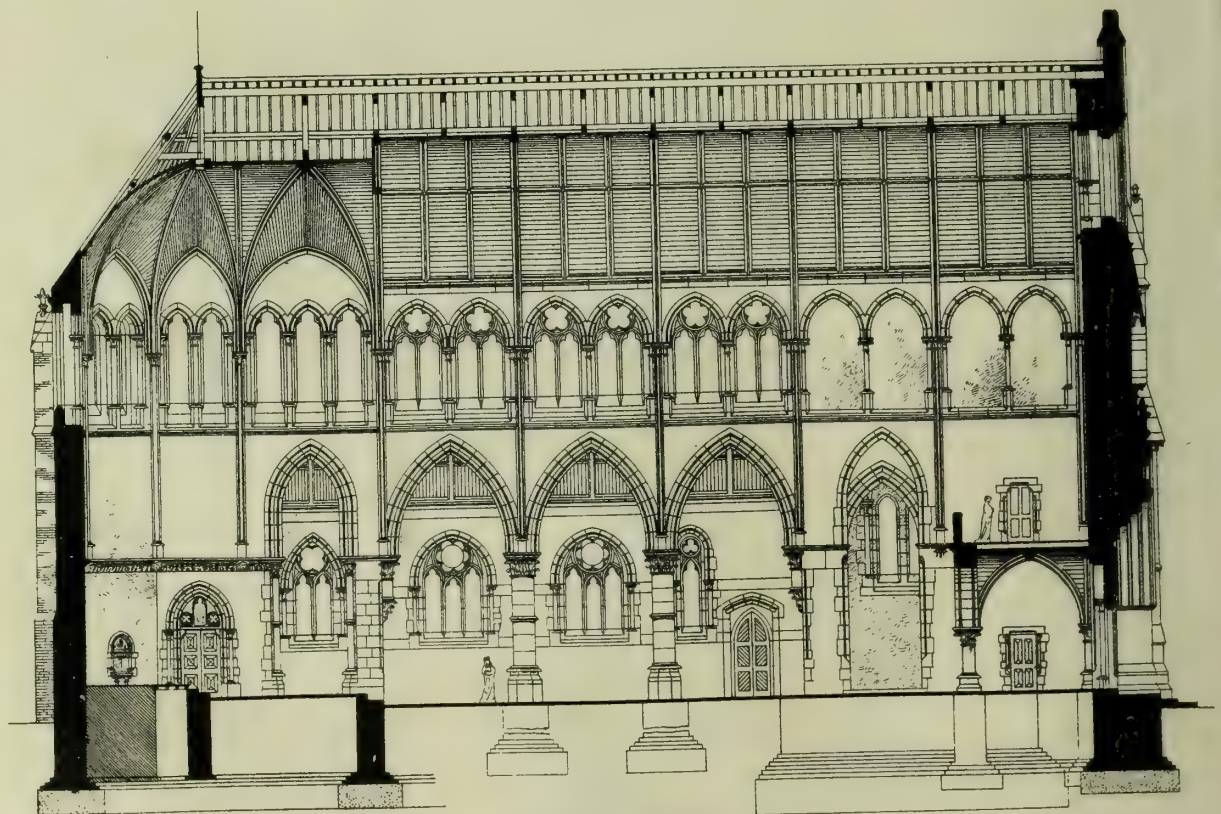
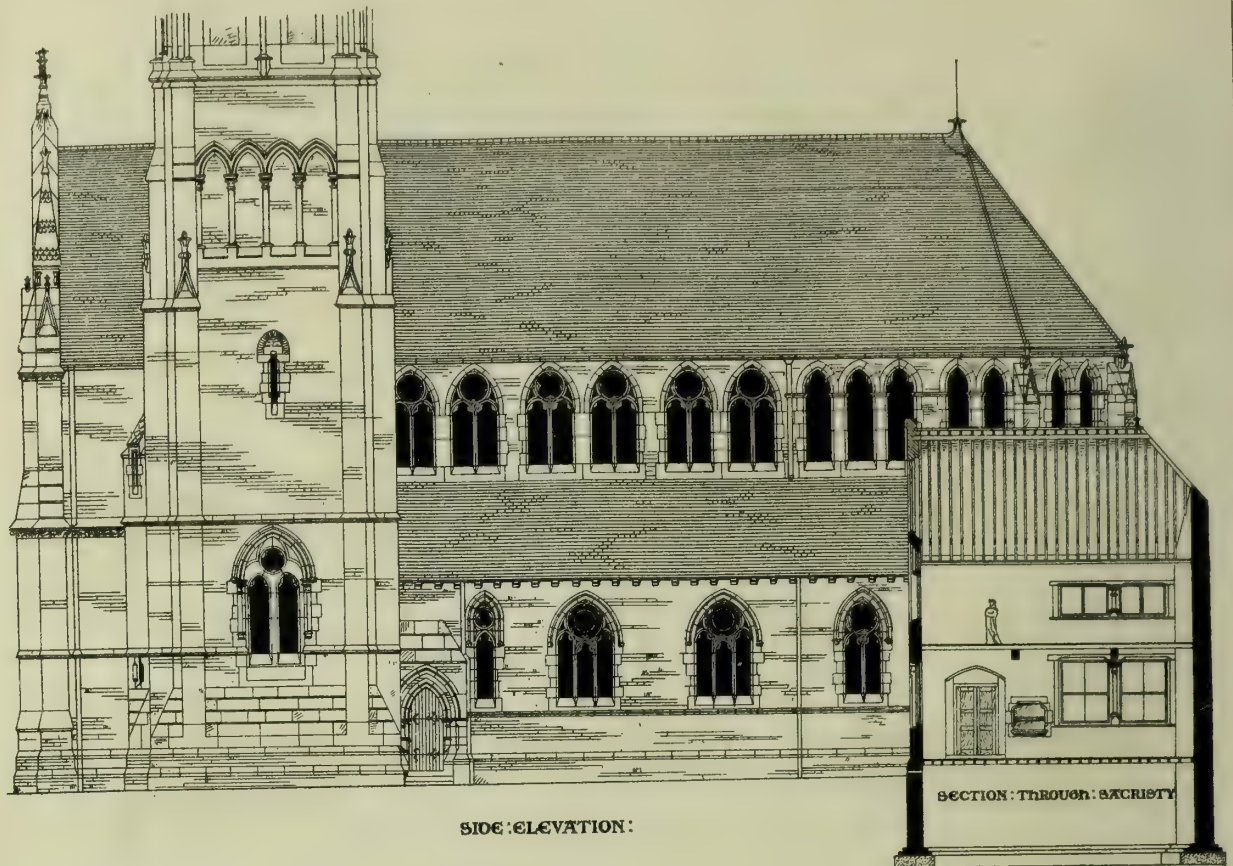
George Edmund Street RA
 Architect

Scale of Feet

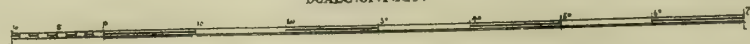


Clifton

CHURCH OF S. WILFRED : YORK :



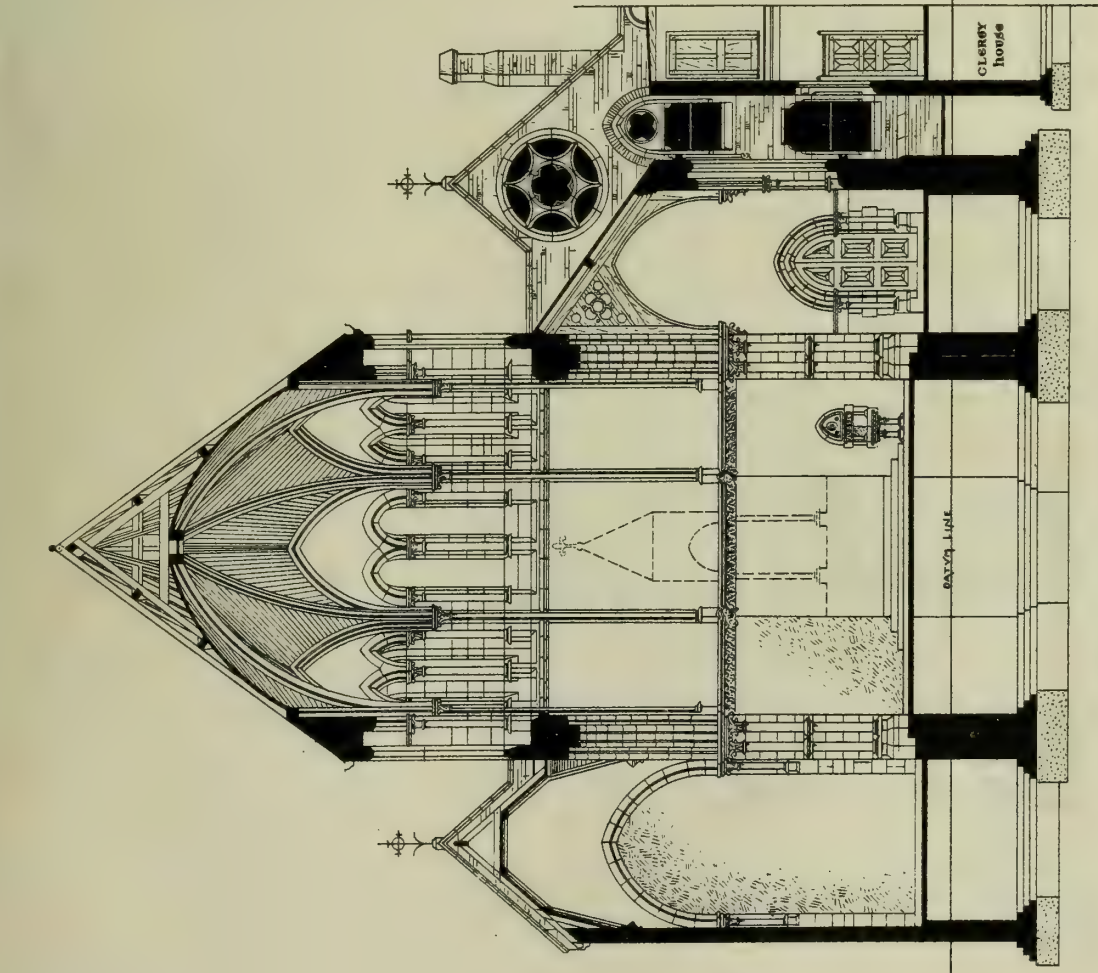
SCALE OF FEET :



GEO. GOLDIE :
ARCHITECT

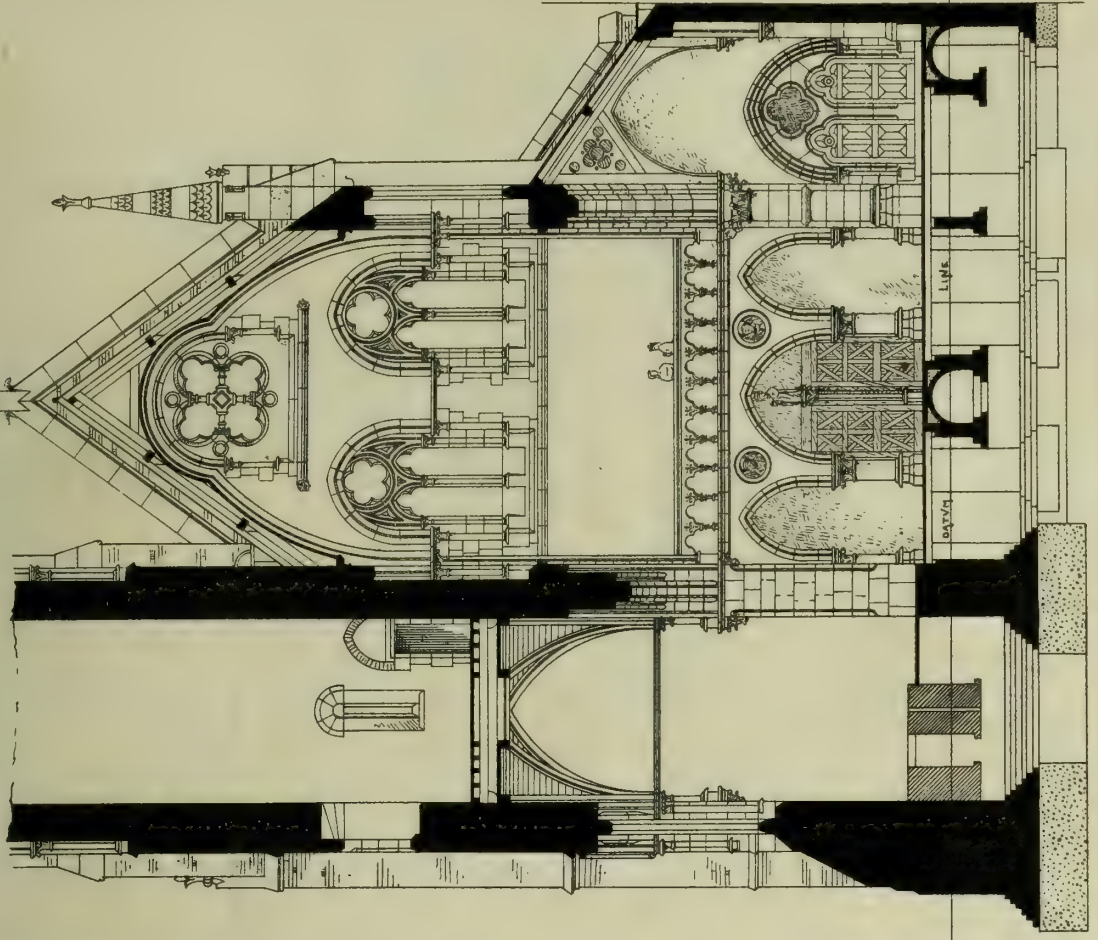
MAURICE B ADAMS DEL.

CHURCH: OF: S: WILFRED: YORK:



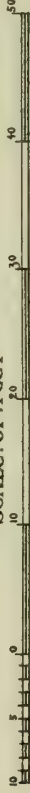
CROSS: SECTION: THROUGH: CHANCEL

MAURICE S ADAMS DEL.



CROSS: SECTION: THROUGH: NAVE

SCALE: OF: FEET

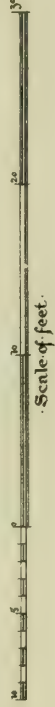
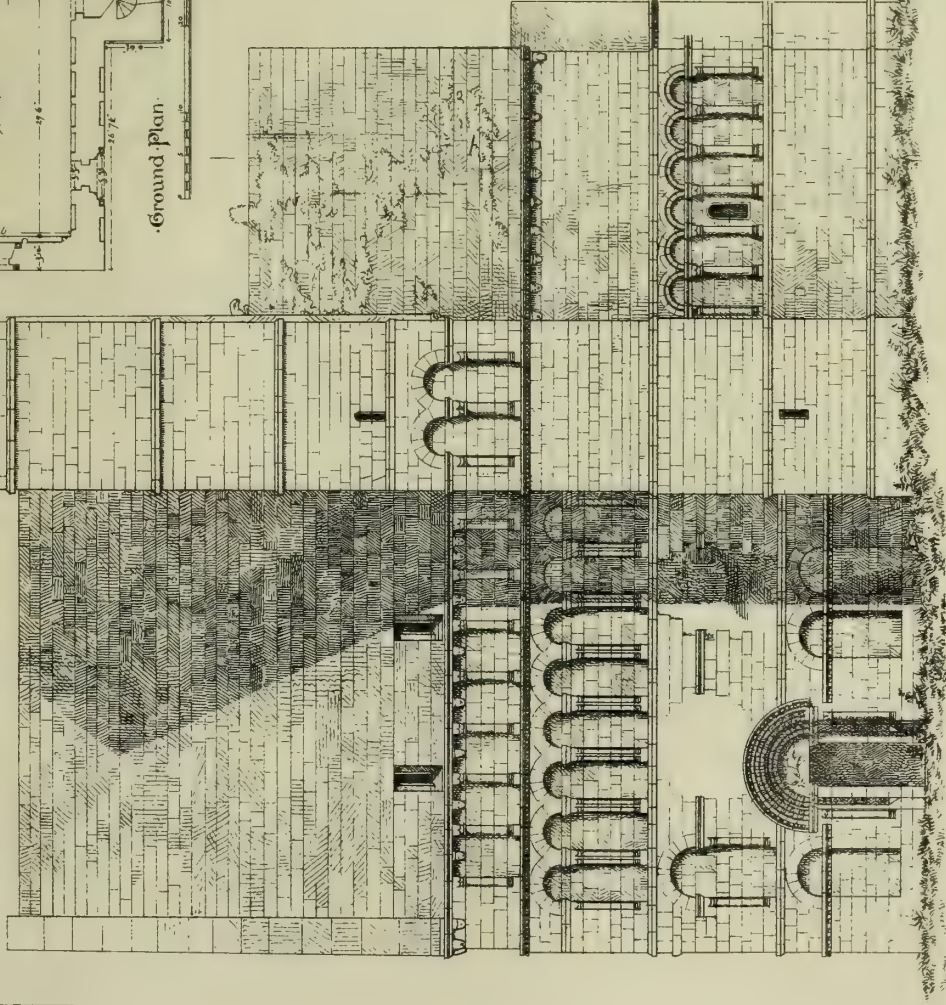
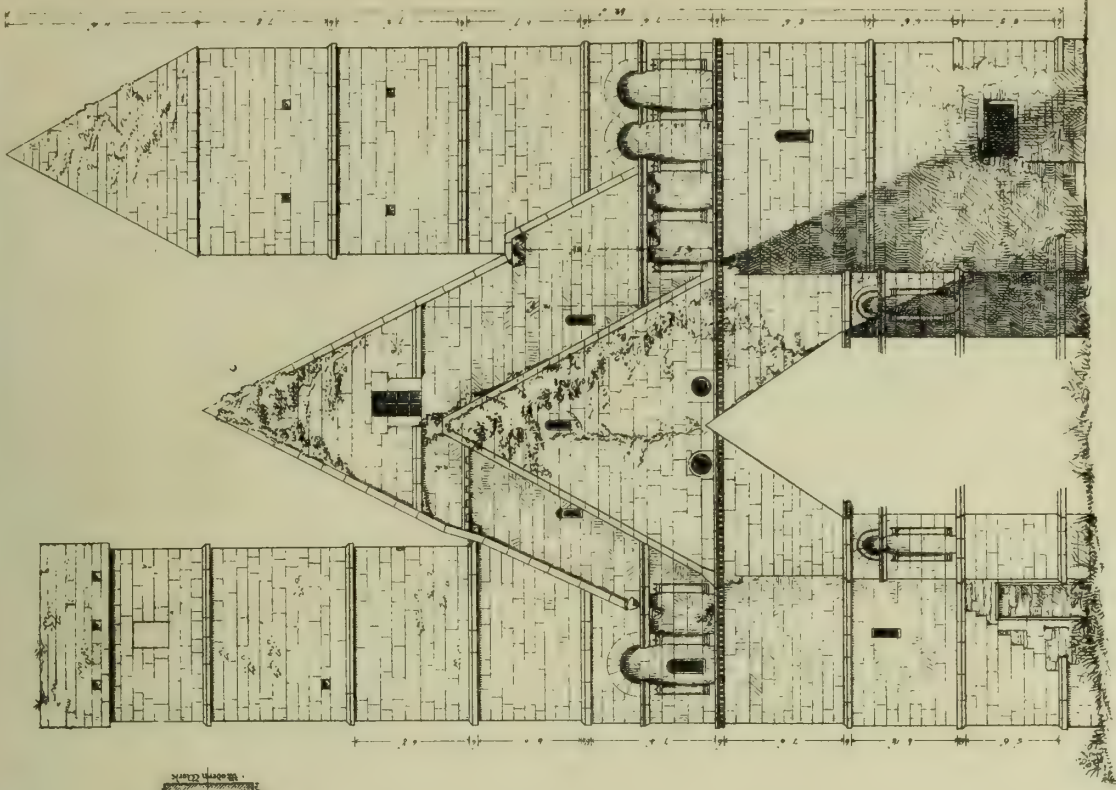
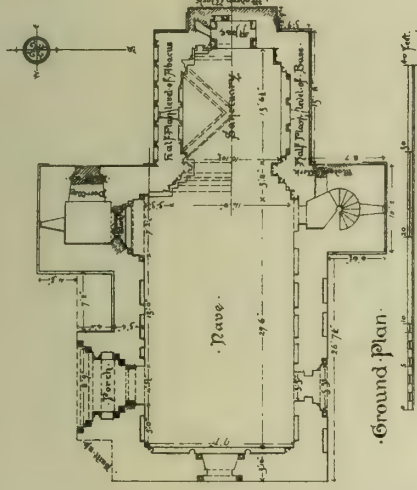


Geo: Oldie:
ARCHITECT.

Cormac's Chapel. Cashel.

Measured and drawn by
Arthur Hill of Cork.

* Medal of Merit Awarded *

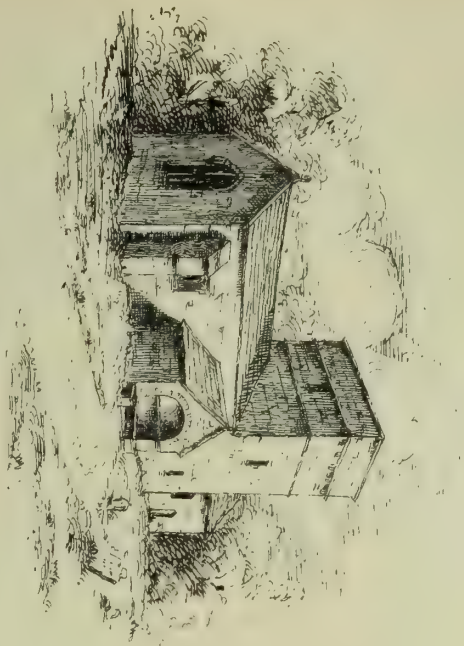


East Elevation.

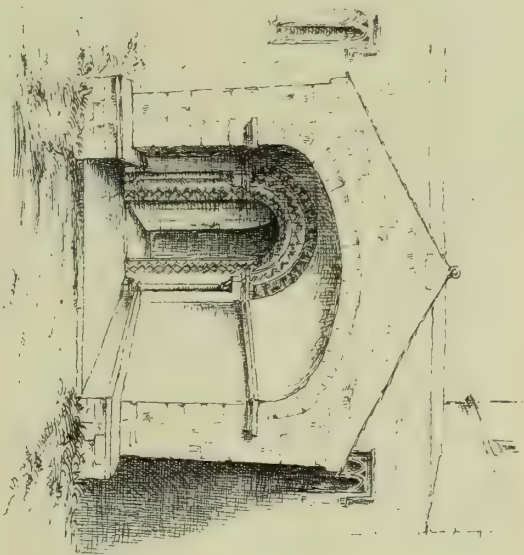
South Elevation.



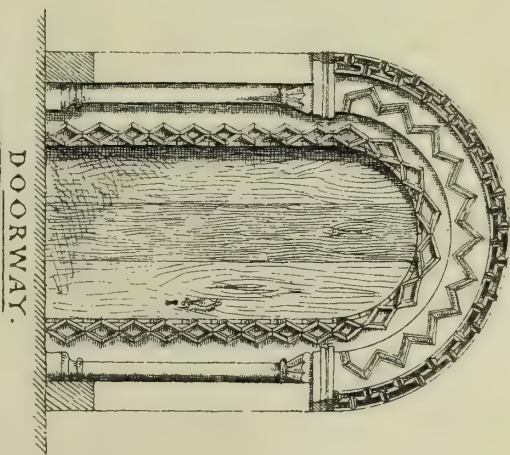
CHRISTON: CHVRCH: SOMERSET.



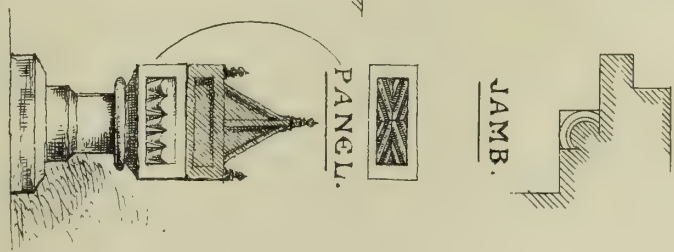
S.W. VIEW.



PORCH.
& DOORWAY.



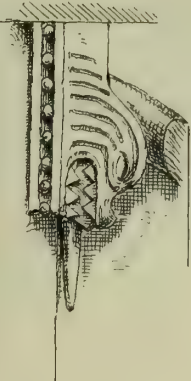
DOORWAY.



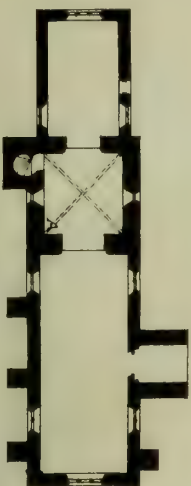
JAMB.

PANEL.

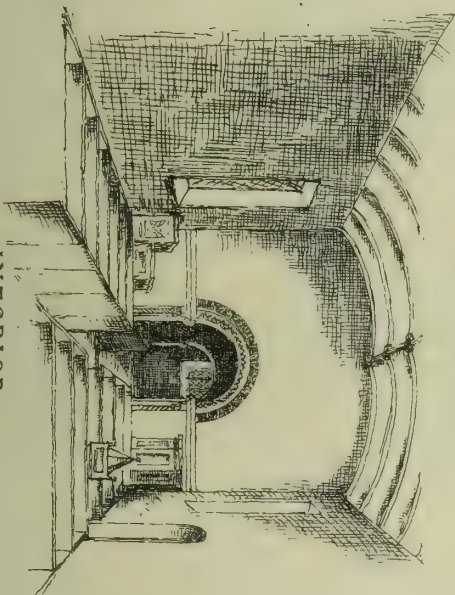
FONT.



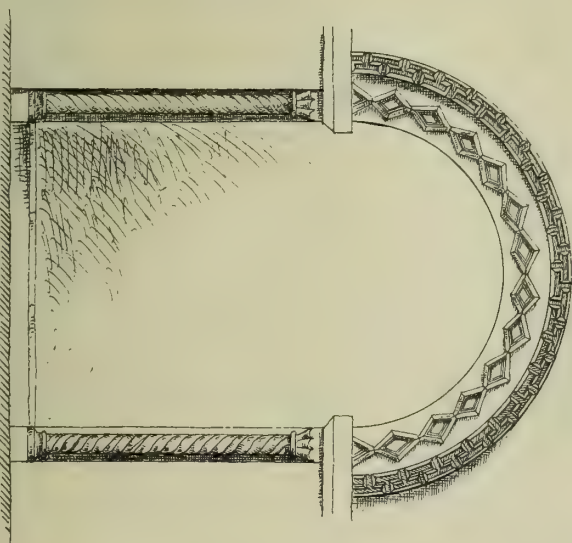
CORBEL SPRINGING OF GROIN: A.



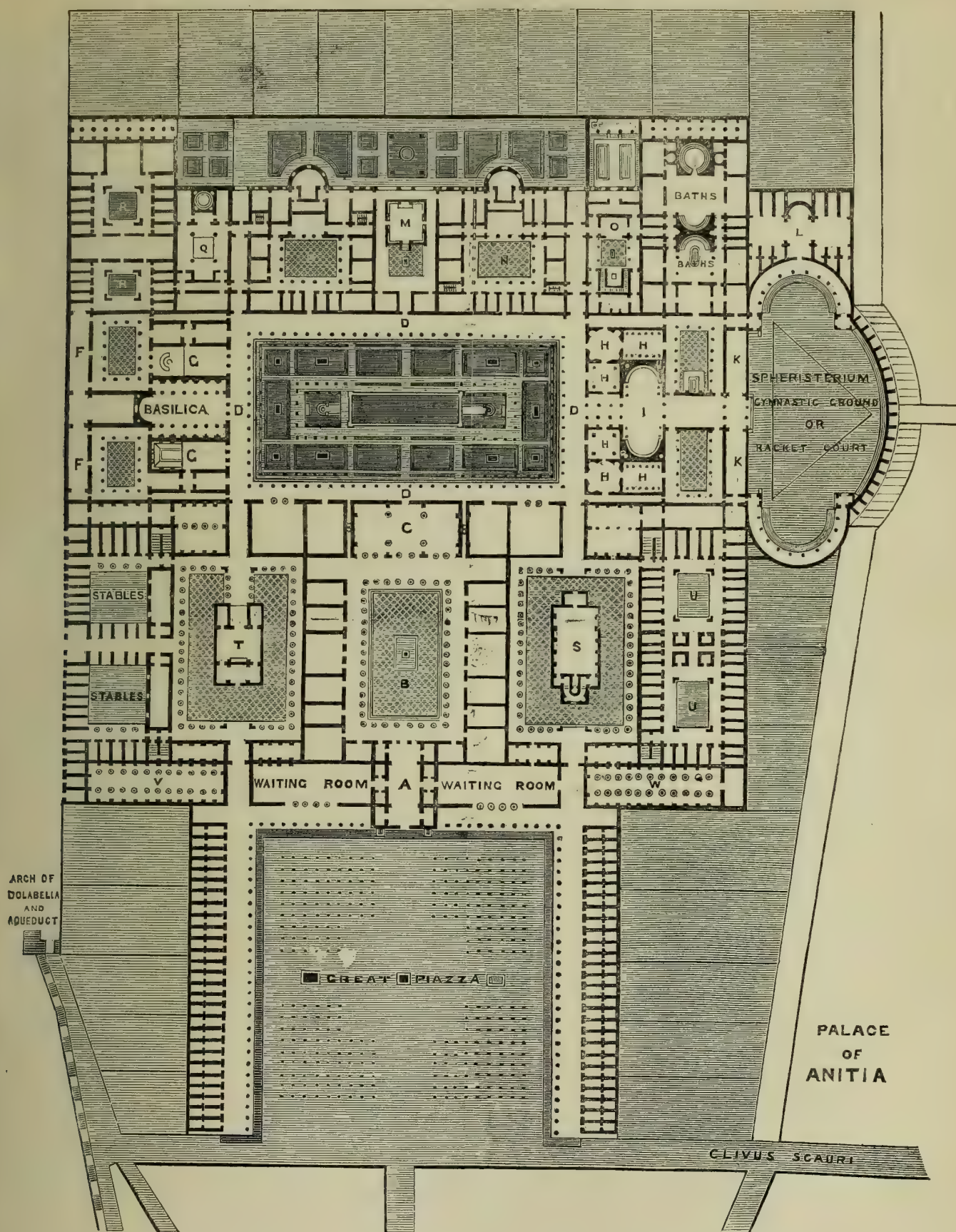
PLAN.



INTERIOR.



ARCH: IN: NAVE.



PLAN OF THE PALACE OF SCAURUS (SEE NEXT PAGE).

- A.—Prothyrum, or Vestibule.
- B.—Atrium, or Great Hall.
- C.—Tablinum.
- D.—Peristyle enclosing the Xyste or Garden.
- E.—F. Fauces.
- F.—Pinacotheca, or Picture Gallery.
- G.—Triclinia, or Dining Rooms.
- H.—Ceci, or Reception Rooms.

- I.—Exedra, or Conversation Rooms.
- K.—Biblioteca, or Library.
- L.—Aleatorium, or Recreation Hall.
- M.—Sacarium.
- N.—The Private Apartments of Scaurus.
- O.—Venereum.
- P.—Private Apartments of Lollia, the wife of Scaurus

- Q.—Private Baths.
- R.—Rooms of Lollia's Servants.
- S.—Pistrinum, or Bakehouse.
- T.—Kitchen.
- U.—Servants' Offices.
- V.—Wine Cellars.
- W.—Granaries.

THE PALACE OF SCAURUS.*

THE Palace of Scaurus may be taken as the type of the palatial residence of a Roman noble on the largest scale. The plan (which forms the subject of one of our illustrations this week) is taken from a restoration of the palace made by Mazois, the celebrated French author of the finest work on Pompeii hitherto published, and was based by him on a description written in the century before Christ by Merovir, a captive prince of Germany, during his exile in Rome. The description was written in the form of letters to Segimir, his friend, and that portion which details the arrangement of Scaurus's palace was translated by Mazois. Merovir, although he had been a prisoner for some time in the hands of the Romans, did not visit Rome until the eighth year of his exile. He happened to be peculiarly fortunate in his guide, for his friend and host in Rome was Chrysippus, a young Greek artist, and architect of the palace of Scaurus. The restored plan must be accepted on the faith of the reading which Mazois gives of it, for so rapid were the changes in Rome, that even in the time of Pliny (who mentions the palace), its site was uncertain. From the descriptions given, it would appear that even in those early days there was a "Board of Works," who issued "Building Acts," with laws relative to the position of houses, their heights, frontages, the construction of walls, nature of materials employed, the water supply, and precautions against fire. Pliny also informs us that the superintendent of sewers took security for any injury which might happen to the works under his charge before he would allow Chrysippus the architect to convey through the streets the great columns 38ft. high of Lucullian black marble destined for this palace of Scaurus. Before proceeding to the description of the palace, it will be necessary to say a few words on the customs of the Romans as regards the distribution of their houses. They were divided generally into two parts, the public and private—the first containing the vestibule, hall, and morning rooms, the second the dining-rooms, drawing-rooms, and sleeping apartments. These divisions become very important in the case of a large mansion, from the fact that every patrician or wealthy man had a large number of clients or retainers of the plebeian class, who were accustomed to resort to him for advice or assistance, giving in return their support in elections, &c. They assembled at daybreak in his vestibule and ante-rooms to solicit his favours or recommend themselves by their attendance. In front of the large palaces or mansions were generally a large piazza or open space, planted with trees and surrounded by porticoes, at the back of which were shops, and one or two vestibules or waiting-rooms for those who arrived before the doors of the palace were opened. The chief room of the public part of the house was called the *atrium* and of *atria* Vitruvius describes five kinds, varying according to the importance of the house. The Tuscan atrium was an apartment with the roof carried by four beams crossing one another, and leaving a space in the centre, called the *compluvium*, open to the sky. The tetrastyle or four-pillared atrium was similar to the last, except that the beams of the roof were carried by columns, one at each corner of the *compluvium*. The Corinthian atrium was much larger, and had several columns to carry the beams, the centre space always being left open. In the centre of these atria, and sunk in the floor, was the *impluvium* or space into which the rain fell from the roofs or sky. The *atrium displuviatum* had its roof inclined the opposite way, so that the rain was carried off to the outside of the house, and the fifth kind, the *atrium testudinatum*, was roofed all over, and was used only in the poorest class of house. Round the atrium were several rooms, of which the chief were the porch and entrance-hall, with porters' rooms, the *alæ* or conversation-rooms, the *tablinum*, containing the pictures, statues, and genealogical tables, &c., of the family, and other rooms probably used by the chief officers or attendants of the establishment. The private portion of the palace or mansion had a series of rooms grouped round a peristyle, which was a kind of atrium on a large scale, except that a *xystus* or garden was formed in the centre, with trees and shrubs, fountains, grass borders, &c. The chief rooms were the *trichlinia* or dining-

rooms, *æci* or reception-rooms, the library (*biblioteca*), picture gallery (*pinacoteca*), baths, sleeping apartments (sometimes grouped round additional courts), and the temple or *sacrarium*, dedicated to some particular deity. The several offices and stables were grouped round special courts, and finally, above certain portions of the whole building, was a first floor, with terraces called *solaria*, and sleeping apartments for the servants, freedmen, and inferior branches of the family. The palace of Scaurus formed what the Romans called an island, that is, it was isolated on all sides by streets, and those houses and shops which were attached to it were the property of Scaurus, and were let by him—the former to his clients and friends, and the latter to persons in his employ, who sold in them the various produce of his land, from which he derived a considerable revenue. In the front of the palace was a large open space or area planted with trees and decorated with equestrian and other statues. In the centre was a colossal figure of Apollo. On three sides of this space were porticoes, to afford shelter from sun and rain, and the shops before spoken of were situated behind these porticoes on the right and left-hand sides. In the centre were large open *loggia* or waiting-places; these features, which seem strange to our customs, are still found in all Italian cities, and to a certain extent in France the people are accustomed, on the boulevards and in the wide streets, to sit in the open air conversing and watching the throng passing to and fro. The entrance to the palace was through a long porch, on the threshold of which was a mosaic with the word *Salve*, and further on a representation of a fierce dog, with the words *Cave Canem*. On the right and left of this porch were doorways leading to the waiting-rooms or portico, and thence to the stables and kitchens on one side, the bake-house and granaries on the other, and porters' lodges. In the centre was the door leading to the atrium—a magnificent space open in the centre to the sky, and surrounded on all sides with a portico or peristyle, with the magnificent columns of Lucullian marble 38ft. high before spoken of. The pavement of the centre was in marble, with a small marble tank in the centre, and a fountain. At times, this space, it would seem, was covered over with a velarium or tent to afford shelter from the hot rays of the sun. The decoration of this atrium was of the most splendid kind. A dado of marble was carried round the walls, above which were paintings similar in their nature to those in Pompeii and Herculaneum, and which are constantly being discovered in Rome whenever any excavations are made. Of the nature of these paintings and their several varieties, reference will be made further on. The pavement of the atrium was composed of bits of marble inlaid in a cement ground and polished. The purposes of many of the rooms surrounding the atrium is given in the letters of Merovir. The central one, opposite the entrance, was the *tablinum*—a large room in which the archives of the family, busts and portraits of ancestors, genealogical trees, &c., were deposited. On the walls were hung shields in bronze and silver belonging to the family of Scaurus. The side rooms were intended for conversation; others were occupied by the secretary, treasurer, chamberlain, steward, &c. The roof over the portico was in wood, decorated with coffers painted and gilt. Two passages, called *fauces*, on either side of the *tablinum*, led to the peristyle, the central feature of the private portion of the palace, there being in addition a private door leading direct from the *tablinum*. The peristyle was a portico of columns, smaller but more light and elegant than those of the atrium. They enclosed a large open space in which a pleasure-garden was arranged, with borders of grass and ivy, small shrubs, and trellis-works affording shade. *Exedra*, or small semicircular marble seats, constituted the chief features of this space, called the *xystus* or garden. In the centre was a fountain and basin in marble containing water, in which tame fish of various kinds disported themselves. Sometimes these gardens were placed at the back of the palace, and were of great size. The expense of ground in Rome, however, obliged Chrysippus the architect to content himself with a smaller garden laid out in the peristyle enclosure. The walls of the peristyle were painted by a celebrated Greek artist, Serapion by name. At the back of the peristyle on the right-hand side was the suite of rooms occupied by Scaurus himself. He had the luxury of three bedrooms: one so arranged that he would be completely undisturbed by the

movements of his family or servants; a second occupied in the winter months, and facing the south; and a third with the walls painted in imitation of trees and shrubs, with birds flying about, and used in the summer. Other rooms occupied by his valet and other servants were distributed round a small court, together with a small private dining-room. To the right of this suite followed a second, called the *venereum*, specially destined for the mistresses of Scaurus. The walls of this suite of apartments, Chrysippus tells us, he had painted black in order to bring out to advantage the whiteness of its occupiers' skins and dresses. The walls of the room sparkled with gilding, and were decorated with paintings very suggestive, if not quite moral, in their tendency. At the back was a small private garden, with portico or summer-house, reached by a few steps. The temple, *sacrarium*, or private chapel (to use a more familiar term) was situated in the centre of the palace. In front of it was an open court, and an altar on which sacrifices were offered to propitiate the deity to whom the temple was dedicated. In the centre of the *sacrarium* was the statue of the goddess "La Bonne Fortune." On the left-hand side of the *sacrarium* was the suite of apartments occupied by Lollia, the wife of Scaurus. It was similar in plan to the suite occupied by Scaurus, and opened out, as well as his, on to a small private garden at the back, the communication between the two suites being effected by a passage in the rear of the *sacrarium*. Farther on to the left were the private baths of Lollia, and beyond them two courts surrounded with small chambers occupied by her servants, not to mention the black eunuchs in care of the whole establishment. The decoration of all these apartments did not yield in beauty and delicacy to any of those before mentioned, and in one of the rooms the architect and his friend made the acquaintance of a distinguished lady artist engaged in painting portraits. In the centre of the left-hand side of the peristyle was situated the basilica, a building used in the time of Scaurus's father, who was a senator, for what we should term cabinet councils. It was used by Scaurus for entertainments, at which a poet or writer was invited to hold forth for the delectation of his friends. The ordinary basilica was a court of justice, but its form, size, and disposition caused it sometimes to be used for other purposes. Beyond and behind the basilica were placed the picture-galleries, filled with the finest works of Greek artists, which Scaurus had purchased and brought over from Greece. The walls were painted here and there in fresco, and easel pictures on ivory and wood, and frescoes which had been detached from their original position on the walls of Greek temples, occupied various positions in the gallery. This detaching of fresco paintings from the walls was often resorted to, and Pliny mentions it on one or two occasions. In the excavations made at Pompeii two frescoes were found which had been taken from the walls before the eruption, with the intention of transporting them elsewhere. On each side of the basilica were the *trichlinia* or dining rooms, the seats or couches being arranged on three sides of the central table, leaving the fourth side open for service. The walls were lined with tapestry up to about 4ft. or 5ft. in height. Above, the wall was divided into panels by painted columns, in the centre of which were painted those gracious figures which form some of the prettiest compositions of the ancient Greeks. Above these panels ran a deep frieze round the room, divided in twelve parts, and surmounted with one of the signs of the Zodiac, and painted with groups of the several delicacies in season in that particular month. Merovir and Chrysippus were entertained at dinner by Scaurus, and the number of courses which succeeded one another would put to shame the *diner à la Russe* of the present day. The two chief dining-rooms in Scaurus's house could accommodate from forty to sixty persons, but when a greater entertainment was given, the *atrium*, or great hall was made use of. On the opposite side of the peristyle, and facing the basilica, were the *æci*, or halls, which would seem to have been used as drawing or reception-rooms. There were six of these, each vieing with the others in richness of decoration. In four of them were columns of rich marbles, used partially for decoration, and partially for the support of the ceilings. These latter were reconstructed in wood, with coffers in plaster, enriched with stucco ornaments, painted and gilt. The floors were paved with rich mosaics, representing battles or hunting pursuits. One of these, *æci*, the Egyptian room, had columns of two

* Abstract of Paper read before the Architectural Association by Mr. PHENE SPIERS, A.R.I.B.A., on Friday, April 18.

orders superposed, and was so called from the fact that its ornaments and decoration were imitated from those in the temples of Egypt. The superposition of two orders is a feature often found in great temples of large size, the Parthenon, for instance, being one of the best-known examples. A small gallery was generally carried round the room, just above the lower order of columns. Many of the basilicas in Rome had the same arrangement. Placed in the centre of these *eci* was the *exedra*, a large hall with two semicircular ends, furnished with marble seats. It was here that the poets, philosophers, and literary men used to assemble in the day when there were no printed books, and read out their latest works. The decoration of the hall was simple, and scenes, based on the mythology of Greece, were painted on its walls. Beyond the *exedra*, and corresponding to the picture galleries on the other side, was situated the library (*Biblioteca*) divided into three halls, one for Greek, and the other two for Latin works. The manuscripts were kept in cedar cases inlaid with ivory surrounding the room. They were written on parchment or papyrus-paper, and sometimes bound in the form of books, but more generally kept rolled up. To the right of the *Biblioteca* was a large court (*spheristerium*), with two semicircular ends and porticoes round, and one semicircular side, all three fitted with seats for those who wished to look on the various games at ball, quoits, &c. Scaurus's baths were situated close to the *spheristerium*. They consisted (1) of the *apodyterium*, a room in which the clothes were taken off and deposited; (2) the *baptisterium*, a cold bath, open to the sky; (3) the *frigidarium*, a room with a bath of cold water at one end of it; (4) a large *tepidarium*, with two large baths of tepid water; and (5) the *sudatorium* or *caldarium*—the sweating-room of the establishment, a circular hall with seats round, and lit only by small openings filled with glass in the dome ceiling. The system responded more or less to that known as the Turkish bath. The bathers passed from one room to another, returning to the *tepidarium*, where the scented and anointing took place. The Roman baths seem to have been the only rooms in palaces or mansions which were vaulted over, possibly because in no other way could the necessary heat or cold have been maintained in them. The vaults were formed in light stone, and coated with plaster and stucco decorations, coffers, &c. Round the *tepidarium* were a series of small niches in which the perfumes, &c., were kept. The kitchen and its dependencies were in and round a court to the right of the atrium. The kitchen and scullery were vaulted. In addition to the before-named rooms, were the *olearium*, or oil store, the *horreum*, or dry store, for fruits, honey, preserves, salted meats, &c., and the wine vaults, 100ft. long, in which Merovir informs us were stored 300,000 amphoræ of wine, in 195 different varieties. Above the wine-vaults were the larders and pantries. The stables and coach (or rather, chariot) houses were situated round the court to the right of the kitchen establishment, and on the opposite side of the building, and forming a pendant to these two establishments, was the *pistrinum* or bakehouse, with granaries and other store-rooms, and the *ergastulum*, or slaves' habitations. These constituted the chief apartments and offices on the ground floor. In certain parts of the establishment were staircases leading to a first and second floor, which, without any plan, cannot well be defined. A great portion, however, of the first floor consisted of terraces only, and was laid out with gardens and promenades, similar in all respects to those known as "hanging-gardens," and which are found now in various parts of Italy. A long description is given by Merovir of the way in which the floors of this terrace were constructed in order to render them impervious to moisture. The wood covering the rooms below was of enormous thickness, carefully chosen and covered over with straw and shavings, above which were put layers of pumicestone, then a thick layer of concrete or *béton* composed of burnt bricks crushed, and mortar, laid with a slight fall. There was a second layer, of a material called *tessons*, the nature of which Mr. Spiers said he had been unable to discover. Thus formed, the terrace was paved with bricks, tiles, or marble mosaics. The trees and plants were placed in wood or cement cases over the walls where possible, some being in movable boxes, like the orange-trees at Versailles and Hampton Court; and fountains and pools of water, aviaries, &c., were arranged here and there. The construction of all these magnificent works was so

extremely simple that it scarcely calls for any description. The walls were very thick; there was scarcely any bond, and the good quality of the mortar seems to have been the only point of importance. Timber in great quantities and of immense bulk was ready to hand, and great care was taken in choosing it. Vitruvius gives us much information on the qualities of the various woods employed. In the construction of their vaulted halls, centres would seem to have been placed under the chief ribs; boards were laid from centre to centre. The ribs were formed of the Roman bricks, which, being not more than from 1in. to 2in. in thickness, and 2ft. square, were more of the character of tiles. Between these ribs and on the boards were laid thin slabs of wood, which formed the moulds for the coffers, and then the whole was filled in with concrete. On the removal of the centres and boarding the soffit of the vault was coated with stucco, and painted. Sometimes, when there were no coffers, and when the vault was going to be painted or enriched with mosaics, a layer of tiles was placed on the boards, which formed a more solid and better constructed ceiling. Time did not allow Mr. Spiers to enter into much detail as regards the painted decorations of Roman houses, for an account of which he referred his hearers to a paper he read on Pompeii before the Association in 1865, and which was published in the *BUILDING NEWS* of January and February in that year. As, however, he had with him a large collection of engravings representing the frescoes of Herculaneum, and as there is every probability of these being precisely similar to those described in the Palace of Scaurus, he would say a few words on the subject. These paintings may be divided into three classes, the first and highest being the pictorial representation of groups of figures, which Mr. Spiers would call the ideal based on nature. The second class comprised the representation of natural foliage, plants, &c.—the real based on nature; while the third class embraced the representations of imaginary perspectives, of imaginary architectural features—the ideal based on conventionalities, fantasies, and conceits. The first are of the most importance to us, and the engravings exhibited, which were copied from the frescoes formerly existing in Herculaneum—a second class Roman town—enabled some idea to be formed of the standard of art which was reached by the Greeks in the three centuries before Christ. It must be remembered, firstly, that these were executed in fresco, a style of painting which demands celerity in execution, and the drawing of which could not with facility be corrected; and, secondly, that they were drawn by second-rate artists, probably for provincial clients. The second class of paintings rank quite as high in their own particular style of work. The imitation of nature is perfect, and the freedom from conventionalities remarkable. Both of these classes of painting, however, exist in our own day, and it is in the third class that we find a style of decoration peculiar to the Greeks and Romans, and which, to a certain extent, has never been attempted since. The walls of the rooms above the dado are painted with representations of porticoes and courts, and at first sight one seems to be looking out of the room into them. They have the effect of a large mirror, and give great size to the apartment. It is true that in the sixteenth and seventeenth centuries the walls and ceilings of our great halls were painted with columns and balustrades and figures disporting themselves beyond, but the eye is rarely in imagination carried beyond the walls or ceiling on which they are painted, as in the Roman pictures. Then, again, the knowledge of perspective possessed in later days enabled the Italian and French painters (who generally executed these works) to establish one point of sight, and there was only one point of sight from which the pictures ought to be seen correctly. But in Pompeii and Herculaneum the architectural perspectives seem to have been done instinctively, and have many points of sight. The parallel lines converge to several points, and, curiously enough, do not always appear to do so until after critical examination. Of the exact meaning of these perspectives Mr. Spiers said he had no definite knowledge. They would seem to be based on recognised features, and probably the ornamental features of the *solaria* or open terraces formed the chief subjects. Mr. Spiers could not but think, however, that the necessity for rapid execution in fresco had sometimes led to the execution of forms which in more sober and reasoning moments would have been discarded. In con-

clusion, Mr. Spiers made some interesting remarks descriptive of the many hundreds of drawings, photographs, and engravings which were exhibited.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

PNEUMATIC FOUNDATIONS.—THE MANUFACTURE OF PNEUMATIC PILES.—SCREW PILES FOR SUPPORTING WATER MAINS.

(Concluded from p. 502.)

GENERALLY, the most effective method is to excavate the material under the pile, and, with heavy wooden wedges, firmly wedge up the lowermost edge; then, by letting the air escape suddenly, bring the atmospheric pressure and the weight of the pile to bear like a blow. In this case the silt came in so rapidly as to carry the wedges before it. Another cylindrical section was put in place, thus adding 10ft. to the length of the pile, making it 16ft., and, with the air-lock, 22ft. above the earth-surface. A strong frame of 12in. by 12in. timbers was laid down for a fulcrum; blocks and falls were attached to the air-lock, and a severe strain was put upon the pile. The material was again excavated, and instead of the wedges, a strong beam, cut to the segment of a circle, put down. The pressure was let off, and the pile descended, but without any correction of the inclination, although the timbers of the fulcrum were broken. A pine strut 8in. by 8in., 11ft. long, was set at a slight angle—its top against the leaning pile and its foot against the pile already in its place—without avail; and at last the cylinder broke off 27ft. below the surface, where there was a "cold shut" in the metal. With 15ft. of sand in the cylinder, 45lb. air-pressure to the square inch did not lift the piece broken off; but 27lb. was sufficient after the sand was removed. This is the only opportunity he has had to measure approximately the friction on a cast-iron pile. The friction per square inch of surface in contact, before the sand was removed, was greater than 1.77lb., and after, it was less than 1.39lb. This friction must vary with the depth of material, and is diminished when the earth is loosened by the passage of air-currents through it. The case instanced differs from that of a pile in place under a load. An important subject of inquiry is—what should be taken as the safe resistance of such a pile, in sand, to sinking alone, where no bed-rock can be reached? as along the lower Mississippi, and on the Gulf coast, it may be desirable to sustain structures upon piles or caissons, resting wholly in and on sand. The next two piles were put down without great difficulty, one at the rate of 10ft. per day. To cause the piles to sink, they were loaded by filling the cylinders with stones, except a central passage or well-hole. Frames built within the cylinders kept the stones in place. After reaching a certain depth, it was necessary to increase the downward pressure on the pile, by allowing a portion of the compressed air to escape; the pile would then sink from 2ft. to 4ft. at a time. The top of the bottom cylinder was covered with a cast-iron diaphragm, through which there was a man-hole, closed by a valve opening inward, which, when shut, prevented more sand from entering the pile while sinking than would fill the lower cylinder; thereby the tendency to "lurch" and the disturbance of outside material was lessened. At this stage of the work, Gen. Smith was succeeded by Mr. Theo. E. Sickles, who successfully employed levers in forcing the piles down, and corrected the inclination by drilling holes through the higher side, at different heights, through which the compressed air escaped, loosened the outside material, and thus lessened the friction against the pile. Gen. Smith then sank the piers for the railroad bridge across the Missouri river, at Leavenworth, Kansas, three in number (two in the river, and one on the east bank), upon which and a stone abutment, three spans, each 340ft. long, were erected. This was finished in two years after its commencement. The difficulties encountered were similar to those at Omaha. The following conclusions are deduced from an experience of 14 years in sinking pneumatic pile foundations:—(1.) The greatest difficulties to be overcome are—1st, in keeping the piles vertical. For this they should be made to follow the excavation, without a reduction of air-pressure—and 2nd, in righting the pile when inclined. For this, wedging under the bottom, or propping the top on the lowermost side, and drilling through the uppermost side, are the best

means yet tried. (2.) The "air-lift" as described is the cheapest and most efficient method of removing sand or mud from within a pneumatic pile or caisson. (3.) A strong and reliable pier can always be built of pneumatic piles—their number, diameter, and the thickness of metal being determined by the conditions of the case. (4.) In cold climates, these piles may be fractured by frost; to prevent which, a filling below the frost line, from 2ft. to 5ft. deep, of asphaltic concrete is recommended. 5th. Where suitable timber and stone are to be obtained at reasonable prices, a single pneumatic caisson can be sunk with greater certainty, and at less cost, than a pier of three or more pneumatic piles, where it has to be sunk for a considerable depth through a soft material to a hard one. A pier of masonry on such a wooden caisson, cellular, with its walls well drift-bolted, and its interior carefully filled with concrete or rubble, is the cheapest and best bridge foundation yet devised. 6. Concrete does not "set" well under air-pressure—the water was let in through a pipe inserted therefore in the cement, to cover the successive layers as put down: usually cement 5ft. in depth would seal the pile—the remainder was added in the open air.

Mr. MARTIN said the first work he had to do in sinking the pneumatic pile piers for a bridge across the Savannah River, on the Charleston and Savannah Railroad, in 1861, was to straighten up a cylinder, which was about 30ft. in the sand and considerably inclined. The method described by Gen. Smith, of excavating underneath the lowermost edge of the pile, wedging it up firmly, and then, when severely strained in the right direction by strong tackle, causing the pile to go down by suddenly letting the pressure off—did not succeed, although the pile descended 2ft. or more. He then excavated under the upper edge as much as possible, so that the escaping air passed through, and loosened up the material on that side—wedged up and strained the pipe as before, and with a battering-ram made of a 12in. square oak timber, 12ft. long, and in the middle suspended from shear-poles, struck successive blows against the top of the pile, while it was descending: it was thus quickly brought into position. A pneumatic pile is easier kept vertical than straightened afterwards: in most cases it may be guided in its descent by a platform attached to wooded piles driven around it. Gen. Smith presented a plan for sinking to any depth pneumatic piles and caissons through sand, whereby the excavation is made without exposing workmen generally to the injurious effects of compressed air—which increase with the depth, and, below 60ft., are dangerous. For a pneumatic pile—there should be a short section at the bottom, covered with a plate, through which there are a man-hole and valve—a supply and one or more discharge pipes—the latter made telescopic, and with joints, so that a workman standing on the plate may cause the mouth of the pipe to traverse the surface to be excavated beneath the pile. Thus air, forced into the closed section, through the supply pipe, would escape through the discharge pipe, and carry with it the material to be removed. In a caisson, the same principle may be carried out. Men need enter the compressed air-chamber only to remove an unusual obstruction. Such a method is required in sinking foundations to very great depths—the greater the depth, the more efficient is the *air-lift* described. Of course this plan cannot be adopted where the material to be removed will not yield and flow with an air-current.

A paper by Robert Cartwright, C.E., of Cleveland, Ohio, on "The manufacture of Pneumatic Piles" was read. The bridging of the Missouri River was a necessity to the railroads connecting the east and west of this country. The river is a rapid-running, turbid stream, with a bed of treacherous, shifting material, and a channel which changes at every flood. The bridge at Omaha has 11 spans 250ft. long, and at Leavenworth 3 spans 340ft. long; both Posts' truss upon pneumatic pile piers. The manufacture of cylinders for these is here described. First there was built a brick pit, 47ft. internal diameter, and 14ft. deep—water-tight, with a foundation in the centre for a 25-ton crane, and 4 buttresses therefrom, dividing the pit into quarters, each to take two moulds. For access to the moulds, and to supply air during casting and subsequent cooling, there was a tunnel from each quarter to a shaft sunk outside of the pit. Each mould was built of firebrick laid in loam, upon a level cast-iron bed-plate, and covered with another similar plate,

the two being firmly bolted together. Outside the mould was a casing of sheet iron, a space of a foot between the two being filled with spalls, cinder, and moulding-sand, which allowed the passage of escaping gases; the remaining spaces in the pit were also filled with sand. From the centres of each bed-plate up to the top of the mould was a vertical wrought-iron shaft, upon which the core barrel centred. The inside of the mould was coated about ½ inch thick with loam, brought to a true surface with a "strike" board revolving about the shaft. That the castings might be of uniform section under the difference of ferro-static head, the diameter of the mould at the bottom was made 3-16ths of an inch less than at the top. The core barrel consisted of six or more staves or circular segments, strengthened by ribs cast on them, and bolted to two circular spiders, which were attached to a central hollow shaft bored to receive the shaft fixed in the bed-plate of the mould; the whole being so arranged that the hollow shaft and spiders could be withdrawn together and the staves left in position, to be afterwards removed singly. The barrel was coated with loam, to which a small quantity of chopped hay had been added, no rope being used. When the mould was coated and dried, and the core in place, it was covered with a plate or trough, coated with loam, and well fastened down; through this were twelve holes 1½ inch in diameter for pouring "sprues," and six elliptical holes about 3½ × 1½ inches for "risers." The last were about 12 inches high and 6 inches in diameter at top, and were an effectual substitute for a "sinking head." A casing was then placed about the covering plate, forming a "runner" around the whole top of the mould, connected with a pouring basin, which had two outlets, each stopped by a "straining" gate to retain the slag. The mould was filled to the top of the risers, the iron entering simultaneously at twelve equidistant points, and, as shrinkage took place, fresh metal was supplied and "churned" with cooled rods. When the iron was "set" the runner casing was taken away, the "sprues" and "risers" broken off with a sledge, and in rapid succession, the covering plate, and the several parts of the core barrel removed, leaving the red-hot section just cast in the mould, and free to shrink uniformly as it rapidly cooled without danger to its shape or soundness. In about fourteen hours after pouring, the section (weighing nine tons) was taken from the mould, which was then freshly coated with loam; the bricks were usually hot enough to nearly dry it. As its parts were withdrawn, the core barrel was put together, and then coated with loam, which was almost dried by the heat retained. The barrel was then placed vertically on a car, and run into the core oven, which was large enough to receive four.

The loam was prepared in a loam mill, consisting of a revolving pan, and two heavy cast-iron chasers; it was, with the addition of a little fresh material, repeatedly used. With eight moulds and six core barrels, one and sometimes two sections were made daily for months. 281 sections were cast, 8½ft. in diameter, 10ft. long; some 1½in. and the others 1½in. thick; each with a 4½in. inside flange, 2½in. thick at each end. Of these only one was lost, and this by the breaking of a brace after the mould was nearly full. The two flanges were faced in a lathe at the same time, and then each drilled with sixty-one holes for 1½in. bolts.

A paper by C. D. Ward, C.E., of Jersey City, N. J., giving "description of screw piles for supporting a 24in. water main, across the Providence River—Providence, R. J." was read. The piles were placed in a single row, 12ft. apart, with a cap or rest on the top of each, in which the water-pipe rests. They were each 22ft. long, 10in. exterior diameter, 1in. thick, and weighed about 2,500lbs. The largest diameter of screw was 3ft., and the pitch was 10in. There were two threads, each making about ¾ of a turn. The piles descended from 6in. to 8½in. per revolution, and were put down by 8 to 21 men with ropes attached to levers 10½ft. long. The direction of draft reduced the effective leverage to about 7½ft. 12 piles were put down, from 9 to 12ft. each, in sand and gravel in five days, when regularly moving, the ordinary rate of sinking was about 2ft. per minute.

The Archæological Institute of Great Britain and Ireland will hold its annual meeting at Exeter on the 29th July and following days. Lord Devon has consented to fill the office of President.

ARCHITECTURAL COMPETITIONS: ARE THEY CAPABLE OF BEING MADE BENEFICIAL TO ART, TO THE PUBLIC, OR TO THE PROFESSION?

At the usual fortnightly meeting of the Architectural Association, held on Friday evening last, at No. 9, Conduit-street, the president (Mr. J. Douglass Mathews) in the chair, this question was discussed, Mr. Thomas Blashill having, as we stated last week, undertaken to answer the question in the negative.

Mr. BLASHILL (who read his remarks from MS.) said: Not one of the questions which ordinarily come before us exceeds in interest that system the merits of which we are now about to discuss. For good or for evil, it touches our relations with our clients at their most delicate point, for most people know that the mode in which a business transaction originates is likely to exercise an influence over its entire course, and we are fast committing ourselves to a mode differing materially from that common with other men of business. Having obtained a strong hold over all important works of a public nature, the system of competition has begun to prove attractive to private persons, and architects of respectability are found to respond to their invitations. Nor can those who hold with it as applied to public works reasonably object to it in private practice, where, if there be any difference, the judgment we meet with will be at once keener and fairer than can be looked for at the hands of a mixed and irresponsible committee. I invite you therefore to consider this system, not as a thing to be met with occasionally, but as likely to become your chief means of obtaining professional work, and to form some decided opinion one way or the other on the prospect that lies before you. Nor need such an inquiry be an idle one, for although the public may be attracted by the spectacle of our struggles and may be willing to give the system a fair trial, nothing can be more opposed to their ordinary practice and predilections. They seldom comprehend the peculiar relations created by it, and never consent to be bound by our notions as to those relations. Since the great competition for the Houses of Parliament, how many governmental and civic buildings of the first class have been entrusted to the victor in the competition? They are entrusted in the end to men who might fairly have expected to get them without competition, while a number of other men who could not have been selected for actual employment have been allowed to join in a struggle which seemed indispensable, but which was in no way conducive to the result. I conclude therefore, that if we do not want competitions the public will soon find that it does not want them, and the subject may be treated as one which we can practically settle in the way most satisfactory to ourselves. I need not occupy any portion of the short time at my disposal by dilating on the unsatisfactory results of the competition system as practised hitherto. Although we have been reforming it ever since I remember, we will assume that any reformation you can suggest has really taken place, and I shall contend that, being bad in principle, no reform can make it a fair or useful mode of obtaining professional work. No doubt architectural competitions have been invented as a means of escape from the evils and uncertainties attending the distribution of patronage. A perfectly fair competition should ensure the selection of the best man in each particular case, and of course the best man would have a right to the employment. Now, judging by what we see in ordinary life, does the public want or expect to get in each case the best, that is, the most able, man? And has such an one a right to expect that each work shall, after proof of his superiority, be given to him? I believe nothing could be more monstrously absurd than the position into which such ideas would lead us. In ordinary transactions between the professional man and his client, it is found convenient to treat the matter of remuneration as being fixed beforehand, the question being as to the quality of the services, which is always in a great measure uncertain, to be rendered in return for it. Now a client does not seek out the greatest genius available; he goes to some one whom he knows, or whom a friend may have employed, to a neighbour, or to the nearest person of good repute. But he is almost certain to prefer before all these a person whom he has already himself employed, if even with something short of perfect satisfaction. It may be difficult to say how far he is influenced by the talent or the merit of the candidate, and how far by mere whim or liking,

but everybody worth knowing is greatly influenced by the latter, and I believe the terms of confidence created by this mode of selection are, on the whole, beneficial to both parties and to the work. They are certainly so far satisfactory that people in general prefer to act upon grounds of preference rather than upon strict measure of capacity. They know that ordinary business is quite within the range of ordinary men, and they trust people whom they like and know to be fairly trained and practised. Fancy a man making every fresh business transaction the occasion of a cold-blooded selection of the best man within reach, disregarding old associations, honest but perhaps ineffectual efforts to excel, the struggles of moderate capacity, the sentiment of neighbourhood, in order to put his work into the hands of the brightest practitioner he can hear of, and getting ever such a little bit more for his money! You cannot imagine a more detestable animal than this, or one more likely to be robbed through thick and thin. Now a committeeman will generally be allowed to have done his duty in his public capacity if he does as well for his constituents in the matter of patronage as he would do for himself. There are, however, influences brought to bear which complicate this question. Privately, a client might go to a friend or the relation of a friend, and (blood being thicker than water) even a relation of his own, knowing nothing of his capacity, while one could not defend his acting in the same way in a public matter. But even in cases of the grossest favouritism or bribery, the check is not generally sought in any system of competition like our own, but in publicity, if the nature of the transaction admits of it, and in the dangerous character of the business if it is secret and corrupt. In any case a disappointed rival can have little right, except in his quality of ratepayer, to meddle in the matter. We may dismiss the right of the greatest genius to carry off all the first prizes of life in few words. There can be no such right, else what would become of the lesser lights, who would receive only thanks and £5 notes; of the middlings, who would get nothing but "honourable mentions;" of the very small people who would get nothing at all? Moreover, what would become of the genius himself when his fellows, having reached to the end of their forbearance, perhaps also of their food, remembered that they, too, were ratepayers, and would starve no longer? I have endeavoured, without referring particularly to our own profession, to point out certain considerations which are of general application, for I believe we shall never effect any improvement in our own condition until we see the necessity of treating matters relating to architecture on the same principles as we would treat any other matter of business. Indeed, nothing but the firm conviction that all the world outside our own circle is in the wrong, can make it prudent to neglect this rule. By adopting it we place ourselves in proper relations with the people with whom we have to deal; by neglecting it our position becomes exceptional, and therefore false; we lay ourselves open to misconception and suspicion, and our conversation and literature becomes encumbered with complaints and accusations against our clients and our brethren to an extent unparalleled in any other profession. With these views in mind, I will state what I conceive to be the effect of competition in its best form upon art, upon the public interest, and upon ourselves as architects. The obvious effect of competitions under the best conditions is to develop the skill of the draughtsman in a high degree; it has also largely developed a certain sort of critical ability. The number of persons able to make a design on paper, and the number of persons who can examine and give opinions on such designs, have been much increased. But true art depends upon the practice of correct principles, and not on the number of persons who can draw and talk intelligently about drawings. For every building actually erected under the competition system there are probably not less on the average than ten more or less careful designs made for it. Now no person can exercise a favourable influence upon the art of design unless he is thoroughly acquainted with practical work, and if he has to make ten designs on paper, each prepared in hot haste, for every one he can carry out, he must either neglect and lose his experience in work, or else have his designs made for him by men of less practical experience than himself. Neither himself nor the public, nor even the professional judge of a competition, can

be unaffected by this state of things. Something showy, and something designed to look well from a particular point of view, must be aimed at rather than those simple and suitable characteristics found in old work, and which are the result of leisurely study of the building with reference to its purpose. Looking back for twenty years upon large classes of competitions, such as cemeteries, hospitals, workhouses, town-halls, schools, churches, as well as those large Government competitions which have created great interest in their day, I can see no advance in the art of design which can fairly be put down to the competition system—none which would not have been worked out in the course of ordinary practice. On the other hand, we have seen ideas adopted which, from looking well on paper, have taken the public fancy to a degree not at all warranted by their effect in actual execution—ideas of the draughtsman merely as distinguished from those which are developed in the mind of one who has to study materials and construction, and to think of the purpose of each part of the building he has to design. I commend this question particularly to those who may advocate the competition system, because it is one somewhat difficult to decide, but it is worth our consideration, that while in former times progress was made by study of buildings actually erected, we now study pictures of buildings never to be erected, and the effect of this must be prejudicial to that form of art which is practised by ourselves. The chief questions which the public feel and appreciate are those of sound construction, healthy and convenient arrangement, and economy in cost. But a building must not only be of reasonable cost—the client must know before he proceeds far with the business what the cost is likely to be. Now, in any competition, however well managed, the external or visible parts of the building are liable to receive more careful attention than questions of construction, which will be at first neglected and then starved, for the sake of what is called "architectural effect." A professional assessor may check this in a degree, but he can only advise his committee, and we can judge whether they will let him stand in the way of a design which they fancy, and which has friends to press its claims. Perhaps more odium has been thrown upon us on account of inadequate estimates of cost than on any other account whatever; yet it is difficult to imagine that an architect employed in the ordinary way would wilfully make his estimate lower than the actual cost. But in a competition he is compelled to avail himself of the utmost stretch of his conscience in that respect, and to trust to the tenderness of the committee or their assessor; and although he is generally allowed a margin of 10 per cent. over his estimate, he is obliged to reckon upon that also, and to discount it in order to keep up with other competitors. If, indeed, the custom of insisting on actual tenders becomes established, just see what a competitor must undertake! He must make drawings and full specifications sufficient to go to tender—work which would entitle him to three-fifths of the full charge of an architect, and this on the bare speculation of getting the work to carry out. I expect few men will undertake that who are not prepared to make every possible omission from the contract, and every possible arrangement with the builder—a transaction so open to malpractices that it ought to be considered unprofessional on that ground alone. Probably the art of planning has been much more studied since we have had exhibitions of competition designs, with the power of comparing many methods of doing the same thing. But, again, the study is on paper only, and we cannot see the actual results in practice of the rival arrangements. I have no doubt that the one man who actually has to work out a problem of planning, with every inducement to give undivided attention to it, will seldom find his task beyond his powers, and that, in point of fact, the general arrangement of buildings designed without competition—even before it was in vogue—are equal in all respects to those which we see produced under its influence. I may venture to say, finally, on this head, that if the public knew, as we know, that owing to a system which compels men to design ten times as many buildings as they can hope to erect, large numbers of architects are brought up with little or no opportunity of seeing building operations actually carried on, judging of the quality of materials, negotiating contracts, or settling accounts; and that, in fact, their draughtsmanship,

though unequalled in beauty, is often merely an ornamental screen behind which there is nothing, they would say such a system was unbusinesslike on the face of it, and plainly hollow and delusive to a closer view. We have, lastly, to consider the probability of making the competition system really useful to ourselves, as a means of obtaining professional employment, in its influence on the conduct of our business, in its pecuniary results, and in its effects on our younger members, both individually and in their relations with men in practice. You are aware that the General Conference of Architects, at its meeting last year, approved and adopted a set of regulations for the conduct of architectural competitions. By them the promoters of a competition are to appoint one or more professional assessors, who, of course, must not compete. The assessors are to advise as to the instructions to be issued and as to the relative merits of the designs, but they are to determine as to conformity with the instructions and the exclusion of such as do not conform. The number and scale of the required drawings are to be fixed, and rules as to the questions of estimate and names or mottoes are to be laid down. The assessors are to determine whether the estimate would in any case be exceeded by more than 10 per cent. The designs, together with the report of the assessors and the decision of the committee, are to be exhibited after the award. The author of the design declared to be the best is to be employed, on compliance with the conditions, "especially as to a tender being obtained within 10 per cent. of the competitor's estimate"—a curious proviso, for that is clearly not one of the conditions laid down. Then follow suggestions as to the number and amounts of the premiums, and reserving to the architects the property in their designs. You see that if the promoters happen to know a man fully competent to judge of their requirements, inflexible in integrity, and, in fact, such an one as one would think they might appoint as their architect, they must put him in such a position that he is the only man in the world besides their building committee who is disqualified to act as their architect. Also, the promoters may, notwithstanding the advice of their assessor, give not only the actual execution of the work, but the premiums, to such of the competitors as they think fit. Perhaps we may think they should at least be bound to pay the premiums on the advice of the assessor, and some of us may think that they should be bound to give the work also to the author of the design he might select. But we need not so deceive ourselves. Our public bodies have no idea of giving up their patronage, which, in the eyes of the worst of their members, is a legitimate source of influence, and in the eyes of the best of them is a duty which they are elected to do, and not to delegate to an assessor. Indeed, apart from competition, there is no doubt that our public bodies are able to choose their architects with as much fairness and discretion as they exercise in the choice of other persons whom they employ. Will any one say, for instance, that the Government, which can make peace and war, or select the Viceroy of India, could not be trusted to select the architects of the offices where the book-keeping part of their business is conducted? And this applies with equal force to the case of a burial-board with their pair of cemetery chapels and lodge. Nepotism is an evil which the public understands and can guard against so far as it wishes to do so, but nothing favours it so much as a competition in which the nephew can use in secret that influence which he would not venture to use openly. If, however, this system continues to prevail, we must still hear of people manoeuvring for nominations to compete, with the subsequent finessing and the canvassing of committeemen, and the squabbling over the award, till at length the parties withdraw from the contest, some of them with reputations (or perhaps only tempers) so ruffled that they cannot settle down into their normal shape without letters and pamphlets, more or less damaging to everybody concerned. Vastly more dignified, as it seems to me, is it to have a short and sharp quest after a job if you are young, or to have the job come to you if you are older, after which most of your brethren would not only let you carry it out in peace, but would, if needful, give you (at least in London) their cordial sympathy and help. I should be glad to hear of any persons who have established themselves satisfactorily in the profession by means of competitions. I believe that generally they make no connection of any importance, but whenever they cease to compete they

cease to obtain work, while they lose the position which ordinary perseverance in private practice would be pretty sure to give them. As to the pecuniary results to the architect of a speculation which has so many blanks to one prize, I have little to say, except that I do not understand how we can justify the ordinary list of charges if we are ready to do half the work for nothing, and to repeat the operation many times before we can expect to get *bonâ fide* employment. In future this matter may be amended by increasing the number and the amounts of the premiums offered, but I think that nothing short of the payment of a fair and full professional charge in the case of every architect consulted, clear of all speculative inducements, and just as in cases where a number of physicians or barristers are called in, will secure really useful service or give genuine satisfaction. This, however, would not be reform, but revolution.

(To be continued.)

PARLIAMENTARY NOTES.

ORDNANCE SURVEY.—In reply to Mr. Greaves, on Monday, Mr. Ayrton said the map of Great Britain would not be complete for some time. The one-inch map for England and Wales was already published. The map of Scotland would be complete in four years, and in six years the entire series of maps would be finished, with the hills all shaded in.

ANCIENT MONUMENTS PRESERVATION BILL.—Sir J. Lubbock, on Tuesday, in moving the second reading of this Bill, said the monuments it was intended to preserve had in past times been upheld owing to the superstitious feelings of the people. That state of things had, however, passed away, and now some of the most interesting relics of antiquity, including most of our Ancient Camps, were being sacrificed to increase the value of land, and the material of which they were composed was used for building and other purposes. He held in his hand a letter from the President of the Society of Antiquaries, expressing a conviction that these monuments were gradually disappearing, and in the absence of legislation would shortly disappear. Seeing that the House concurred in the object he had in view, it was needless for him to enter into particulars, and he should, therefore, move the second reading.—Mr. Bruce said the Government were willing that every facility should be given for providing a body to take charge of these monuments, with power to acquire the land on which they were situate. They did not think, however, it was a purpose to which the public funds should be applied, nor was this necessary. He was sure there were persons sufficiently interested in antiquarian matters to supply the requisite funds, and any appeal made to them by the hon. baronet, who had done so much to elucidate the history of these monuments, would be cheerfully responded to. If the hon. baronet would consent to expunge the provision as to the Treasury, the Government would give him every assistance otherwise, as a matter of principle, they must oppose the Bill. Sir J. Lubbock gave the assurance asked for and the Bill was then read a second time.

Building Intelligence.

CHURCHES AND CHAPELS.

BRADFORD.—On Saturday, the foundation-stone of a new Wesleyan Chapel was laid at Bradford. The chapel will be in the Classical style, designed by Messrs. Andrews and Pepper, and will cost about £6,400. The internal dimensions are 78ft. by 50ft., and it will seat 1,000 persons. Messrs. Cordingley and Peel are the masons, and Mr. Spencer clerk of works.

CHEDDAR.—The parish church of S. Andrew, Cheddar, having undergone a complete restoration, was re-opened on Wednesday week. The total outlay was about £3,500. Mr. Butterfield, architect, of London, eighteen months ago made a thorough examination of the fabric, stating that the pillars, arches, and mullions were in such a state of decay that they were absolutely dangerous. In removing the several coats of whitewash that had been daubed over the walls, Mr. Butterfield discovered they had originally been decorated, and the once bright tints have been now imitated.

Minton's encaustic tiles are laid in the chancel. The ceiling of the nave is richly illuminated, and here and in the chancel, appropriate colouring has been introduced. On the exterior the parapets of the nave have been raised, and the pinnacles restored.

CHESTER CATHEDRAL.—Since a new impulse to the work of restoring this cathedral was given at the beginning of last year, considerable progress has been made. The groining of the north aisle of the nave has been brought to its completion at the point where it abuts upon the restored Norman arch of the north-west tower, thus accomplishing the interior restoration of the whole of the nave, with the exception of the decoration of the north wall. On the exterior of the choir the singular apsidal roof at the east end of the south aisle is now quite finished, thus completing the whole reparation of the southern side of the church to the west of the tower. The same thing may be said of the whole of the south side of the nave to the west of the tower. The tower itself was completed at an earlier period. The stonework of the south cloisters is quite finished. That which remains to be done here is the putting down of the tile pavement. Meantime, the exterior restorations on the north side of the choir and at the west end of the nave have been gradually advancing. The roof of the Lady Chapel has been completed in such a manner as to give the requisite elevation, and yet not to hide the eastern window of the choir. Three additions have been made to the coloured windows of the cathedral. Two great tasks remain to be accomplished. First, the internal repairs and decorations of the choir, and the bringing of it into visible architectural combination with the great south transept; and, secondly, the external restoration of that transept, which forms one of the most remarkable features of this cathedral. This latter work has now been begun on both the east and west sides—the other it is proposed to begin immediately after the Chapter meeting in June.

DUMBARTON.—On the 27th ultimo the United Presbyterian Church, in High-street, was reopened for worship, after having undergone considerable alteration. The seating and pulpit, with its surroundings, have been wholly remodelled; the heating, lighting, and ventilation have been improved, and the interior has been decorated throughout upon a scheme in harmony with the style of the structure—Greek. The imitation of Hungarian art has been freely used on the pulpit, breast of gallery, and ends of seats, and the upholstery is of blue velvet. In the two windows behind the pulpit are figures of Moses and S. Paul—the Moses a study from Buonarrotti's statue, and the S. Paul from Raphael's cartoon. Both are by Ballantine, of Edinburgh. The pew accommodation has been increased from 450 to 620 sittings. Architect, Mr. John MacLeod, of Glasgow.

LINCOLN.—The new church of S. Martin, Lincoln, was opened on the feast of SS. Philip and James. It is in the Decorated style of Gothic architecture, and consists of a nave, with clerestory, north and south aisles, chancel, vestry, organ chamber, south porch, and a tower at the south-east angle of the church. The nave architecture consists of five bays on each side, with an open-timbered roof. The church will accommodate about 800 people, and the contract for the building was taken by Mr. George Johnson, of Nottingham, Mr. W. Goodbarn being clerk of the works, and Mr. Beckett, of Nottingham, the architect.

WEST MALLING.—On Wednesday week the opening service was held in the now completed chapel attached to Malling Union. The architect of the chapel was Mr. E. W. Stephens, of Maidstone, and the builder, Mr. Church, of Malling. The walls are of Kentish rag with Bath stone dressings, with a tiled roof. A turret containing a bell surmounts the front. The benches are of stained deal, and will seat 300 persons.

BUILDINGS.

GLENMUICK, NEAR BALLATER, N. B.—J. T. Mackenzie, Esq., of Kintail, &c., having lately acquired possession of the extensive and romantic deer-forests of Glenmuick and Bachnagain, has just finished the erection of a magnificent mansion house and offices, &c., from plans supplied by Sir Morton Peto. Glenmuick House is pleasantly situated on an eminence about two miles south-west of the village of Ballater, and commands an extensive prospect, including Birk-

hall, one of the summer residences of H.R.H. the Prince of Wales, and the ruins of Bracklay and Knock Castles, while the coils of Muick, Mount Kean, Morven, and the frowning precipices of "dark Lochnagar" form admirable backgrounds to the picture. The ground-plan of the house surrounds three sides of a quadrangle. The house consists of basement, ground, first, and attic floors, and contains a splendid suite of public rooms, with ample domestic and chamber accommodation. The north, which is the principal elevation, is broken up by a handsome portico with covered-in carriage-way, surmounted by a massive-looking square tower, and flanked on either side by spacious bays. The different flats are defined by bold moulded strings, and the oriels and chimneys finished with cornices, having broad projecting water-tables. The work is designed in the Tudor style of architecture freely treated, and modified to harmonise with the rugged and colossal proportions of the details of the surrounding scenery. The walls and dressings are executed in a light pink-coloured granite, cut from the gigantic boulders so abundant on the hills of the district. It will give some idea of the size of these blocks when we mention that several of the window-sills, weighing over three tons, and mullions measuring 12 feet long, were cut from a single stone; and it oftentimes required considerable ingenuity on the part of the contractor to be able to transport them to the site of the building, as from the nature of the ground the making of roads was out of the question. The details of the building throughout are clean-dressed and filled in between with untooled rustic work. The outside woodwork is of teak, varnished, while all the internal finishings are executed in wainscot. The several works have been executed in a highly creditable manner by local contractors, under the superintendence of Mr. Nidd, clerk of works.

S. GEORGE'S.—The foundation-stone of the Lilleshall Company's new hospital at S. George's, Salop, was laid on Friday. The hospital will be erected in the Elizabethan style, and will accommodate six beds in its present form, with provision made to add another wing if necessary. There will be thirteen rooms in all, and the cost of the building will be about £3,000. Mr. J. Fogerty, of London, is the architect, and Messrs. Millington and Son the contractors.

S. MARYLEBONE BATHS AND WASHHOUSES.—The commissioners of the S. Marylebone Baths and Washhouses have decided to erect a new first-class bath upon ground adjoining the present building, and facing the new street in continuation of Seymour-place. The bath itself will be 74 feet long and 26 feet wide in the clear. The roof will be supported by elliptic cast-iron ribs, and the walls forming the abutments for these ribs will also serve to inclose one side of the bathers' boxes ranged down each side of the bath. The walls will be finished on the inside with Keene's cement, panelled for receiving ornamental tiling. The architect, Mr. H. Saxon Snell, estimates the cost at £4,000.

WALSALL.—On Monday the foundation-stone was laid of a new club-house for working men. Mr. J. Adkins, of Walsall, is the builder; Mr. E. J. Reynolds, of Preston, late of Walsall, the architect. This building will contain in the basement a bowling-saloon, 50ft. long by 8ft. wide; a bath room, kitchen, sculleries, cellar, and other offices; on the ground floor, a reading room, 21ft. by 15ft.; a smoke-room, 16ft. by 14ft., with bar parlour and bar adjoining, and a refreshment room 21ft. by 14ft.; on the first floor a fine concert or lecture-hall 50ft. by 26ft., and 16ft. high in the clear, with retiring rooms, &c.; on the second floor, a billiard-room 35ft. by 34ft., and three bedrooms of good size. The building is substantially designed in brick, with Penkridge stone dressings, the front elevation being relieved in effect and construction by Italian pointed arches. The contract price is £1,949.

SCHOOLS.

MIDDLESBROUGH.—A site has been obtained for new Roman Catholic schools at Middlesbrough. The plans, which have been prepared by Messrs. Hunter and Carr, architects, of Middlesbrough, show a building of three stories high. Externally the buildings will be Gothic in character, of an Early English type, built of red pressed bricks, with stone dressings. The side elevations will be relieved by a projection, terminating in a

gable of steep pitch, having circular stone windows, with quartrefoil lights. There will be no elaborate detail in the elevations.

TAUNTON.—The new parochial schools at Creech S. Michael, have been inaugurated. Mr. J. H. Spencer, of Taunton, was the architect, and Mr. J. Dinham the contractor. The site was given by Mr. Foster. The style is an adaptation of Domestic Gothic, and the material Monkton stone, with grey brick dressings. The walls are lined internally with coloured brickwork, and the roofs open-timbered, varnished. The accommodation is for 170 children.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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JOHN HANCOCK.—“Intercommunication” was not instituted to serve as a medium for advertisers, but for the distribution of information for the benefit of ALL.

J. A. D. NORTING-HILL.—Your request will be complied with in reference to the drawing for the premises at Ludgate-circus, for Messrs. Collinson and Lock, by Woodzell and Colcutt, now exhibiting at the Royal Academy, but we shall not be able to give it till the Academy closes.

SCHOOL-PLANNING COMPETITION.—All the drawings have been returned, with the exception of those bearing the mottoes, “Lux Lux,” and “Light,” for neither of which have we the address of author.

J. T. ROBERTS (Newark, N. J.).—We cannot promise without seeing the drawings. We prefer pen-and-ink drawings, and the better they are, the better they can be reproduced by photo-lithography. There is no charge for insertion of illustrations, but we could not undertake to return drawings prepaid to the United States.

HARRY HEMS.—The photos to hand.

Correspondence.

EXHIBITION FURNITURE.

To the Editor of the BUILDING NEWS.

SIR,—A few years ago the name of a designer of piece of Exhibition furniture was usually kept by business people in oblivion, and the artist was considered a very unimportant party by manufacturers. However, the requirements of the Exhibition catalogues, combined with a demand for a different class of house fittings, have recently occasioned them to change their tactics, and that to such an extent as perhaps may justify the publicity of this letter. As far as I am concerned, I have not designed any woodwork whatever for this purpose since the International Exhibition of 1871, though there have been many articles exhibited in my name. In one instance a bad copy of my work was exhibited against my wishes, and the exhibitors had no right to the design or even the manufacture of the same. In other cases, the design has been made previous to 1871, or else taken from my work on Furniture (published in 1867) and detailed by some person in at least a different manner to what I would have done. Now, it is ridiculous to expect what is termed

“Fine Art Furniture” or even well-designed furniture, to be got up in this manner, for since then there has been a change in the treatment of these things. It seems to me that a piece of furniture intended for exhibition should be worked honestly and carefully made for this purpose, and that a designer's name should not be used unless it is so—or at any rate that he is agreeable to the exhibit. As it is at present, my name has simply been used for business purposes at the cheapest rate. Of this, I made no complaint last year, nor would I now do so, if the International Exhibition was not intended for a permanent Institution. Besides, it is hardly pleasant to have such articles criticised as one's especial work.—Yours, &c. B. J. TALBERT.

THE BUILDING NEWS.

SIR,—Perhaps you will kindly allow me to endorse the excellent sentiments expressed by your correspondent Philip E. Masey, in this week's number of the BUILDING NEWS, in regard to the way in which the above publication is now conducted. It is certainly a pleasure to find that your efforts are calling forth such a meed of praise on all sides, and it is no more than what is justly due to you. I am astonished often to find that you keep up from week to week, without any apparent deficiency as regards the merits of the engravings, particularly when at so small an advance on the former price charged. It is indeed a marvel, and the suggestion thrown out by your correspondent “P. E. M.” is a good one, viz., that were each of the present subscribers to get one extra subscriber—and this I think would not be a very difficult task, as the work is only to be seen to be appreciated—it would only be doing a service in return for ample value received. I, for one, intend doing this, and I have not the slightest doubt many others will do the same, as I consider it no more than a duty in doing so. Before concluding, I notice you have this week returned to give the famous illustrations of Albert Dürer. This of itself clearly shows your intention to give general satisfaction.—I am, Sir, &c., WILLIAM B. HALL.
2, Borough Houses, Gateshead, 5th May, 1873.

Intercommunication.

QUESTIONS.

[2838].—The Building Act.—Can some one say what progress is being made with the new Building Act, and whether it is possible to obtain a copy of the present one other than that in Laxton? The one in Weale's series is out of print, and hitherto I have been unable to meet with any.—A. C. G.

[2839].—Headstones Vegetating.—Will some correspondent inform me of the most effectual means to prevent headstones not painted from becoming vegetated, when exposed to the weather, without injuring or discolouring the stone?—MASON

[2840].—Old and New Brickwork.—Is there any process, solution, or method by which new brickwork in alterations can be made to resemble the old work by which it is surrounded?—HARMONY.

[2841].—Fixing Crayon Drawings.—Will some one kindly inform me what is the best medium for fixing crayon drawings with, also the best for pencil drawings? I have tried milk without success.—LUX.

[2842].—Mayence Cathedral.—Where can I get a copy of the photograph of Mayence Cathedral at present in the International Exhibition? It is evidently taken from D. Roberts's beautiful little water-colour in the Bethnal-green Museum.—R.

[2843].—Mr. Brooks's Churches.—Am I correct in saying that Mr. Brooks forbids sketching in or about his many churches in North London and elsewhere?—STUDENT.

[2844].—The True Law or Rule of Apportionment.—I should be extremely obliged if any of your readers would give me the true law or rule of apportioning the expenses incurred of repairing the roads to the satisfaction of our Local Board, and also whether the owners of property abutting on a 4ft. awarded foot road are liable to channel and flag the same in the first instance, the owners of the various plots having bought them under the following conditions?—“The respective purchasers of the building lots shall have the right of using on foot, or with horses and carts or carriages, such of the several roads, marked on the said plan, as lead to their respective lots. And each purchaser entitled to the use of any one or more of the aforesaid roads shall contribute a proportional share (with the other persons for the time being entitled to the use of the said roads) of the expense of repairing and maintaining the same in good order and condition until such time as the parish or other public authorities shall become liable for the repair thereof.” (We had no Local Board when this was drawn).—A CONSTANT READER.

REPLIES.

[2832].—Sakramentshaus.—The “Sacrament-house” is the German tabernacle for the Reserved Host, which is always placed on the Gospel side of the altar, sometimes taking the appearance of a canopied tower or gigantic pinnacle, or else forming an actual locker in the wall. The Passion of Christ is often depicted on them. The receptacle (repositorium) itself is closed by a pierced

iron grating. The more famous examples are at Nuremberg and Ulm. Their date is about the close of the 15th and beginning of the 16th century. The material was stone, but wood or bronze was also employed. The holy oils and reliquaries were placed in a locker on the Epistle side of the altar. In Holland, Italy, and Portugal the tabernacle was a cupboard in the wall; in France under a ciborium, or dome; and in England suspension was practised—a hanging pyx being used for preservation of the Blessed Eucharist; it was covered by a canopy cloth of rich material, weighted down at the corners by metal balls. In Scotland stone tabernacles of the 16th century, with representations of the Reserved Host and censuring angels, are still preserved, as at Deskford and Pluscardine, but the custom also of having a stationary “Eucharist” of metal on the altar prevailed. The standing tabernacle was adopted by Cardinal Pole:—“In every parish church let there be a decent and honest tabernacle, under lock and key, raised on high and fixed in the midst of the high altar, if convenience permit; but otherwise in some honourable and fitting place next to the high altar, in which the Holy Sacrament of the Eucharist may be kept.” In the 13th century an arca was used on the altar in some French churches; whilst in others, as in those of England, we find the ambry (armarium v. sacarium) either behind or on one side of the altar. They also in France made part of the retable, or retables, into which the ciborium was merged.—MACKENZIE E. C. WALCOTT.

[2832].—Sakramentshaus.—Or Sakramentshäuschen, is, in Roman Catholic churches, the tabernacle, or Ciborium, also called “Gotteshäuschen” (the hut of God), or “Weihbrotegehäuse” (the shrine of the consecrated bread). They are free-standing, richly ornamented, pyramidal constructions, to keep the consecrated wafers. The tabernacles are often placed on the altar itself. The detached shrines (Sakramentshäuschen) on the Gospel side were introduced in the 14th century. The most remarkable was that in the dome of Cologne and one in the Church of S. Elizabeth at Kaschau, in Hungary, a masterpiece of Gothic style. We may mention also the tabernacle of Adam Kraft, in the S. Lorenzo Church at Nuremberg, 64ft. high: that of the Minister of Ulm (1469), 90ft. high; and that of the Cathedral of Ra isbon, 52ft. high.—PROFESSOR.

[2833].—Laps in Wall Plates.—No more s allowed than the exact measurement of the lap. This, of course, is easily found from the width of stuff used. Supposing 4in. wall plates used, then addition for lap would be 4in. As to second question about lead-work, the exact measurement must, of course, be taken if measuring from a building; if from drawings, London surveyors usually allow an addition of 6in. to the length for each lap.—B.F.

LAND AND BUILDING SOCIETIES.

STOKE-UPON-TRENT TRADESMEN'S AND MECHANICS' PERMANENT BUILDING AND INVESTMENT SOCIETY.—The twenty-first annual meeting of the above society was held on Thursday week. The result of the year's working shows a clear profit of £556. 14s. 1d., after fully providing for the usual five per cent. compound interest due to each member, and also all working expenses. A bonus of one per cent. has been awarded upon the total subscription due to each member, which amounts in the whole to £28,541, upon which it will have to be divided. To do this will require £285, and leave a balance of £271 to be carried forward to next year's account.

Our Office Table.

DISCOVERY IN ROCHESTER CATHEDRAL.—During the time the workmen have been employed in the works connected with the restoration of Rochester cathedral several interesting discoveries have been made of ancient portions of the original cathedral, erected A.D. 604. On excavating at the spot near the present communion table discovery was made of a large leaden coffin, evidently of great age, which, from the largely legible figures and marks still to be traced, is believed to contain the ashes of some person of distinction. It is probable that the coffin in question contains the remains of Ithamar, one of the first bishops of Rochester, who died in 655, and was buried in the cathedral. Subsequently his remains were removed by Bishop Gundulph from the body of the cathedral in which they were originally deposited, and placed in a new grave, it is believed, close to the then altar. Another leaden coffin was also discovered near that which is supposed to contain the remains of Bishop Ithamar, but there are no traces of any inscription which would lead to its identity. From its appearance and the position in which it was found, it is believed to contain the remains of some person of eminence. In the progress of the works several encaustic tiles have likewise been discovered, containing numerous rude figures.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—On Thursday last Capt. E. D. Lyon gave a lecture at the Society's rooms, 9, Conduit-street, “On the Ancient Temples and Mythology of India.” Dr. Zerffi in the chair. The lecturer dwelt on the customs and manners of the Indians, describing some of their temples and religious ceremonies, and exhibiting a large number of dissolving photographic views. Dr. Zerffi, in proposing a vote of thanks to the lecturer, in the

name of the Society expressed the hope that the deep interest lately taken in Indian matters would endure, as nothing could be more important than to make ourselves acquainted with the poetry, religious notions, and philosophy of the Indians. We should find in their writings the germs of all conceivable poetical beauties, in their philosophy all imaginable systems, and in their religion all possible dogmas. In trying to find out the connecting links between the past and the present, we foster the ties of forbearance and tolerance, so necessary to transform humanity into one great loving brotherhood. After the usual thanks to the chairman, proposed by the secretary and seconded by Mr. Saddler, the proceedings closed. The attendance was very numerous.

STREET WATERING.—A new type of water-cart, in which several scientific improvements have been introduced, is being used by some of the vestries. It consists of an iron tank, 7ft. 3in. long, 4ft. 6in. wide, and 2ft. 6in. deep, which holds 450 gallons of water. The tank is mounted on springs and carried on four wheels, with light hinged shafts, the whole being painted in bright colours. One horse draws the van, when filled, with ease, being relieved from severe strain as there is no weight on his back beyond that of the shafts. The distributor and branch pipe are on an improved principle, which admits of the outflow of water being regulated to meet the varying conditions of streets and weather. Contrary to previous practice, the inventors of the new watering-van, Messrs. E. H. Bayley and Co., of the Steam Wheel Works, Southwark, made the upper orifice of the branch pipe, where it opens from the tank, smaller than the lower part to which the distributing pipe is attached. The holes in the new van are made to follow curved lines, which rise from the centre towards each end of the pipe. This enables the distributor to be placed low, so that a good spread is obtained, owing to the head of water above, while the curved lines allow full advantage to be taken of the high trajectory of the end jets. With this van and an ordinary watering-cart, some comparative trials were made recently in Regent-street, under the auspices of the authorities of S. James's Vestry. The cart was of full size, and held between 250 and 300 gallons, being a fair average specimen of a water-cart. The van and cart were both filled and started from a standpost by Hanover Church, and the object was to ascertain the area of ground the water from each would cover. The two vehicles proceeded on their way towards the Regent-circus, the cart having emptied itself by the time it reached Newman's-yard, while the van proceeded as far as the Circus and returned up Regent-street to Air-street, when the water gave out. The width of spread of water from the van was 23ft., that of the spread from the cart being 16ft. The van laid the water much more evenly than did the cart, which left a number of small pools in its track. By measurement of the plans at the Vestry-hall after the trial, it was ascertained that the van had spread its water over a length of 2,640ft. which, multiplied by the width of the track, 23ft., gives an area of 60,720 square feet covered. The cart had travelled 1,440ft., and its spread being 16ft., it had consequently covered 23,040 square feet. Mr. W. Booth Scott, the chief surveyor of S. Pancras, has made some experiments in street watering both with the old and new system and he has reported the saving in his parish with the new system to range from £800 to £1,000 per annum, according to the season.

THE TALLEST BRIDGE IN THE WORLD.—The highest bridge in the world is said by *Van Nostrand's Magazine* to be the Verrugas Viaduct, on the Lima and Oroya Railroad, in the Andes of Peru. The viaduct crosses a mountain torrent, called the Agua de Verrugas, in a wild and picturesque locality, 12,000 ft. above the level of the sea. The structure consists of four deck spans of the Fink type of truss, three of which are 110 ft. long, and one, the central span, 125 ft. long. The spans rest on piers built of wrought-iron columns. The piers are 50 ft. long by 15 ft. wide on the top. There being three piers, the total length of the viaduct is 575 ft. The piers are the principal feature of interest, and are respectively 145 ft., 252 ft. and 187 ft. high. Each pier consists of twelve legs, which in plan form a rectangle. The legs are composed of a series of wrought-iron six-segment columns, in lengths of 25 ft., connections being made by cast-iron joint boxes having tenons on each end running into the column. The tenons and

the face of casting against which the column bears are machine-dressed, so as to obtain an accurate fit and perfect bearing surface. The columns have an exterior diameter of 12 in., and a diameter, including flanges, of 16 in. Compared with other works of a similar type, such as the Crumlin viaduct, which has hitherto borne off the palm, it is far ahead, both in magnitude and perfection of details.

CHIPS.

The foundation-stone of a new "Free Gospel" chapel and school was laid at Prescott, Liverpool, on Monday. Mr. J. Thompson, of Lancaster, is the architect, and Mr. J. Williams, of Prescott, the builder. The chapel will be of freestone, and its dimensions will be 35 feet by 28 feet.

On Sunday a new United Methodist Free Church Chapel was opened at Moston, Lancashire. The chapel, which is of Gothic design, is composed of red stock bricks, with stone dressings; and the front elevation rises to a height of 45ft. above the level of the street. The interior dimensions, inclusive of vestries and organ loft, are 55ft. by 33ft.; and accommodation is provided for the seating of 350 persons. The total cost of the building and land is about £1,500.

A scheme is in contemplation to remove some of the vandalisms which disfigure the Cistercian ruins at Kirkstall. The representatives of the late Earl of Cardigan, who own the monastery, having evinced a desire to dispose of the place, the lessees have resolved upon purchasing the property, and they purpose restoring the Abbey to some extent. With this object in view, Sir Gilbert Scott has been instructed to report upon what should be done.

Edward Pether, of 8, Chiswell-street, London, glass-letter maker, has commenced proceedings for composition with his creditors. The first meeting is to be held at 9, Ironmonger-lane, on the 19th inst., at 3 p.m.

In the Court of Exchequer on Monday was tried an action, *Earl v. the Vestry of S. Mary Abbott's*, Kensington, to recover the value of a horse, which had been so frightened by a steam-roller that the animal ran away, and was so much injured that it had to be killed. The jury gave the plaintiff £50 damages.

Mr. Cole has withdrawn his resignation of the direction of the Museum at South Kensington.

Trade News.

WAGES MOVEMENT.

BANBURY.—A number of the carpenters of Banbury having recently demanded an increase of 4s. 8d. per week, the masters refused to give it them, and the men have consequently turned out on strike. The masters offered certain of the men 1s. a week more, which was declined. There appears to be some difference of opinion amongst the men themselves, as in some of the shops the men expressed themselves satisfied with their present wages, while in others they agreed to strike, and at the last moment fell from their resolution.

BERLIN.—It is stated that the carpenters of Berlin, to the number of about 10,000, are on the eve of a strike. They demand that the ordinary working day shall be eight hours, and that their wage shall be increased by a third beyond the existing amount. The employers reply that they will rather shut their workshops than yield, as it is impossible for them to compete with the foreigner on such terms. They have also declared that henceforth they will only give work to men who do piece-work, or who consent to a nine hours and a half working day.

BIRMINGHAM.—A conference between the master builders, master masons, and the building operatives of Birmingham took place on Wednesday week, at which a settlement respecting the wages to be paid was arrived at, and working rules, signed by both parties agreeing to the terms, were arranged. The terms were an advance of wages of one farthing per hour, to take effect from May 1st.

LONDON.—The first of a series of meetings organised by the carpenters and joiners of London was held on Thursday week at the Earl Grey, Mile-end-road, Mr. T. Davis in the chair. The chairman, after entering into a statement respecting their former efforts to obtain an advance of wages, said the present movement was simply the taking up of their former struggle at the point at which it was suspended last summer by the temporary settlement with the Master Builders' Association. He said the former agreement was acceded to under protest, and the carpenters' committee were pledged to the trade to carry out to a successful issue the original terms of their memorial, namely, "nine hours and ninepence." Mr. Matkin, the secretary of the carpenters' committee, next read the correspondence that recently took place between the Carpenters' Society and Mr. Stanley Bird, the hon. secretary of the Master Builders' Association. It was moved,—"That in the opinion of this meeting the memorial forwarded to the Master Builders' Association for an advance of wages of one halfpenny per

hour, to come into operation on the first Saturday in June, is a fair and just demand; and, further, that this meeting pledges itself to support the committee peculiarly and otherwise in carrying out the same."

LIVERPOOL.—A difficulty has arisen between the Liverpool operative marble masons and their employers. A short time ago the journeymen marble masons presented a memorial to their employers asking for an advance of wages. Up to last year, when the men obtained a diminution of hours to fifty-four, they had been in the habit of working fifty-seven or fifty-nine hours per week. Though the hours were reduced last year, the men, it is said, have not had an advance of wages for eight years. They decided to ask for an advance. The present wages are—masons, 30s.; polishers, 24s.; sanders, 20s.; and the advance asked for was 3s. per week for the two former branches, and 2s. per week for the latter. The masters refused this, and the men came out on strike on Monday morning. There are nine firms in the trade in Liverpool, who employ about eighty men.

NORTH SHIELDS.—The contemplated strike of the journeymen house-painters of North Shields has been amicably settled by the men accepting the offer of the masters—namely, shorter hours without advance of wages.

RADCLIFFE.—The joiners in the Radcliffe and Pilkington districts, Yorkshire, have struck work because their employers have refused to increase their wages and reduce their hours of labour. The price paid to the men at present is 6½d. per hour. They ask for 7½d. and state that according to the official returns issued of the rates of wages in other towns, they are entitled to the concession asked for. The increase sought is equal to 2s. 3d. per week of 54 hours on their present rate of wages; but they stipulate that for three months during the winter season 49 hours should be considered a week.

STRIKE OF STONEMASONS AT OLDHAM.—Three hundred stonemasons have struck in Oldham, throwing the building trade of the town into confusion.

SWANSEA.—The stone cutters and masons of the Swansea district having some time ago given notice to their employers that they would require an increase of three shillings a week in their wages, the masters, on Thursday week, when the notice expired, intimated their willingness to concede the men's demand. Work has therefore continued without interruption.

YORK.—The building trade of York is again disturbed by a strike, the stonemasons having left work to a man for the purpose of enforcing the operation of a local code of rules (involving an advance in the price of labour) which they some time ago submitted to the masters. What they ask for is that the wages be from the 1st March to the 31st October, 7½d. per hour; and from the 1st November to the last day of February 7½d. per hour; fixers of hewn stone to receive 3d. per hour extra. According to this scale of remuneration, the wages of banker masons will amount to £1. 12s. each per week, and masons (fixers of stone) £1. 14s. per week.

ASHTON & GREEN.

Slates, Iron, and Marble Merchants, and Quarry Agents—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portmadoc and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.			
24 by 12	22 by 12	20 by 10	18 by 10
420s.	370s.	240s.	222s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8
222s. 6d.	170s.	212s. 6d.	130s.

Per m of 1,200 Slates, subject to a discount. Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A & G's Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

CHORLEY TOWN HALL, LANCASHIRE.—Messrs. Ladds and Powell, architects.

	With brick facings.	With stone facings.
Stimpson (London).....	£21,485 0 0	£21,930 0 0
Whiteley (Leeds).....	30,310 0 0	21,170 0 0
T. Bridge (Ormskirk).....	18,957 0 0	20,530 0 0
" " for carpenter's work only		2,350 0 0
" " joiner's and ironmonger's work only		2,200 0 0
	With brick facings.	With stone facings.
Warburton (Manchester)*.....	£16,200	£17,160 0 0
Evans, excavator and bricklayer's work contract 1A.....		5,088 0 0
Evans, excavator and bricklayer's work contract 1B.....		6,033 0 0
Caton, plumbing contract.....		825 0 0
Lowther and Milnes do. do.....		635 0 0
" " glazier's contract.....		140 0 0
" " painter's contract.....		150 0 0
Whalley, slater's contract.....		721 0 0
" " plasterer's contract.....		1,858 0 0
Foster, smith and founder's contract.....		1,550 0 0
Lucas, plumber's contract.....		731 7 4
" " glazier's contract.....		165 10 11
" " painter's contract.....		268 8 7
Gillett and Sons, bricklayer's contract 1A.....		4,736 10 0
" " do. do. 1B.....		4,695 6 0
" " stonemason's contract.....		4,227 2 0
" " do. (alternative contract).....		5,055 10 0
" " plasterer's contract.....		1,349 5 0
" " carpenter's contract.....		2,509 8 5
" " joiner & ironmonger's cont.		2,743 16 10
" " plumber's contract.....		780 6 4
" " glazier's contract.....		179 1 11
" " painter's contract.....		353 17 0
Winnard, stonemason's contract.....		5,558 0 0
" " do. do. (alternative contract).....		6,567 0 0
Rigby, carpenter's contract.....		4,360 0 0

(* Accepted).

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 16, 1873.

HAND-PAINTED OR ART TILES.

IT is recorded of Dr. Philip Doddridge that when a child his mother taught him the history of the Old and New Testament, before he could read, by the assistance of some Dutch tiles in the chimney of the room where they usually sat. This little biographical incident reminds us how common was this style of decoration of English fireplaces in the days of the eminent Nonconformist divine, and before his time. The introduction of that modern, but not very happy institution, the register grate, and the severely plain chimney-piece, banished all ornament of the kind from our hearths and homes. But like many another old-fashioned notion which the taste of the next generation discards as being behind the age, the generation succeeding that again falls back upon and adopts *con amore*. Rude in design as the antiquated Dutch tiles might be, still, they gave us colour and variety; they were something for the eye to rest on, and they at least *taught* something, as Philip Doddridge found. This is more than can be said of our existing fireplaces. To say nothing of the enormous waste of heat occasioned by their faulty construction, a point we are not now considering, what could well be uglier or more cheerless-looking than the universal blackleaded grate? Every model housewife is supposed to be specially ambitious of having "a bright and clean fire-side," and accordingly, those who can afford it find a gratification of their ambition in a steel register, highly polished as any mirror. Here is brightness enough, we grant, but what is more colourless and cold-looking than your steel grate and ditto fender? And, by-the-way, what is more difficult to keep clean? A similar objection applies to the slabs of black or white marble, as painfully polished as the grate, and, as a rule, utterly devoid of design or ornament, which we call a chimney-piece. As for the plaster chimney-pieces done up in imitation of marble and granite, and which are so common in English houses of the present day, these wretched shams are altogether unworthy of the domestic architecture of the age. But we have come back to tiles, not only for hearths and fireplaces; we have extended their use to a variety of purposes never dreamt of by our forefathers—purposes as varied nearly as are the patterns of the tiles themselves. The existence of so many large firms as those of Minton, Hollins, and Co.; Maw and Co.; Simpson and Son; Moore; Malkin, Edge and Co.; Minton Taylor, W. Godwin, and others, is a proof of the very great demand there is for them. Besides church and other pavements, for which plain and encaustic tiles have been in general use for the last thirty years, glazed and enamelled tiles are brought into service for lining baths and lavatories, dairies, shops, offices, larders, stables, entrance halls, dark passages, and areas for reflecting light; majolica tiles for the walls or dados of libraries, smoking-rooms, entrance-halls, and staircases; also for fireplaces, flower-boxes, for inlaying with cabinet and ironwork, such as sideboards and fenders, and for church mural decoration, as reredoses, sedilia, arches, niches, pilasters, friezes, panels in walls and pulpits, stringcourses, memorial tablets, &c. And as the latest and most important development in this direction, we have hand-painted or art tiles, which also are now being applied to most of the above purposes, and, indeed, to all kinds of mural decoration, ecclesiastical and domestic, with the greatest success. In each of the forms of decoration enumerated the process is widely different. The com-

monest tiles, those used for closets and the like, are simply printed in the same manner as an ordinary piece of crockeryware. In encaustic or figured tiles, having the ornament inlaid in the pattern, a mould is made from a design on paper, and the different coloured clays poured into the mould. For majolica a metal mould is employed, but instead of the clays being poured in as in the former case, the tile is painted in enamel colours, the raised ornament, as well as the groundwork of the pattern, being very elaborately coloured and richly glazed. In the new art tiles, however, the figure or subject, whatever it may be, is painted directly on the prepared tile or slab by the artist. The material employed for painting on being the same as that of the tiles used for pavements, and the colours being, as in the case of the other tiles, burnt in at a high fire, the permanency of the whole is guaranteed. But as they are subjected to the action of heat alone, after coming from the artist, they possess a freshness of character and an artistic feeling difficult of attainment in productions wherein a mechanical after-process is involved. It is further claimed for art tile decoration that it is as durable as stone, is not affected by atmospheric influences, and is therefore well suited for both exteriors and interiors. Designs of every description appear to be applicable to it, from a simple diaper to an elaborate composition of figures. We recently saw a number of beautiful specimens in all colours and styles of ornament, at the establishments of Messrs. Minton and Co., Simpson and Sons, and R. Minton Taylor. The first-named firm show in their extensive collection a set of clever and artistic studies of animals on tiles, about 9in. by 9in., the work, we believe, of Mr. Simpson, a young Staffordshire painter; as well as slabs for chimney jambs or panels, having thereon the favourite stork, admirably executed by another artist. In glazed tiles, this firm, it may be mentioned, has recently fitted up a remarkably fine dado in the smoking-room of the Carlton Club. Dados of plaster, brick, or wood are alike objectionable, because they invariably become defaced and disfigured with footmarks, scratches, and damp, whereas the other does not, to any appreciable extent. Messrs. Simpson, who have made a special feature of art-tile decoration, exhibit numerous attractive subjects, in single tiles and panels, of birds, animals, foliage, and flowers, many of them of a richness and artistic expression rivalling that of oil-painting, while among Mr. Taylor's varied specimens may be noted several panels containing female figures designed and painted by Mr. H. Marks, the well-known artist, and also capital representations of the signs of the Zodiac, Æsop's Fables, and the familiar nursery rhyme of "Jack and Gill." It is becoming generally known that there is no description of decoration so suitable for the substantial adornment of the north, south, and east walls of churches. Many important works of this nature have already been carried out by these firms and others. The subjects introduced over the altar-table, &c., consist of emblems of the Apostles and Saints, symbols of the Crucifixion, sacred monograms, the Ten Commandments, texts, inscriptions, and monumental tablets. In most of the works thus executed which we have seen, the jointing is scarcely apparent, so carefully are the tiles fitted together. Designs, however, can be executed with a mosaic arrangement of joints, as in stained glass, by which the regular square reticulations may be avoided. The squares are made of all sizes, from 4in. by 4in. up to 12in. by 12in., but those most commonly used are 6in. by 6in. and 8in. by 8in. The new art has, we understand, found a warm patron in Sir Gilbert Scott. For that gentleman Mr. D. Bell, of Upper Charlotte-street, Fitzroy-square, has executed several works—among others, a Crucifixion, in Arksey Church, Yorkshire—a panel measuring 2ft. 4in.; and a similar work for S. Ed-

mund's, Salisbury. Mr. Bell has also executed various designs in hand-painted tiles in Birstall Church, Leicester, Preston parish church, and Bramber Church, Sussex, for Mr. Lacy W. Ridge, Mr. Rowland Plumbé, Messrs. Paley & Austin, and Mr. Joseph Clarke, architects. This form of decoration is found to be quite as effective as, while much more durable than, oil-painting; and if it cannot compare in brilliancy with glass-painting or mosaic, it has the advantage of being less costly. The price of art-tiling varies from seven-and-sixpence per foot for ordinary ornamental work, to about two guineas for rich, ornamented figured work. This latter price is about the same as stained glass, and one-half the price of mosaic. In practically applying the art of decoration, there has been a long-felt want of some method of surface-decoration, combining the qualities of artistic expression and durability adapted to withstand the atmospheric changes of the climate of this country and the deteriorating influence of the smoke of our large towns. There seems to be a very general opinion among architects that these conditions appear to be fulfilled by the new art-tiles. Hence the large measure of favour they are attaining.

"THE MECHANICAL DRAUGHTSMAN."

WE have received the following description of what purports to be a new and singular piece of machinery—destined, if the inventor is to be relied on, to modify very considerably the routine of many architects' offices. Inventors, however, are notoriously over-sanguine, and we are inclined to believe that the present one is no exception to the rule. We are far from affirming, it will be understood, that there is any inherent reason why architecture—such architecture, that is, as adorns most of our new streets in London and other towns—should not be designed by mechanism, for mechanism may conceivably be applied to all processes except those which require thought and the power of adaptation; and for the same cause we are still less inclined to dispute that the work of mere drawing clerks, as distinguished from that of assistant architects, might be done by similar means. It is the vagueness of the description which casts a doubt on the whole affair, and which leads us to question whether some important details of the arrangement may not, after all, still remain to be perfected. With these few words by way of caution, our correspondent shall speak for himself:—

"For years past," he says, "I have noticed in your pages, and elsewhere, advertisements of machinery—such, for instance, as the 'General Joiner,'—which are said to be capable of doing all, or nearly all, that a man can do after seven years' apprenticeship to the trade. Such a trade as a joiner's, however, needs a good deal of muscular strength, and any machine to do that sort of work must necessarily require considerable force to drive it. It seemed to me, therefore, that the greatest saving could be effected in those businesses where neither brains nor muscle, to any large extent, are necessary, and where about one horse-power would suffice, say, for a dozen men. Being of an inventive turn, and looking about for a business of this sort, I happened one day to get into conversation with an architect, and I saw at once that I had found the very thing. He was none of your restless, revolutionary artistic characters, you understand; but a sober, solid, middle-aged gentleman, who did not want to turn the world upside down, and did not see the use of trying to do everything so much better than his neighbours. This, we all know, is the sort of character which insures universal respect, and by maintaining it steadily and consistently for many years, this gentleman had established himself in an influential position. In the town where I live he had built a large number of warehouses, as well

as some scores of villas in the suburbs, and several new churches in the immediate neighbourhood. It had always struck me that one of his buildings was very much like another—which, for the purposes of my machine, was just as it should be. On walking round and taking a more careful view of them, indeed, I found several important points of difference, but not such as a clever mechanic would not be able to provide for. Some of his warehouses for instance, had ten windows in a row, and some had not more than four or five—for if the frontage was long, of course he had to fill it, and if it was short, his design had to be cut off accordingly. Some, again, were seven stories high, and others not more than four: but the deficiency was evidently no fault of his, for he built as far as the money would go. I need not tell you the doors and windows were all spaced out in rows, and set straight one above another, like the squares in a chessboard, and what you call the ‘details’ were pretty much the same in one design as in another. So far it was all plain sailing, and I went home, and in less than ten days turned out a working model that would draw warehouse-fronts by wholesale. It is not necessary to trouble you with the particulars of it, but it was an application of the principle of the pentagraph, with one great improvement. In the ordinary pentagraph, as you know, a drawing is copied to an enlarged or reduced scale, by passing a metal point over each line of the original, to do which, you must of course see the lines. I soon got over this difficulty, by making the drawing of the first window or door (which of course is copied for all the other windows and doors), not on paper, but on a surface of wax and other materials, into which the outlines are slightly sunk with an etching-needle. A very simple arrangement of two or three wheels and screws suffices to make the tracing-point follow these lines, and so by merely putting in a sheet of paper, and turning a handle for five or ten minutes, the entire design for the elevation is produced in the most accurate and finished style. All the preparation required is to stick in four pins at proper distances, so that the pencil or ink holder may stop when it reaches the end of the building site, or the level of the top story.

“I could hardly make up my mind at first whether or not to try and make the machine serve for plans as well as elevations, especially as in the buildings I examined, the latter did not seem to depend in the slightest degree on the former. A second conversation with my friend, the architect, did, however, induce me to try, and happily the attempt has now been crowned with extraordinary success. Without telling him of my invention, I happened casually to remark that his profession seemed to involve no very severe strain on the mental powers. ‘Indeed,’ he said, ‘you are mistaken; and, as a proof of your mistake, I can assure you that my profession proves too difficult, even after years of apprenticeship, for many intelligent and well educated young men. You shall see the clerks in my office [of whom at this time he had nine or ten], and I can assure you there is only one of them whom I can depend on not to draw a room without a doorway, or a house without a staircase, or a fireplace without a flue. If I stand behind them and say, ‘put a doorway,’ they will put one, and so with other things; but it is impossible to rely on their doing this spontaneously.’ Well, I thought, it is hard if I cannot invent some machinery that will do it, and do it without fail, as well as fifty other things which my friend assured me, to my amazement, were always in danger of being left undone and forgotten. In fine, sir, I have so developed and improved on my original invention that it will now do everything that an ordinary drawing clerk will do, and do it—which is its invaluable merit—without the possibility of mistake. A few very simple expedients, which you will understand better

from seeing them, than by any written description, insure not merely that such obvious necessities as doors, staircases, and flues are provided for, but also that the doors shall be in convenient positions, that the stairs shall have headway enough, and the flues be carried up in a manner consistent with the Building Act; along with a multitude of equally familiar requirements which, I should have thought, nobody who had passed six months in an architect’s office could ever by any chance lose sight of.

“Taking facts, however, as I am assured they are, I anticipate a very large sale for the invention. I have named it after the person it is assuredly destined to supersede—the *mechanical draughtsman*. The draughtsman who is not merely mechanical, who does his work with thought, invention, and originality, cannot, of course, be superseded by any machine, however complicated; but draughtsmen of this sort seem to be so rare that they may be left out of the calculation. As to the mode of working the apparatus, a half-horse power engine would keep seven or eight ‘mechanical draughtsmen’ going at a high rate of speed. In country places, especially in elevated situations, nothing perhaps would be cheaper than to work the machine by a band from a small set of wind sails fixed on the roof, or even by a smoke-jack from the kitchen chimney. I will only add that I hope very shortly to have the machine ready for sale at all the principal mathematical instrument-makers, and that the price will vary from ten guineas, in a plain varnished deal case, up to twenty or twenty-five, in polished oak with electro-plated fittings.”

SCHOOLS.—No. III.

NEWCASTLE, AND THE TYNESIDE TOWNS.

CONSTRUCTIVE energy has made the Tyne the mightiest river of the world in developing the material agents of civilisation; and, as might be expected, the construction of schools has not been taken upon trust by the Tyneside School Boards or their architects. Accepting none of the established regulations of the Education Department without, to them, sufficient reasons, and starting on the assumption that the question of elementary schools in large towns is entirely different to that previously entertained in agricultural and parochial districts, their labours acquire a special interest. It remains to be proved whether their mode of procedure has contributed new elements towards the formation of an essentially English type of school; at the same time, we are inclined to believe that Newcastle has done something considerable in that direction. A school combining provisions for aggregate and class-teaching, with convenient facilities for entire supervision by one head of a department without a subordinate staff of costly teachers, and with all the details of proper space, temperature, suppression of sound, furniture, and conditions for mental occupation provided—such as building is, at least, a noteworthy contribution to the art of school-building. Then, again, remembering the lamentable physical conditions of the more unfortunate children whom the compulsory provisions of the Education Act will reach, it is satisfactory to find a school proving that special buildings for neglected children—such as the Salford School Board has discussed—need not be erected, while there is no insuperable disadvantage in having personal uncleanness to deal with. An example of the former class of school will be erected in Newcastle; an example of the latter has been completed at Jarrow.

The designs for the Newcastle schools must be referred to with reserve at present, being yet on paper only, not perfected in all their details, and not open to public scrutiny. Nevertheless, by the courtesy of Mr. Thomas Oliver, architect, of Newcastle, we are enabled to note the general arrangements of an in-

genious and very far-advanced plan of a school to accommodate 1,000 children, designed by him, and about to be erected for the Newcastle Board. It combines the advantages of the various school systems in one. Around a central room, wherein the whole of the children in a department may assemble, he has grouped six class-rooms, four of which may be converted into two of intermediate dimensions. The upper portions of the divisions between the several rooms are formed with glass, and the desk of the head-teacher is placed in such a position that the whole of the seven, or five, rooms can be inspected therefrom, and the work of the entire department scrutinised, while the attention of the scholars remains confined to their respective rooms. The plan, which may be said to be upon the American principle, affords scope for diverse methods of teaching and classifying, with facilities for lighting and ventilating. The floors and divisions will be constructed to preserve the utmost possible quietude by means of pugging, felting, and otherwise preventing the transmission of sound. The heating will probably be by hot-water, with coils carried to a ventilating-shaft for extracting the vitiated air. The walls will be stone. Tenders have been received for the erection of this school, and also for one of corresponding accommodation, in brick, designed by Messrs. Austin & Johnson, architects, of Newcastle. A third school, of similar dimensions, will be erected for the Newcastle Board, from the design of Mr. F. R. N. Haswell, architect, of North Shields. We shall give a more complete description of these several schools when their details have been finally determined and they assume a more public form.

The Gateshead School Board, after many delays, has commenced the erection of new buildings. Before the Leeds and Huddersfield Boards resolved to build wide schools, this Board had commenced negotiations for the same purpose. Their principal architect, Mr. Thomas Oliver, preceded the deputation from the Leeds Board to the Education Department, to urge the assumed advantages in teaching, construction, and cost, of wide buildings on the “Battersea” system, but without immediate success. Since the concession to the Yorkshire Boards a partial and reluctant approval of the Gateshead School plans has been obtained; but the central Department has notified that future plans for schools in Gateshead, upon the “wide” principle, will not receive official sanction. As only a portion of their building scheme has been matured, the future action of the Board will be watched with great interest. In the first instance the Board invited architects to submit designs in open competition for five groups of schools, to accommodate 4,000 children. The competition was generally responded to, and from a number of designs, four (for as many of the proposed groups) submitted by Mr. Thomas Oliver, of Newcastle, and one design submitted by Messrs. Ross and Lamb, architects, of Darlington, were selected.

A contract for the erection of one of the schools designed by Mr. Oliver has been entered into by Mr. Harrison, builder, of Newcastle. The works are now commenced upon a site of 93 yards by 96 yards, situate in the outskirts of the town, and known as Prior-street. The schools, to accommodate 1,300 children, consist of two detached blocks; one, two stories in height, to accommodate 310 boys on the ground-floor, and 350 girls on the upper story; the other, a one-story building, to receive 650 infants, in two departments. Each of the four departments has a principal room, 56 by 34ft., lighted on both sides, and, in the senior schools, fitted with desks on both sides. The infants’ departments have galleries with raised seats and backs, and two class-rooms; the other departments have three class-rooms, each 20 by 18ft., fitted with galleries. There are teachers’ rooms, an entrance lobby, a

lavatory, and a cap-room, in each department. The walls are 20in. hollow brick-work, with stone dressings from the Gateshead Fell quarries. The general heating is by hot-water, with open fire-places in the class and teachers' rooms. Sherringham's galvanised cast-iron ventilators are inserted under the eaves; and a series of ventilators fitted with perforated zinc are inserted in the air-chambers of the roof. The windows have solid wood frames, with pivot-hung casements over the transoms. The method of deadening the sound upon floors, successfully managed and universal in Scotland, is here adopted. (This absolutely essential feature of school-construction, especially in schools of two stories in height, is not commonly introduced. There are schools recently constructed in which the movable partitions exclude sound far more effectually than the floors.) The cap-rooms, lavatories, latrines, stores, and corridors are floored with Wilkinson's granitic cement. Clark's patent high-backed enamelled fittings are adopted for the urinals; Macfarlane's No. 6 w.c.'s, with flushing apparatus, are used in the latrines; and galvanised cast-iron troughs in the lavatories. The iron troughs for the lavatories will be found to be a mistake (earthenware is incomparably a better material for the purpose); and it is a question also whether iron is not the most unsuitable material for the kind of closet adopted, especially in connection with flushing apparatus that requires constant manipulation. There will be a water-supply in lead cisterns, and gas throughout. The roofs are open to the collars, with the stop-chamfered principals exposed. The walls are plastered. The cost, including schools, covered play-grounds, out-buildings, fences, fittings, furniture, architect's commission, and payment of clerk of works, will not exceed £6 per head.

The group of schools to be erected in Alexandra-road, from the design of Messrs. Ross and Lamb, will accommodate 320 infants and 170 boys on the ground floor, and 180 girls on an upper floor over the boys. Each department has one class-room only, and the large rooms are not divided for class-teaching. The infants' schoolroom is a T-shaped apartment, 63ft. long one way, and 48ft. the other, with a height of 13ft. up to the ceiling at the collar of the roof. The boys' schoolroom is 40½ft. by 33ft., and 14ft. high; the girls' has the same superficial area, and is 18ft. high to the collar, where it is ceiled. Three rows of desks are placed on each side of the large rooms. Heated fresh air is admitted by Lewis's school-grates in open fireplaces; cold fresh air is admitted through ducts leading from the external walls to the centre of the floors in each room, and by means of pivot-hung casements over the transoms of the square-headed windows. The impure air is extracted from the roof air-chambers by Howarth's Archimedeal screw ventilators. The elevations display a tasteful treatment of ornamental brick-work, with bands, stone heads, eills, and copings. The lowest tender for the works, submitted some months ago, made the cost of the building, complete, about £5. 5s. per head; but the contractor has declined to undertake the works, except at a sum proportionate to the advance in prices, and other tenders are being invited. The superficial area per child is 8ft., and the seating 18in.

Messrs. J. and T. Robson, builders, of North Shields, are erecting a large group, forming one of the Tynemouth Board schools, in the western district of North Shields, from the designs of Mr. F. R. N. Haswell, architect, of North Shields. These schools are not planned to give the advantages of class-teaching. For the boys' department only one inadequate class-room, of 18ft. by 15ft., is provided in connection with a schoolroom 60ft. by 32ft., and 24ft. high. The girls' schoolroom, of corresponding dimensions, has one class-room, and a sewing-room. The infants' department, 56ft. by 33ft., and 25ft. high,

has two class-rooms, and three galleries in the large room. These arrangements are, to say the least, capricious, and opposed to the strongly-expressed opinion of teachers, as well as to the general experience in favour of class-teaching. The heating of the large apartments is to be provided by means of the No. 3 Derwent Foundry Company's stoves, fixed below the floor level in the centre of the rooms, constructed with air-ducts and smoke-flues carried to the chimney-stacks of the open fire-places in the class-rooms. Nine-inch fireclay flues are constructed in the walls, with ventilators, by which the vitiated air will be extracted. Hill and Hay's ventilators are used in the roofs; 12 by 12in. cast-iron revolving ventilators are used in the floors; Boyle's ventilators are used in the foul-air flues. The latrines and lavatories are fitted with the same appliances as those introduced in the Gateshead schools, except the cisterns, which, in this case, are cast-iron. The cloak-rooms, of considerable length, have skeleton divisions, forming a series of compartments for hanging clothing. The walls are built in 24in. masonry, with range work face and dressings; inside they are lined with matchboarding about 5ft. in height, and above that plastered.

At Jarrow, a Board School to accommodate 1,000 children, has been constructed upon an entirely novel plan, designed by Mr. J. J. Lish, architect, of Newcastle; and a second school of equal size upon the same principle is now in progress under the same architect. The singularity of this, which may be called the "Jarrow" plan, consists in dividing a wide room for about nine-tenths of its length, longitudinally, by a party-wall, wherein the fire-places are constructed—both rooms being covered, externally, with a roof in one span, and internally, with boarded ceilings to rafters, giving the appearance of a double roof with an intermediate gutter, and skylights on each of the gutter sides. On plan, in the central space at the end of the rooms, where the middle party-wall stops short, the teacher's desk is placed. It is not at all clear that any facilities for teaching are gained by this arrangement, which only enables the teacher to take a side-long view of the scholars on each side of the party-wall in front of him; while minute supervision is out of the question, and general supervision of the department not gained, because the class-rooms here are placed at the other end of the long rooms away from the teacher. Of course the expediency of this plan turns upon the question whether the head-master and mistress are merely to direct others, or to be engaged themselves in the work of teaching. In either case, their duties would be more conveniently performed in a room with a group of class-rooms, upon the Newcastle plan. But there are other requirements, wherein this "Jarrow" plan has special merits. It contains a new feature in lighting, and promotes ventilation. The outer roof is constructed with two slopes—a lower one starting from the eaves-line, and an upper extending to the ridge, which is stilted about midway up the principal rafters upon a perpendicular framing constructed with louvre-boards and dormer-windows alternately. Over the double roofs seen on the inside there is a current of air constantly passing between these louvre-board ventilators, and light is also admitted. The light from the dormers is indirectly admitted into the rooms by the skylights, before referred to, on that side of the ceiling facing the desks; and the circulation of air between the rooms and the roof-chamber is maintained through three longitudinal panels in the roof, one in the centre and one on each side at the plate line, pierced with varied patterns of running ornament. The equalisation of light is considerably aided by this plan. The circulation of air is further obtained by casements hinged upon the transoms of the windows, and worked with cords over an ingenious appliance, which does not altogether

overcome the usual unsatisfactoriness of cords applied to casements hinged as these are. The fireplaces are open; in each of the long rooms there are two, back to back, in the party-wall, to others, with an intermediate hot-air chamber constructed upon Lewis's principle of admitting the heated air through the mantel to the rooms. The walls are lined to the height of about five feet with white glazed bricks. The varnished timbers and pierced panelling of the roofs, combined with the cleanness of the glazed bricks, produce, so far, most agreeable rooms, but their completeness and cheerfulness has been destroyed to a great extent by the coarse, ordinary brick-work between the glazed work and the roofs, which has been merely pointed and coloured grey, forming a rustic-looking background for maps, out of harmony with the finish of the other work and furniture. The moral of this is, that school-walls should be rough-stuccoed or plastered.

Another novelty in these schools consists in the introduction of bath-rooms and a disinfecting stove, required in consequence of the squalor and poverty that belongs as inseparably as intellectual energy to the population on the banks of the mighty Tyne. These deplorable necessities of baths are arranged in connection with a detached keepers'-house placed at the back of the schools, where there is an entrance from a main road. Hot water for the baths is obtained from a boiler in the grate of the keeper's living-room. There are spacious playgrounds, with outbuildings and latrines. Glazed earthenware troughs are used in the latter, with a self-acting flushing apparatus. There are three departments in the schools—accommodating 400 boys, 300 girls, and 300 infants, upon the ground-floor. Each department has a separate entrance from a different street. There is an entrance, before referred to, for exceptional children, and there is a principal entrance in the centre of the main frontage for the members of the Board and visitors. The total cost of the schools has been about £5 per head, giving the average space for each child in an unpretentious brick building.

At South Shields, Board Schools have been designed by the architect to the Board, Mr. Oliver, of Newcastle, and the first, for 1,000 children, has been commenced in Ocean-road.

HISTORIC ART STUDIES.

By DR. G. G. ZERFF.

GREEK PLASTIC ART AT ITS HEIGHT.

(With Illustrations.)

IT was Aristotle who propounded the principle "that man ought not to be contented with the mere practical purpose of art, but that he ought to look also towards its ornamentation (*κοσμος*)."

"That the practical ought to be raised with full consciousness to the ethical (or beautiful)."

"That there ought to be as little caprice in the building of a temple as there was in the formation of the universe." (See Aristotle—"Physics," II. 9). The large square blocks used in a building are placed lowermost, because they are heaviest, whilst the woodwork is used uppermost, because it is lightest. Aristotle pointed out that artists in their works followed nature, which was in no way merely dead and inert matter, but was endowed with the principles of form. The difference between art and nature was not clearly defined by him. Nature develops organically from an inner germ. The products of art are inorganic. Particle after particle is either taken away, as in sculpture, or added, as in painting; the organic element of the work existing only in the artist's idea, which becomes reality when brought into form. The further difference between the products of nature and art is, that in the products of the former, the idea becomes reality during the process of evolution itself; whilst

in the latter, before any form is developed, the idea of it exists in perfect completeness. Now, the artist has only four sources from which to draw ideas—Nature, Religion, Poetry, and History. The Greeks neglected none of these sources. The divine revelation of the *moral* law went forth from eternity, and the different religions of all times and ages have tried more or less successfully to embody it into a system. The divine revelation of *truth* was also given from eternity. Science has tried to attain it; erring continually, but halloved in its erring by its love of truth. The divine revelation of *beauty* has also existed from eternity, and all nations have tried to bring it into shape and form. The Oriental spirit succeeded in finding a form for morals on Mount Sinai. The Greek spirit, with the daring of a Prometheus, found divine beauty in the human frame. The North-European spirit at last succeeded in tracing, through criticism, the outlines of science. It was the Greek spirit that, under the guidance of Phidias, the pupil of Hegias and Ageladas, became incarnate in marble. This spirit we have to trace in the faint outlines of our illustrations. But what lines! Every curve is a fervent prayer to God, humbly acknowledging that so much harmony and beauty had been concentrated by the Eternal Creator on the human frame as to give us a possible idea of what the gods must be, if they had form and shape. Firstly, we have on two coins (Figs. 1 and 2) sketches of the two most glorious works of Phidias—the Zeus of Olympia and the Pallas Promachos, on the Akropolis of Athens. Both are known to us only by descriptions, and a few reproductions. The statue of Zeus was a chrys-elephantine work. The mineral, vegetable, and animal kingdoms were used in harmonious combinations, full of symmetry and proportion, to proclaim the glory of God. This Zeus was a Vedantic hymn of worship—a dithyrambic psalm of praise, in marble. The statue of Athené was of bronze, 50ft. high. It represented the goddess raising her shield with her left arm, and holding her spear in her right hand, ready to defend the seat of Greek art and glory. The protecting spirit of Athens, the blue-eyed daughter of Zeus, towered high above the Akropolis, a symbol of strength and wisdom. This Athené must not be confounded with the statue in the Parthenon, 40ft. high, in gold and ivory, holding, like Zeus, a Niké (6ft. high), in her hand. In Fig. 3 we have part of the frieze of the temple of Theseus. Scattered over the great battlefields of the past, lie the works of art of Greece. Here a hand, there a torso, a head, or a torn and broken limb. Our museums look like anatomical halls, in which we may study the forms of Greek art, in their minute details of excellence. But do we resort to these museums? Let us refer to our own, in London. We may proudly say that we possess the richest collection of the very best specimens of the most glorious period of Greek art. Do we see any traces of these collections in the products of our sculptors? On the contrary. They will not learn how to group them, despise the refined treatment of the flesh and excel in carving rope-like veins on hands and feet. They will not study the delicate "stone-weaving" of drapery, in which the Greeks are unsurpassed; but prefer a coarse naturalism to any higher attempt at idealisation, and scarcely ever attain more in sculpture than did the mediæval stone-cutters. It is true we are not plastic by nature, but could we not make up for this deficiency by studying, and endeavouring to enter into, the spirit of the past? Let us consider this frieze of the temple of Theseus. What life in these groups, executed in Parian marble! What variety and contrasts! Around the three calm divinities, as the representatives of the static element, are grouped, to the right and left, fighting, conquering, and conquered warriors, in eurythmical arrangement. We see in these figures the influence of the Gymnasium, but this is

only of secondary importance. It is the idealisation in the composition of a passionate combat without any sensational harshness that deserves our appreciation. It is not the accuracy of the anatomically-correct treatment of the limbs, muscles, and veins that we have to admire, but the complete victory over the severe monotony and stiffness found in the earlier works of Greek sculpture. An admirable contrast may be studied in Figs. 4 and 5 (Metopes, from the Parthenon). Of the 39 Metopes in existence, we possess 17 in our Museum. In Fig. 4 we have a Kentaure crouching, in wild passion and despair, under the powerful grip of one of the conquering Lapiæ. In Fig. 5 we have a touching love-scene—Hermes sees the heroine Herse, the charming daughter of Kekrops, and falls instantaneously in love with her, his passion thrilling with might through his human frame. But these excellent sculptures are far surpassed by Figs. 6 and 7, from the eastern pediment of the Parthenon. The breath of Phidias gives flesh and blood to the Pentelic marbles. In Fig. 6 are two sitting divinities, and in Fig. 7 the two daughters of Kekrops, Aglaurus and Herse, the wife of Hermes and the mother of Kephalus. The bodies live. The drapery disguises and yet reveals the gigantic, though soft and tender, female forms. This is perfection at its height. This is the petrification of the spirit of beauty. It is the complete victory of idealism over rough materialism; the transformation of the highest artistic thought into a divine, and therefore immortal, form. The static and dynamic elements of repose and life are thoroughly balanced in these figures. The freedom of composition is limited by the strict laws of proportion. We unfortunately possess only the trunks of the bodies; the heads, full of calm and supernatural intellect, are wanting. The same spirit of an elevated sentiment of religious beauty pervades the Panathenaic procession (see Figs. 8, 9, and 10) with which the cella of the temple of Athené was adorned. We become acquainted through these forms with the whole joyous life of Greece, when to be good was to be beautiful, and to be beautiful to be an object of worship. We see deputations from all parts of Greece are hastening to the festivities of Athené. Old men and young girls, young men and matrons, horsemen and pedestrians, victors in chariots attended by drivers, chief magistrates, priests, sacrificial animals, females carrying vases, maidens carrying gifts (Fig. 10). Some are hurrying, some already marching in solemn procession; some are mounted on their fiery steeds (Fig. 9), others are about to mount. In the centre piece (Fig. 8) we see Poseidon with Erechtheios (one of the Autochthons, the husband of Praxithea), Peitho (the genius of persuasion), Aphrodite (the goddess of love), and at her side the innocent-looking Eros, the ruler of the universe, the greatest mischief-maker amongst gods and men. Aphrodite looks stern and dignified; she is still the draped modest incarnation of womanhood, and not yet the model of mere sensual love into which she sank under the chisel of the effeminate Praxiteles. That polychromy was used in Greek reliefs, to heighten the effect of sculpture—especially of a sculpture which had much of the pictorial element—cannot be doubted, as traces of colour may be seen on the hair and the dresses. That the bridles and the staves of heralds and magistrates, were of metal is beyond all doubt. The technical treatment is not less worthy of attention than the variegated composition. Pentelic marble is the most difficult material to handle. It generally breaks in parallel layers, and requires, therefore, the greatest gentleness in the use of the chisel. The reliefs nowhere project more than about 3in., and are so well executed that they look at a certain distance like the finest monochromes, now that they have lost their colouring. When this frieze was still tinted, it must have formed the transition link between

plastic and pictorial art. The goddesses began to lose their drapery. The Greeks degraded philosophy to a trade—tragedy into farcical attacks on living statesmen, and vulgarity and sensationalism began to be rampant. The inner dissolution of the State pervades all the compositions of the sculptors. We are, again, the fortunate possessors of specimens of this period from the frieze of the Temple of Apollo, at Bassæ, near Phigalia, in Arkadia. The temple was built after the Parthenon, by Iktinos. War and bloodshed—combats with Kentaurs and Amazons—are the subjects Fig. 11 gives us an idea of the wild, fanatic spirit of hatred against Sparta which filled the breasts of the Athenians. The rough, warlike Amazons, the half-brute, half-human forms, are allusions to the different stages in the historical development of Greek national life. When men played the parts of women, and women had to do the hard work of men, they had their Amazons. When men lived, more like wild animals, in a state of savage barbarism, they had their Kentaurs. The animosity of the refined Athenians against the uncouth Spartans communicated itself to their artists, and the friezes of the temples were changed into marble battlefields. Exaggeration and sensationalism are the distinguishing features of these compositions; as also of those in Fig. 12—a frieze from the Temple of Niké, at Athens. The calm and peaceful spirit of the Periklean period has fled. The processions of worshipping crowds are replaced by scenes of sanguinary combats, in which even women, with their tender forms, take part, so as to stimulate the youthful generation of the Greeks to deeds of horror against their own countrymen. The Peloponnesian war sends its fratricidal curses through the air, and poisons the thoughts and forms of the artists, who cannot free themselves from the spirit that pervades a certain period of art.

In the remaining illustrations, Figs. 13–16, we have some relics of the better period. The Karyatides (Fig. 13) from the Erechtheion, though charming in execution and detail, are certainly not objects to be imitated in good art. Whether we credit the legend, that they took their origin in a revengeful feeling against the women of Karia, who, after their husbands had been killed, allowed themselves to be led into captivity; or that they were mere Kanephoræ, and used by mistake as pillars, the idea of making women bear the heavy ceiling of a temple is contrary to the laws of statics and dynamics, and of beauty. The forms are charming and powerful. In these female figures, dressed in the festive robes used by the Kanephoræ in the Panathenaic procession, an active dignity of enthusiasm and passive humility of religious submission are united in rhythmical perfection. Fig. 14, a statue adorning a Greek tomb, represents the Genius of Death leaning on a withered tree, and holding a dead bird in his right hand. The youth gazes at his once merrily-singing, but now for ever silent, companion, with a tearful smile. The Greek carried his joys even beyond the grave; in his world of shades, there was no weeping, wailing, and gnashing of teeth. The past ceased with the soothing drops of the deep waters of Lethe. Fig. 15, an Amazon from the Vatican, is assumed to be an original by Phidias, which he exhibited in a competition with Polykleitos, Kresilas, Phradmon, and Kydon; in which, however, Polykleitos was victorious. Fig. 16, from the Capitoline Museum, is said to be the Wounded Amazon by Kresilas in the above-mentioned competition. We need hardly praise the high and chaste style of these figures. Polykleitos did not despise the theoretical part of art. He is said to have been the first practical sculptor who wrote a canon on the harmonious proportions of the human body. He is also said to have been the first to introduce greater elasticity of movement in his figures, by making the whole weight of the body rest on one foot, and raising the other in an easy way, though other statues were sculptured by artists of the

Attic school with this peculiarity. We cannot too earnestly impress upon our readers the fact that Greek art must be studied in close union with Greek poetry, philosophy, and the social as well as political conditions of Greek life. We find in Greek literature all the theoretical principles of beauty, which were only put into practice when the minds of Greek artists had been filled with them. That mere naturalness (however precise and correct) was not their aim, we can see from the pointed epigrams written against the painted horses of Apelles, which were neighed at by living horses; the grapes of Zeuxis, which were pecked by birds; and the cow of Myron, which the sculptor himself wished to drive home, mistaking it for his own live cow.

VISITS OF THE ARCHITECTURAL ASSOCIATION TO WORKS IN PROGRESS.

BOARD SCHOOLS AT BOW AND BROMLEY.

ON Saturday afternoon, the 3rd inst., several members of this Association visited some new schools now being erected for the London School Board at the East end. The first block of schools visited was that in course of erection at S. Paul's-road, Bow Common, from plans by Mr. R. Phené Spiers, Mr. Nightingale being the builder. The plans for these schools were submitted in a limited competition, but are not being carried out in their integrity, several modifications, especially in the architectural treatment, having been made for the sake of economy. Accommodation is to be provided for 1,040 children, at a cost of about £8,000. On the ground floor will be two schoolrooms, for 200 infants each, a separate entrance being provided for each schoolroom, and not with the two entrances in the centre, as originally designed. On the first floor will be two junior schools for 160 children each, boys on one side and girls on the other, with their respective entrances at opposite sides of the building. On the second floor are the two senior schools for boys and girls, each for 160 scholars, and placed at different ends of the building, with separate staircases. The boys, girls, and infants have their own separate playgrounds, there being a covered shed in the infants' schoolrooms. At the end of each of the infants' schoolrooms, is a gallery for 100 infants, and there are two class-rooms to each room, one of which, that for the babies, is placed on the side on which the light comes in the wrong way (*i.e.*, not from the left hand), for obviously it does not matter which way the room is lighted provided there is an ample supply of light. The class-rooms are to be fitted with sliding partitions, so as to allow of two of them being made into one room when occasion requires. The question of sliding partitions is a difficult one, and the London School Board has not yet decided the exact form of sliding partition they will adopt. Mr. Spiers proposes to use a stout double framing of wood, with an intermediate layer of felt, the partitions to be suspended from the top by means of small wheels running on an iron bar or rail, this mode of suspension being preferable to having the wheels at the bottom of the framing and running in grooves, as in the latter arrangement a small stone, or whatnot, getting in the groove would cause some difficulty. The arrangements are similar in all the school-rooms and class-rooms, whether for boys, girls, or infants, and a left-hand light is obtained wherever it is possible. A drawing-classroom is provided, lighted from the north, and easily accessible from all the schoolrooms. The walls of all the rooms and staircases will be plain colour-washed, with the lower portion painted some dark colour. The buildings have gabled roofs, with a turret in the centre, and the elevation is in yellow stock bricks, with red and black brick bands and window-heads, and stone dressings. Lavatories and cloakrooms are provided in connection with all the schools, with passages to playgrounds, lifts for coals, masters' and mistresses' rooms; and a small residence for the caretaker is provided at one end of the block. The warming is to be effected by means of Boyd's stoves, and besides the ordinary means of through ventilation, special contrivances will be adopted for securing a wholesome atmosphere in the schoolrooms. Macfarlane's latrines will be used for all the closets. The thanks of the visitors having been given to Mr. Spiers for conducting them over the building, and especially for the manner in which he had caused the plans to be fastened upon the wall of

one of the schoolrooms—a method which it would be desirable to see generally adopted on these occasions, as everybody can then see the plans—the new Board Schools in Mary-street, Bromley, were visited. These schools are being erected from plans by Mr. Lacy W. Ridge, Mr. Nightingale again being the builder. Accommodation is provided for 880 children, at a cost of about £6,400. It was originally intended that the school should provide for 800 scholars, proportioned as follows: 240 boys, 240 girls, and 320 infants, but as it was found that the infants required a larger proportion of the accommodation, an additional schoolroom for infants has been built out at one end, at a cost of about £900, and by this means accommodation will be afforded for 400 infants, as well as for 240 boys and 240 girls. Each of the schools has two class-rooms, one class-room in each of the infants' schools being appropriated to the babies. The building is somewhat in the form of the letter H; the class-rooms being at the ends of the building, and the schools in the middle. There are no entrances direct from the street, it being a requirement of the Board in this case that each school should be entered from its own playground. The building, as in the case of Mr. Spiers's schools at Bow Common, is two stories high. Each of the schools is warmed by means of fire-lump stoves, and for ventilation, Mr. Ridge relies upon double-hung sashes, with the upper parts made to fall back. A drawing-classroom is provided, lighted from the north. Great difficulty was experienced with regard to the foundations, which had to be carried down from 8ft. to 10ft., and in some cases 12ft., on account of the site being on what is known as "made ground;" but whatever depth has had to be attained, the brickwork is not carried down any lower than is ordinarily the case, the space between the bottoms of trenches and the footings being everywhere filled up solid with Portland cement concrete. Owing to the very bad nature of the ground, the whole of the space inclosed by the walls has been covered with 2ft. of concrete, and, in order to prevent damp or bad smells from rising into the schoolrooms, the Board has ordered the whole of the area so concreted to be covered with asphalt. Over this, with a space of about 18in. intervening, will come the ordinary wooden floor. The usual lavatories and cloak-rooms are provided, and, as in the schools at Bow first visited, Macfarlane's latrines will be used. The walls will be colour-washed, and painted a dark colour for about 5ft. in height, but will not be plastered. Some attention was attracted by the manner in which the internal walls have been pointed, the method being known as "dinging," and consisting in washing the walls with water by means of an ordinary whitewash brush while the mortar joints are still wet, and then striking the joints with a "rowel" or pointer. The buildings are constructed in yellow brick, with red brick window arches and stone dressings, and there is a lofty bell turret in the centre.

S. LUKE'S CHURCH, WEST BROMPTON, &c.

On Saturday afternoon last the members visited the new church of S. Luke, Redcliffe-square, Brompton, and were conducted over the works by the architects, Messrs. George and Henry Godwin. The church consists of nave, north and south aisles, and chancel, with a tower at the north-east end of the building, surmounted by a spire rising to a total height of 140ft. Mr. George Godwin stated the works were started with a difficulty with respect to the ground, the whole of which had been taken out to a great depth some years before for brickmaking, so that loose soil, to the extent in some places of 24ft. in depth, had to be removed. There were 24ft. taken out under the tower and chancel, but slightly less under the rest of the building, the depth diminishing somewhat as the west end was reached. The whole of the foundations had to be put in with great care, and the piers supporting the nave columns were connected together by brick arches. The church, in fact, stands upon a number of legs, and these legs have good shoes to them. There were more than £1,700 spent *under the ground*, but luckily the architects knew the nature of the site before starting. The total length of the nave, which is in six bays, is 102ft. 8in., and its span is 33ft., it being 53ft. high to the inside of the ridge, and 31ft. to the top of the plate. The width of the nave from centre to centre of the columns is 35ft. 4in., and the width of the aisles is 28ft. 6in. The chancel is 40ft. in length, 26ft. in width, and 40ft. 6in.

high to the inside of the ridge, the height to the plate being 20ft. 6in. The chancel arch, 22ft. in span, springs at 16ft. 9in. from the ground, and has a rise of 16ft. On the north-east side, and in the lower portion of the tower, is provided an organ-chamber, 16ft. by 16ft. The tower rises to a height of 86ft., and the spire is 54ft. in height, making a total of 140ft. There is a vestry 23ft. by 15ft., and a choir vestry under it. Mr. Godwin here remarked that the question of vestries nowadays required more attention than formerly, and it was no longer sufficient to give one vestry. The columns of the nave arcade are of Hollington stone, the shafts being 1ft. 11in. in diameter, and 6ft. 2in. in height, the total height of each column, with capital and base complete, being 9ft. 6in. On each of these columns there is about 45 tons' weight, and inasmuch as when the stone came upon the ground it looked like a softly agglomerated quantity of sand, experiments were made to test its strength, and an entire shaft, consisting of three pieces, was subjected to pressure; 100 tons were put upon this shaft without causing it to yield in the slightest degree, and as this was more than double the weight which it would have to bear, no further weight was put upon it, the test being considered sufficient. In this experiment thin slips of deal were put between the joints of the shaft in lieu of the lead which is used *in situ*. From calculations subsequently made, each of these shafts was reckoned as capable of sustaining a weight of 580 tons before crushing would ensue. Sitting accommodation is to be provided for 1,200 persons, and provision has been made for the addition at some future period of a small west gallery, giving sittings for about 100 or 120 persons. The total cost of the foundations was £1,732, and the contract for the rest of the work, including the tower and spire, amounted to £13,409, making the total cost of the building £15,141. At the east end the foundations consist of about 14ft. of concrete, carrying about 10ft. of brickwork; and the foundations are the same throughout, the depth slightly diminishing at the east end. At first blue-lime was tried for the concrete, but the result was not satisfactory, although the builders (Messrs. Hill and Sons) took every pains to endeavour to get good lime. The way in which the blue-lime concrete set not being at all satisfactory, recourse was had to good stone lime, which gave much better results, 3ft. of Portland cement concrete being put in at the bottom. The concrete was filled-in in layers, and allowed to lie undisturbed as long as possible. The spire will be solid for some 6ft. or 8ft. down, and at 30ft. down there will be a York landing across. The thickness of the walls at the bottom of the tower is 3ft. 9in. The main walls of the church are about 2ft. 3in. in thickness. The heating of the church will be effected by hot water, there being 1,500ft. of piping laid for the purpose. Ventilation is secured by hoppers in the clerestory windows, and by means of the small windows above the large west window and the chancel arch.

The visitors then proceeded to inspect some mansions now in course of construction on the opposite side of Redcliffe-square by Messrs. Corbett and McClymont, from the designs of Mr. George Godwin, and then went over one of the finished mansions, which, while apparently well and substantially built, are somewhat meretricious in design, although by no means bad specimens of what wealthy people are content to pay from £200 to £300 a year for.

The visitors next visited the works of Messrs. Corbett and McClymont, who have a large number of woodworking machines of all kinds, but inasmuch as it was Saturday afternoon, the men were not at work, and the machinery was still; consequently this portion of the programme was less interesting than could have been wished, although Messrs. Corbett and McClymont's foreman exhibited specimens of the work which each machine performed.

Finally, the visitors proceeded to some houses in the rear of Messrs. Corbett and McClymont's works, for the purpose of inspecting the fireproof tile and cement roofs somewhat extensively used by Messrs. Corbett and McClymont at West Brompton. Arched wooden ribs are placed from party wall to party wall, resting on stone corbels; boarding is laid on the ribs, and then two, or in some cases three courses of plain tiles are laid in cement, the surface of the tiling and the face of the party walls being afterwards rendered with Portland cement and sand. A stout plaster ceiling shuts all in below. Good workmanship is necessary, and care should be taken to prevent settlements in the walls. We are informed that

these roofs are well worthy of being styled "fire-proof," as some time ago one of the houses so roofed was destroyed by fire—all but the roof, which prevented the fire spreading to the neighbouring buildings. But for this kind of roof, it is believed by competent authorities that the fire in question would have destroyed the adjoining houses.

ARCHITECTURAL COMPETITIONS: ARE THEY CAPABLE OF BEING MADE BENEFICIAL TO ART, TO THE PUBLIC, OR TO THE PROFESSION?

(Concluded from p. 548.)

I HAVE now to consider the position of young architects under the system of competition. It is often said to give them a chance of obtaining practice sooner than they would when exposed to the competition of older men. Where is the man who can honestly say that he has done better by the application of his talents in that direction than if he had employed them in the more regular way—by acting as an assistant in the office and upon works till, being thoroughly competent as a designer and a man of business, he succeeded in showing this to his professional and private friends so far as to obtain an introduction into practice? We must clearly understand that the man who enters any profession without capital and without friends has up-hill work before him at the best, and we ought to be shown how far competition improves his position. For every one of these *rara aves* can we not find dozens who have been led away by false hopes in one competition after another where the first prize went to interest, the second to merit? Perhaps they have actually got the first prize, but not the actual superintendence of the work, which, bear in mind, they will not secure under the new rules, though these will somewhat improve their position. We know men who have entirely neglected the ordinary means of obtaining practical experience, and trusted to carry off the prizes in the larger competitions. But you may depend upon it that promoters in general will find one excuse or another for putting the work into the hands of persons who, from one cause or another, they trust, and that the class of persons so trusted will never yield their claim to clever competition men without a hard struggle. I am told that competition is good because it helps to fill up spare time. Now what is spare time? I never met with much of it; indeed, if we may judge by the very serious complaints of want of employment in all other professions, there is much less of this evil with us than we might expect. In fact, the training of an architect fits him for a very wide range of employments, and a competent man need seldom be at a loss to find something on which he may profitably be employed. The great and incurable evil of competition as it affects young men is that it keeps pupils and assistants, all of whom are free to become practising architects, in a "fool's paradise," where they are surrounded by and help to produce magnificent conceptions of buildings, not 1 in 10 of which will ever be seen in the world. Large numbers of them are turned out without any actual teaching or training, and without any experience of works or of business. Master and pupil alike are devoting their best efforts to draughtsmanship, to the neglect even of the small portion of practical work which comes before them. I am told that many years ago, when the number of persons styling themselves "architects" was small, and consisted of men of high education and connections, who had travelled much, and become much imbued with the Classical tastes of the day, there was also a small and well-known class of draughtsmen, who were men of good experience in works, perhaps even acquired originally "at the bench." These men were employed to put in the construction behind the ornamental *façades*, and generally to attend to everything which the architects could leave to them consistently with the visible features of the design. Since that time, however, the system of competition has tended to increase the skill of the draughtsman, both in drawing and in design, and to decrease his knowledge of work and business. Therefore the "practical man," whether originally a workman or a good man of business, or merely a shrewd man of the world with some capital, usually is employed and paid by the public, and he employs and pays, and in a sense enslaves, the draughtsman. I have no doubt that if I were

called upon to erect or to compete for some great building, of the nature and purpose of which I had never before heard, some unhappy young man might be found prepared to undertake the whole of the design and preparation of the drawings, to do them really well, and on fair terms, and perhaps—when the thing proved a success—to claim the design (which I thought I had purchased and paid for) as his own. We can never wholly escape such accidents as this, but competition fosters the conditions out of which they grow. The remedy lies in the study by the draughtsman of modes of work and of business, so that he may unite in his own person the characteristics of the "practical man," and he will never be able to do that under any system of architectural competition. Having now dealt with each branch of the subject, I will make a few observations on the general subject of "competition," from which let no man think he can escape. There is the speculative kind, in which, as in a race, each competitor, after exerting himself to the utmost, and doing the whole of the task set him to do, finds the whole of his work wasted unless he happens to be first in at the goal. Every such race involves heavy disappointment, induces jealousy, scheming, and underhand dealing, and tends sometimes to rank roguery—often to dishonour. Our system of competition belongs to that class. But the competition of actual business, with all its inequalities, is better and fairer than this. It does not test merely the sharpness or the strength of a man, but it brings out the whole power that is in him, of whatever kind. Moreover, every one gets somewhere about what he has earned. Every bit of him that is good counts for something; no part of his work well done is quite wasted, so that the weak need not feel a bitter jealousy of the strong. I have never had any hesitation as to which of these kinds of competition would be of most advantage to us, and I hope that, following the example of other professions, we shall in the future try to do without architectural competitions. (Applause.)

Mr. LACY W. RIDGE, A.R.I.B.A., after pointing out the disadvantage at which he was placed in having to reply to a written paper instead of to *viva voce* remarks, said he should not attempt to deny altogether or to overthrow the conclusions at which Mr. Blashill had arrived, but he wished to put before the meeting a few considerations in support of an opposite view. He was glad Mr. Blashill had taken a very decided view, and said that competitions under all circumstances were so bad that it was not worth while reforming them—that they must simply be abolished. No one in that room would wish to maintain that competitions were not very sorely in need of reform, but he (Mr. Ridge) did not think they were so bad that architects were bound to say that they would not have anything to do with them under any circumstances whatever. With regard to what the opener had said as to people under ordinary circumstances engaging the services of the nearest medical man or lawyer when they or their friends wanted medical or legal advice, he maintained that this was the ordinary method of procedure of persons about to employ an architect, and it was but reasonable that for ordinary works the client should look to ordinary architects. But it should be remembered that much of the architectural work of the present day, and especially the work to which the principle of competition was generally applied, was of a very special character, many of the buildings being of a monumental kind, and likely to remain upon the surface of the earth far longer than the works of ordinary professional practice. If a lawyer drew up a bad will for a client, the people who administered under the will would be the people most inconvenienced; but if a man put up a bad building the owner would be cursed with it until he sold it. Although, however, there was a special character about the buildings which generally formed the subjects of competitions, one occasionally received letters saying that somebody had taken some premises in the neighbourhood of (say) Bond-street, and wanted a number of architects to compete for superintending the alterations. Of course such letters only went into the waste-paper basket. For important and special buildings the greatest care ought to be taken in selecting a design, and a parallel to selecting a design for an important building was to be found in at least two other professions. When a patient had any very extraordinary disease, or was very ill,

the most eminent physician that could be found was sent for. When a man was concerned in a very important lawsuit, "the Claimant," for instance, he did not go to the nearest barrister, but to the most eminent one; and the competition in that profession, by the bye, was very great. That established the principle that where work of importance had to be carried out some especial means might very legitimately and fairly be taken to secure the best and the proper man for the work. This was eminently true with regard to architectural competitions. If a board or a Government had work to carry out, the fact became known first of all to the son-in-law of the chairman of the board, or say to the nephew of the Premier. Both these gentlemen might be architects, and owing to their relationship to those in authority, would have the field to themselves if the Government or the board had not the system of competition to fall back upon. Competition was a great aid to men holding important public positions, for while it relieved them from all suspicion of jobbery in putting great public works into the hands of relatives, it enabled them to find out the best man to carry out a great public building; at any rate, the object of the competition was to secure the best man. Indeed, in the case of public works, the principle of competition was indispensable. Mr. Blashill had dealt with the subject mainly from three points of view, the first of which was the art point of view. Was it to be inferred, because a large number of young men made handsome and elegant drawings and designs which, unfortunately, they would not be able to carry out, that therefore they did no good for themselves? Was it not very good practice for a young man when he had the time to devote to it—certainly without neglecting his real business—to make studies for a large public building, and work them out fairly in detail? It did not follow that because a man "went in" for a competition occasionally, that he neglected the practical part of his profession, nor did it follow that because a man once engaged in a competition he should always be engaged in competitions. He had heard of "competition offices," but he was sorry for the men in them. He believed that competitions were good for art, and that the competition system, properly regulated, was conducive to the interests of young architects. To Mr. Blashill's view he would oppose a remark made many years ago by Mr. T. Roger Smith in reference to unsuccessful competitions. He said:—"When the drawings come back again, hang up the perspectives and put the geometrical drawings away, and consider them as so much more concrete." With regard to the way in which competitions affected the public, Mr. Blashill had assumed that the buildings which were put up from designs selected in competition were not on the whole better than those which would probably be put up if the promoters had given the work to the nearest architect. Mr. Ridge contended that the buildings erected from competition designs, if not better than, were quite up to the average of the ordinary run of work. There could be very little doubt that in nine out of ten cases where there had been competition—especially where a professional referee had been called in to adjudicate on the design (and he only defended such competitions) the buildings erected were not altogether unsatisfactory. He did not wish to maintain that the result ordinarily of a competition was to produce a design above the average—competitors were so tied down by the conditions as to make their work very difficult—but he did not think it could possibly be maintained that the result of competition was to produce buildings below the average standard of excellence. The advantage to the public from the competition system was considerable, and he had no hesitation in saying that in the competition for a great work like the Law Courts the public derived immense advantage from the preliminary studies which were made for that work. The finished designs in that competition were of an extremely high order of merit, and the architects were to be congratulated on the manner in which they distinguished themselves. It was an immense advantage to the public to have a building carefully thought out by a large number of persons when the work was of sufficient importance to justify it, and in this case he thought the competition had been a particularly successful one. Professionally considered, the competition system had enabled many young architects to obtain important works which they would have been unable to obtain

through other channels—men who happened to be conversant with the particular kind of building to be designed, and who happened to be able to give their minds to the work, having the necessary time and the necessary practical experience. There were members of the Association who had obtained important works in competition, and this without having been nephews or sons-in-law of any of the promoters, and without favouritism or nepotism in any shape or form. He contended that the competition system, if properly conducted, was not otherwise than highly advantageous to the profession. He should therefore vote for the affirmative of the proposition.

Mr. T. H. WATSON, A.R.I.B.A., said he went very far indeed with Mr. Blashill, and although he would not say that he would do away with competitions altogether, he thought that about four-fifths of them might be done away with advantageously to all concerned. There was something unreasonable, if not immoral, in promoters wishing to get £1,000 worth of work out of architects for the £100 or so paid in premiums, and it was folly for the members of the profession to spend £1,000 in labouring to obtain a £100 premium, although of course there were cases in which the intrinsic value of the premium was not all that had to be considered, even from an economical point of view. In cases where large public works were concerned, he considered that a public competition was the proper mode of selecting the architect; for on every great public work there should be impressed the character of the age in which it was erected, and the man who should undertake the direction of a great public work should himself be animated by the spirit of his age. He thought that the result of the Law Courts' competition was peculiarly satisfactory in this respect, for the work had been entrusted to an architect whose mind was in accord with the general sentiment of the age in which we lived. Having referred to the differing tastes, or the sometimes total absence of taste, manifested by succeeding Chief Commissioners of Works, Mr. Watson pointed this out as an additional reason why competition should be resorted to for public works, which were almost always monumental in their character, and it was a fair aspiration for every young man in the profession to look forward to taking part in competitions for such buildings.

MR. BANISTER FLETCHER said he was astonished to hear the speakers say that the Law Courts competition was such a grand success. There were two reports made in the first instance—one by the Judges and one by the Commissioners for building the Law Courts—and both these reports decided in favour of different sets of designs, and the design which was eventually selected for execution was not the one now to be carried out. Touching this very successful competition, page after page of the *Times* was taken up in correspondence, in which language was used which was certainly unpleasant to read. That was the result of one of those grand competitions in which the foremost architects of the day competed, and in which the highest in the land were engaged to arbitrate. They were told that because Government could declare war, and all that sort of nonsense, that they were perfect judges of good taste in architecture, whereas we knew that the highest in the land did not understand either plan, perspective, nor elevation. He asked all who had ever been engaged in competitions, with regard to those corporations where chairmen's sons and members' relatives were employed as architects, was it not merely a blind to the public to get other people's brains, and was not the competition given eventually to the local man—to the relative? Very many instances did he know of it. Only recently, in Devonshire, three competitions had been given to the local men. Advertisements were inserted in the professional papers, and ridiculous premiums offered, and yet there were numerous competitors, each of whom thought he was going to win, especially the younger men who had not tried before. By this means the promoters got a host of good drawings, and at least half a dozen good practical ones. These drawings were kept by a month, during which time the local man, who happened to be the son or nephew of a member of the board, had the run of them, and by their aid was enabled to produce a design which could not otherwise have emanated from him, and to which was awarded the first prize! This was actually what took place continually, and would continue until architects had the sense to see that they did what no other profession in the world would do. Mr. Ridge had attempted to institute a parallel

between the medical and architectural professions, and had said that when necessary a first-class man was called in to see a patient. Had he advocated the calling in of a first-class architect whenever an important building was proposed, the analogy would be perfect; but it would be the height of absurdity to call in fifty medical men to practice upon a patient in order to see who did him the most good. Again, if the mayor of a small provincial town wanted his wife's portrait painted, why should he not advertise for fifty artists to paint the portrait, and then appoint a committee to choose which was the most like her, and to give ten, five, and one guinea to the first, second, and third respectively, in order of merit, and leave the other 47 competitors with their work on their hands? Ridiculous as this would be thought if applied to painters, why was it not seen to be so as concerns architects? The only check to some of the abuses of the competition system would be for every man competing to be paid something like one per cent. upon the estimated cost of the work, and for the higher prizes to be increased in a corresponding ratio. By this means anybody promoting a competition would have to pay $7\frac{1}{2}$ or even 9 per cent., but for this increased expenditure he would get an increased power of selection.

MR. PHENE SPIERS humorously observed that getting into practice by means of competition was very much like getting into an omnibus. The passengers in an omnibus were always very loth to make room for any one else; and if the majority of the members of the Institute were asked their opinion on competitions, they would say that competitions were very bad things, for they were in practice—inside the omnibus; while he had no doubt that the members of the Association would vote that competitions were advantageous to all concerned, but especially to the profession, for the majority of them were not in practice—they were not in the omnibus. With regard to Mr. Blashill's question as to what architects had succeeded in establishing themselves by competition, a perfect host of names could be given. Take Sir Charles Barry—did he not get his position by being first in the competition for the Houses of Parliament? Sir Gilbert Scott had most certainly gained his position by competition, and the same might be said of Mr. Street, Mr. E. W. Godwin, Mr. Waterhouse, Mr. Elmes (the architect of S. George's Hall, Liverpool, who, however, died young), Messrs. Deane and Woodward, Mr. Burges, and others. While, however, he agreed with Mr. Ridge as to the benefit which the younger members of the profession received from being engaged on competition drawings, he could not help thinking that it would be much better for them, instead of plunging at once into these competitions for practical works, to go in for some of the general competitions for honorary medals, as they would have freer scope for the display of their abilities, and would not be tied down by such numerous conditions as would be the case in competing for an actual work.

Two or three other gentlemen having spoken, Mr. Blashill, in the course of his reply, said it had been urged that by means of competition the younger men of the profession were often able to get important works to carry out. But he would ask, What business had a young man with a £20,000 job? In what other profession did the young men get the big jobs first? With Mr. Banister Fletcher, he had been utterly astonished to hear the case of the Law Courts alluded to as a successful competition, for he thought that was about as bad a case as could be cited.

The PRESIDENT then proceeded to take the vote of the members on the question, but the meeting had by this time become very thinly attended, as it had been protracted nearly an hour beyond the usual time. The votes were: Nay, 4; Yea, 19, many members, however, not voting at all.

THE VIENNA INTERNATIONAL EXHIBITION BUILDING.

THE area of the Vienna International Exhibition, according to one of the correspondents, is upwards of two-and-a-half million square yards, of which more than 111,000 are occupied by the Industrial Palace itself. The building is 2,940ft. in length, with an average breadth of 570ft. In the centre rises the vast rotunda, due to the genius of Mr. Scott Russell, 354ft. in diameter and 250ft. high, and encircled by thirty-two iron columns resting on foundations of cement.

Some idea of its immense area may be formed when it is mentioned that it is more than treble that of the dome of S. Paul's, the diameter of which is 111ft., and considerably more than double that of the dome of S. Peter's at Rome, the diameter of which is 156ft. The interior of the rotunda is lighted by a larger and smaller lantern, the former 60ft. high and 100ft. in diameter, and the latter 43ft. in height and with a diameter of 24ft., the whole being surmounted outside by an imperial Austrian crown in coloured and gilded metal and glass, weighing a couple of tons, and upwards of 17ft. in height. On each side of the rotunda extend two immense naves, each 1,030ft. in length, and intersected at regular intervals by eight transverse galleries, 240ft. and upwards in length, 50ft. wide, and 40ft. high. The spaces between these transverse galleries, which have an area of upwards of 8,000 square feet, have, in the majority of instances, been converted into inclosed courts by the different commissions to whom they had been allotted. Owing to the rigorous nature of the Austrian climate, the architects resolved not to light the Industrial Palace by the roof, but by large windows, which in the naves are placed 30ft. from the ground, and in the smaller galleries at about half that height. Of the many annexes by which this palace is surrounded two are of special importance. Firstly, there is the Fine Art Gallery, which looks on its eastern facade, and secondly, the machinery hall, situated in its rear, which is upwards of 2,600ft., or more than half-a-mile, in length, with a width of 150ft. To Mr. Scott Russell is due the merit of the conception and construction of the rotunda, the distinctive feature of the Vienna Exhibition building; but it is M. Charles Hasenauer, the architect-in-chief of the Imperial Commission, who has cased it in, given beauty to its interior, added the wings at the sides, and designed the façades of the edifice, with their pavilions and enriched portals. The building of specimen cottages and villas in the Exhibition park, to show the different national styles of domestic architecture, is an interesting part of the Exhibition.

QUARRIES OF SISTIANA.

THE stone used in the construction of the harbour of Trieste is obtained from the quarries of Sistiana, near that port. A million cubic metres of stone are required in five and a half years, and for such colossal blastings, powder-chambers are cut in the rock, which may be distant from its face one-half to two-thirds of the distance or depth from the upper surface, and which are large enough to contain one-third to one-half as many kilogrammes of powder as the quantity of rock to be blasted contains cubic metres; 800kilog. of powder are considered necessary for one cubic metre of bulk. But in order to form such a chamber, a shaft has to be driven near the point where it is to be formed; and thence, a shaft two metres long is sunk downwards, and the powder-chambers formed at its lowest point. In this manner forty-six large mines, with charges of from 2,000 to 30,000kilog., have been blasted in the quarries of Sistiana from the beginning of 1868. The average result was 2.02 cubic metres of useful material for every kilogramme of powder. It must, however, be noticed that the rock, a greyish white limestone, frequently and unexpectedly reveals great cavities which greatly lessen the effect, and that considerable quantities of powder are requisite for reducing large masses of rock, when the principal mine was not sufficiently charged. For reducing large blocks, holes were bored by caustic, holding as much as 300kilog. For such blastings, a hole is made in the usual way, with stone-borers three to six centim. wide, and four to ten metres long; oil of vitriol is then continuously introduced by means of hemp descending to the bottom of the hole, whereby the stone is dissolved. The hemp is in a small tube, which is enclosed in a larger one, through which the carbonic acid formed at the bottom of the hole flows back into the vessel whence the sulphuric acid descends. It is calculated that 100kilog. of hydrochloric acid of 1.2 specific gravity, and 40 per cent. of hydrochloric acid, in eighteen hours make a hole large enough for from ten to twelve kilogrammes of powder.

New offices for the Altrincham Gas Company have just been completed at Altrincham. The style is Italian. Mr. Pons is the architect.

OUR LITHOGRAPHIC ILLUSTRATIONS.

S. WILFRID'S CATHOLIC CHURCH, YORK.

This church, which is used as the Pro-Cathedral of the Diocese of Beverley, is situated immediately opposite the Minster, and presents a most striking appearance. The principal façade towards Blake-street shows the apsidal and arcaded end of the Chapter Room, then the great gable of the nave, with its wheel window, and below two simple but dignified windows and central niche, beneath which is the fine central doorway. Rising to a height of 147ft., to the east of the nave-gable is the tower, with its lofty base course, its buttresses and arcading, deeply recessed shafted belfry lancets, its sculptured cornice, open parapet, and lofty roof, beyond which is seen the sacristy, with its upper room. The great doorway to which we have just referred requires special attention. It measures 23ft. across by 6ft. in depth, and is composed of five orders of receding mouldings, alternately richly sculptured, and borne upon eight shafts of Cumberland sandstone, with carved bases and capitals. The head of the doorway is solid, and in the centre, rising from a polished granite shaft, which divides the doorway into two openings, and beneath a canopy, is a seated statue of our Lord, inviting the faithful to enter His house. On either side of this figure the two great mysteries of the Christian religion are represented by the Expulsion from Paradise, and the Annunciation. Typical figures of the Synagogue (as painted in the Chapter House of the Minster), and the Church, with the Gospels and Chalice, are introduced above, whilst in panels in the jambs are sculptured the parables of the Barren Fig-tree, of the Tree yielding Good Fruit, and of the Sower. Over the doorway is a full-length figure of S. Wilfrid, and beneath is the head of Melchisedec. Passing into the building, we notice its fine proportions, giving a total length of 110ft., with a breadth of 59ft., and a height of 62ft.; columns 16ft. high, with bases, bands, and carved caps, support the nave arcade, and from these capitals rise small partially-encased shafts, which, passing into the clerestory arcade, support the arched and trefoil roof. The church is lighted from the clerestory, which is formed of a continuous arcade, with red shafts and carved caps. The fittings of the church are most beautiful and complete, all the windows being filled with stained glass, and the benches are of carved oak; but the chancel is particularly striking, with its High Altar, the frontal of which represents the Entombment, and above which rises to a height of 26ft. the tabernacle and throne, enriched with marble columns, crystals, and carving; its reredos of carved stone and various marbles and embossed and coloured tiles, and its walls covered with beautiful frescoes. The two ranges of stalls, sedilia, &c., are beautifully carved in oak.

The style of the architecture is early French Gothic, and the church has been carried out complete, with all its entire fittings, at a cost of very little over £10,000, from the designs and under the superintendence of Mr. George Goldie, of Kensington-square, London.

DESIGNS FOR ENCAUSTIC TILES FOR MR. WILLIAM GODWIN, BY JOHN P. SEDDON.

The present illustration of Encaustic tiles in the collection of Mr. W. Godwin, of Lugwardine, near Hereford, is one of a series designed for that manufacturer, and for the firms of Messrs. Maw and Mr. R. Minton Taylor, by Mr. John P. Seddon, architect. The tiles can be executed in any colours to choice. Those particularly intended in this case, which we regret being unable to give, are somewhat varied; the nine-tile groups have the central portion with yellow ornament on red ground, heightened by white, and the outer portion has the ornament yellow on chocolate ground, these groups are surrounded with borders of plain red, and the large intersecting borders are yellow on red ground, with the flowers white, with green on either side; the fleur-de-lis at the points of crossing are white and yellow on a blue ground, the central tile of the intersection having a white flower upon a blue ground, and yellow circular ornament on red. Further variety is obtained by the contrast of some portions being glazed and others unglazed. The blue ground should be deep, rich, and subdued, and not cold, pale, and staring, which is unfortunately the general characteristic of the blue used by encaustic tile makers. Perhaps it were better to avoid this dangerous colour, and to substitute chocolate. The green is a colour obtainable at present only by superficial glaze, but this green is quiet

and rich. It cannot be used on the same tile with other colours, and therefore the parts in which it is introduced can only have dark green ornament on lighter green ground, or the reverse, by use of the same glaze throughout, over a tile with white and black sub-structure; possibly some other tints might be obtained by using yellow and blue in the under colours. The red and the yellow are safe colours to employ, particularly when the clay employed is unwashed, and the two tints are harmonised by a superficial glaze; the effect then resembles in richness and quietness of tone the old examples, in the execution of which, at the instigation and request of Mr. Seddon in the first instance, Mr. Godwin has been so successful. The usual mode adopted in the manufacture of encaustic tiles is to wash the clay carefully from all impurities, and to aim at brilliancy of colour. This practice is diametrically opposed to that of mediæval times, and the very impurities contained in the clay in its natural state give a mottled appearance to the finished work, which tends greatly to obviate that painfully even, smooth look which modern encaustic tiles are apt to have, so that sometimes they are hardly distinguishable from oil-cloth.

BROXTON HALL, CHESHIRE.

This residence occupies the site of the ancient Manor House, and is delightfully situated, commanding most extensive views of the valley down to the estuaries of the Mersey and Dee. Recently the house, of which a small portion behind the two centre gables is retained, was occupied as a farmhouse. A new farmstead having been built on the adjoining laad, the present structure has been erected by Sir Philip De M. Grey Egerton, Bart., M.P. The house, as will be seen, is timber-framed, all of oak from off the estate. The two centre gables formed part of the old house, but as they had been considerably modernised, it was found necessary to reconstruct them, which was done from remains of the old work. An endeavour has been made to retain the characteristics of the old timber-framed mansions so plentifully scattered throughout Cheshire. The whole of the work has been carried out by Mr. Richard Bockett, of Hartford, from the designs, and under the superintendence, of the architect, Mr. John Douglas, of Chester.

Besides the illustrations above referred to, we also give a sheet devoted to "Greek Plastic Art" (see Dr. Zerffi's article, p. 553); and some details from French Church Architecture, thirteenth century.

ANTIQUITIES IN THE BRITISH MUSEUM.

A COLLECTION of antiquities, said to be of far greater value than those which were recently found in Cyprus, has been in part deposited in the British Museum. The collection consists of twenty-one pieces of sculpture in marble or stone, 173 bronzes, 101 terra-cottas, 160 vases, 41 ivories, and 22 ancient ambers. Among the marbles is a head of Hera, found at Agrigentum, of colossal size and of Greek work, meriting a place beside the head of Æsculapius—that unsurpassed type of ideal beauty now in the Museum. The bronzes include a seated male figure from Tarentum, of matchless beauty, worthy of comparison with the Theseus of the Parthenon, which the attitude of the figure strikingly recalls. Another bronze, of exquisite beauty, is a strigil from Preneste. The terra-cottas include several new types of very graceful female figures, and four very remarkable actors of the ancient Roman stage. A further collection is on its road to this country. It includes a bronze head of Venus, of heroic size, in the noblest and purest style of Greek art—probably, in the opinion of a contemporary, the finest work, next to the marbles of the Parthenon, yet known. It was found in Thessaly, and dates from a period lasting, perhaps, from Phidias, but not later than Scopas. There is also an Etruscan terra-cotta sarcophagus from Cervetri, a pendant to the celebrated one in the Louvre, from the Campana collection, but having a long Etruscan inscription. Mr. C. T. Newton, the keeper of antiquities in the Museum, has reported to the Trustees and the Government in favour of the purchase of this valuable collection.

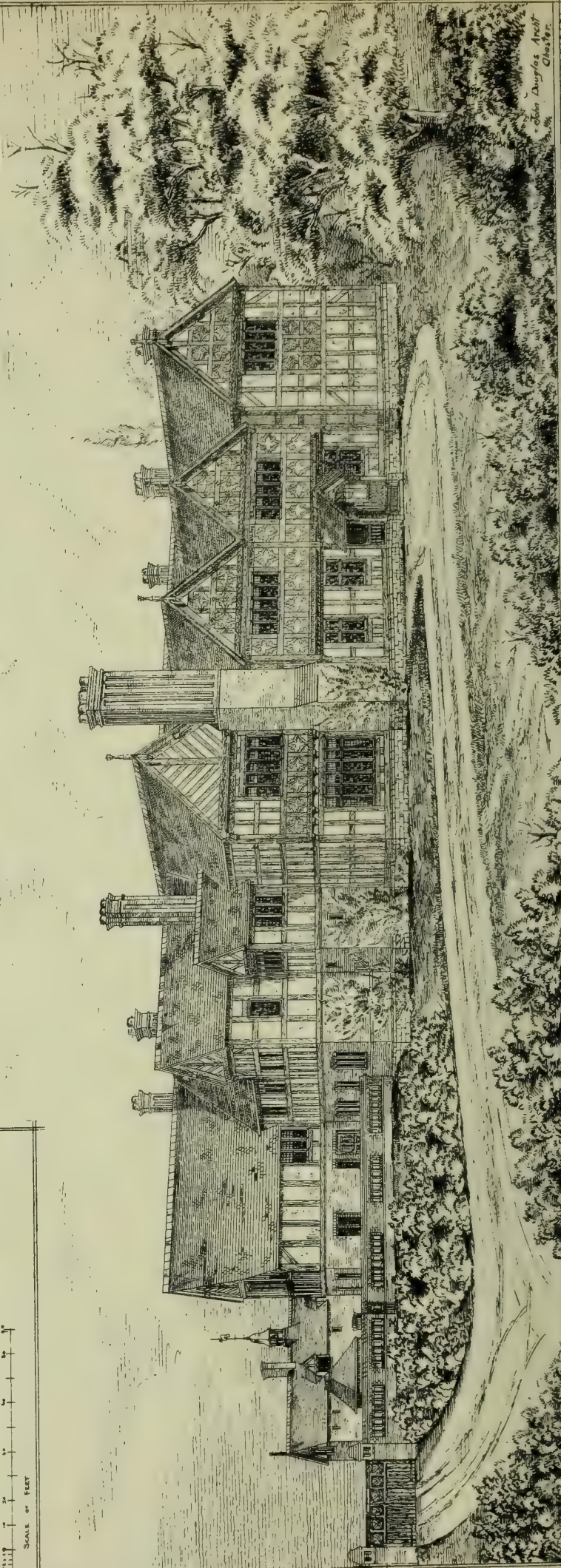
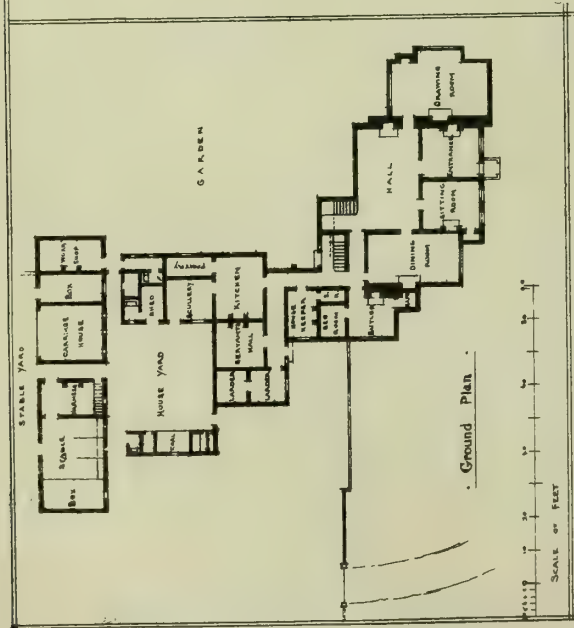
The portion completed of the new church of S. Faith, Stoke-Newington, which has been erected from designs by Mr. W. Burges, will be consecrated to-morrow.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

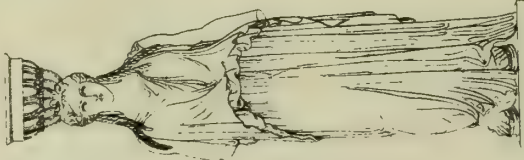
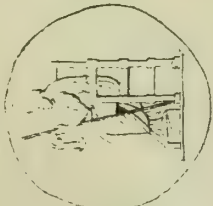
ARCHITECTURAL ASSOCIATION OF IRELAND.—At an ordinary general meeting of this Association, held on the 24th ult., the following letter was read from the Secretary of the Royal Institute of the Architects of Ireland:—"April 7, 1873. Dear Sir,—The Council of the Institute has authorised me to hand over to the Association the late valuable gift of books from Mr. Edmund Sharpe, and any other books we may possess, or from time to time acquire; the Association to be responsible for the care, to acknowledge receipt of same from time to time, and to permit members of the Institute to have access to them, if they should require it at any time. All books the property of the Institute to be returned to it, if at any time the Association should lapse or break up, or be changed into another form of society. The Institute will be at the expense of binding any unbound works before transferring them, and will do all in its power to assist you in forming a library. I would suggest that you thank Mr. Sharpe directly on behalf of the Association for his interest in its welfare and thoughtful stipulation in presenting his valuable works.—I am, dear Sir, yours faithfully, Thomas Drew, R.H.A., Sec., R.I.A.I.—To the Hon. Secs., Architectural Association of Ireland." It was stated that the Secretaries had, by the direction of the Committee, thanked Mr. Sharpe and Mr. Drew for the gift. Mr. W. M. Mitchell proposed, and Mr. D. J. Freeman seconded, a resolution—"That the thanks of the Association are due to Mr. Sharpe and the Council of the Institute, that the Association accept the gift and appoint a librarian, and that the Committee be empowered to draw up rules for the management of the library," which was carried unanimously. The following gentlemen were balloted for and duly elected members of the Association:—Harold Oldham, John C. Wilmot, Sandham Symes, F.R.I.A.I., William O'Neill, and F. Franklin, F.R.I.A.I. Mr. William M. Mitchell then read a paper on "The Present Position of Gothic Architecture."

LIVERPOOL ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The annual meeting of the session of this Society was held on Wednesday week, Mr. T. D. Barry, the president, in the chair. Prizes were awarded for designs for the construction of various classes of roofs.—Mr. T. D. Barry was re-elected president for the coming year, and the council and officers were also appointed.—The president, in his closing address, alluded to the progress made in architecture and building in Liverpool during the past year, and especially congratulated the public upon the intended removal of "the unnecessary, hideous, and rabble-frequented" Hotham-street bridge crossing the Lime-street station. The sanitary condition of Liverpool would, he said, seem to require some observations, but as the authorities who had the responsibility of these arrangements took absolutely no interest themselves in the question, there appeared little chance of any comprehensive step being taken to rid the town and river of so pestilential a nuisance.—The thanks of the meeting were awarded to the president for his address and for the interest evinced by him in the Society.

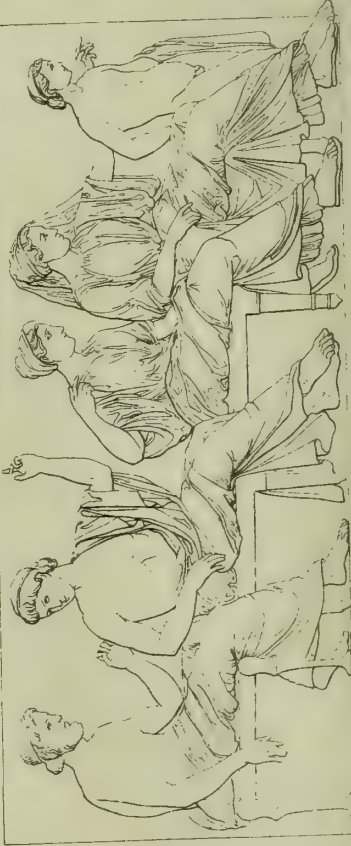
SOCIETY OF ANTIQUARIES OF SCOTLAND.—The usual monthly meeting of this Society was held on Monday. Mr. David Laing, foreign secretary, read the first paper, "On Processions and other Public Ceremonials in Scotland prior to the Union, 1707." The next paper, by Mr. W. B. M. Galloway, architect, gave an account of the ruins of the chapel dedicated to S. Blane at Kingarth, Bute, and of the remains of a more ancient structure incorporated with it at the time of its construction in the twelfth century. The ruins of this interesting chapel show traces of the work of three different periods. The greater part of the structure as it at present stands is Early Norman, and the opinion has hitherto been that the chancel was a thirteenth century extension. Mr. Galloway, however, limited the work of the thirteenth century to the insertion of the chancel windows in the east gable and side walls, with the consequent demolition and reconstruction of these walls, especially of the eastern gable. The next paper, by Dr. John Alex. Smith, was a description of a series of pictures by Japanese artists, brought from Jeddo by Dr. A. B. Messer, R.N., representing the ceremonies connected with the practice of cremation as it exists among a section of the Buddhists of Japan.



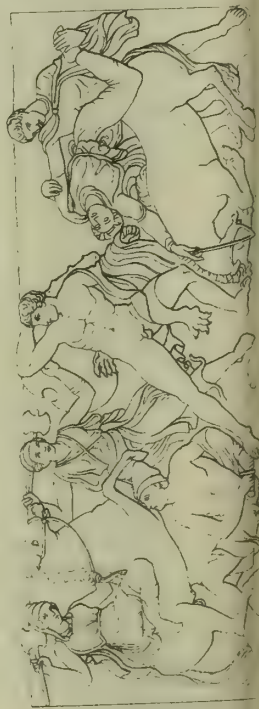
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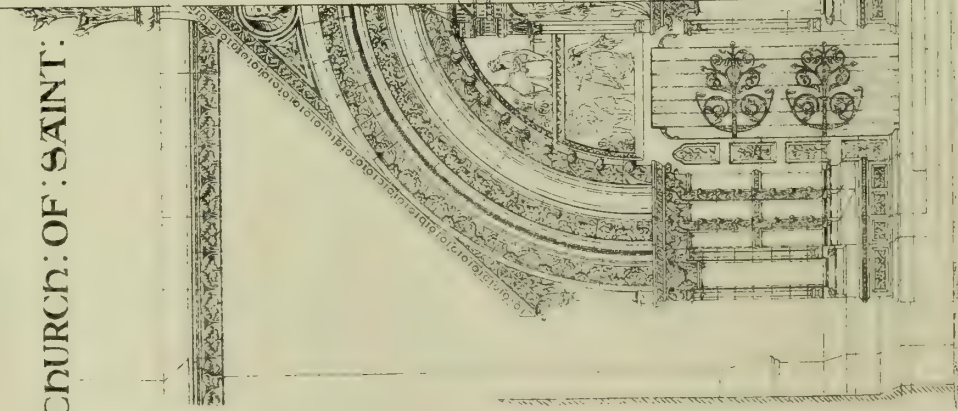


15

CHURCH: OF: SAINT:

WILFRED: YORK:

DETAILS IN
BLAKE: STREET: FRONT.



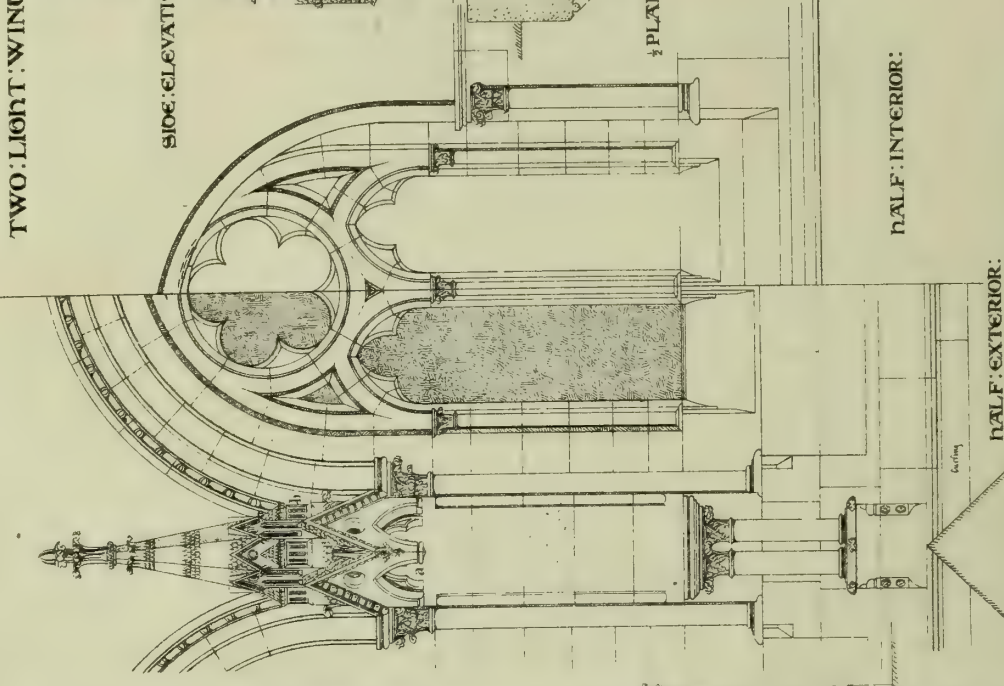
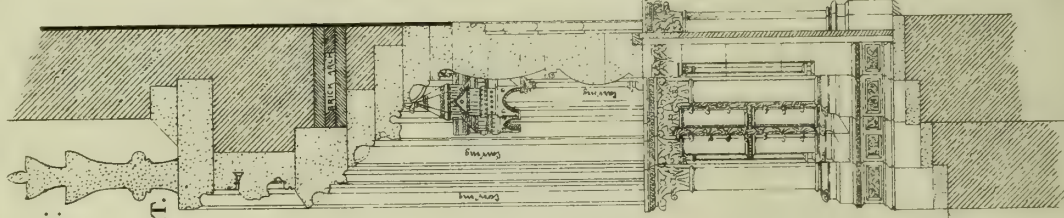
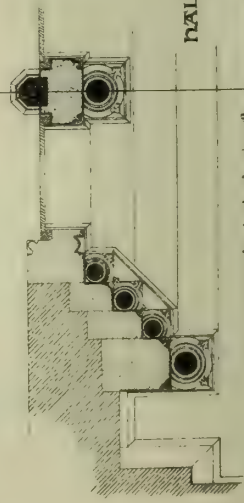
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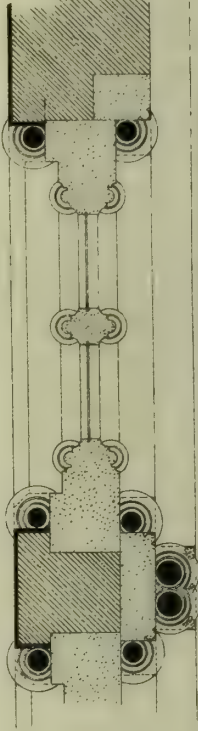
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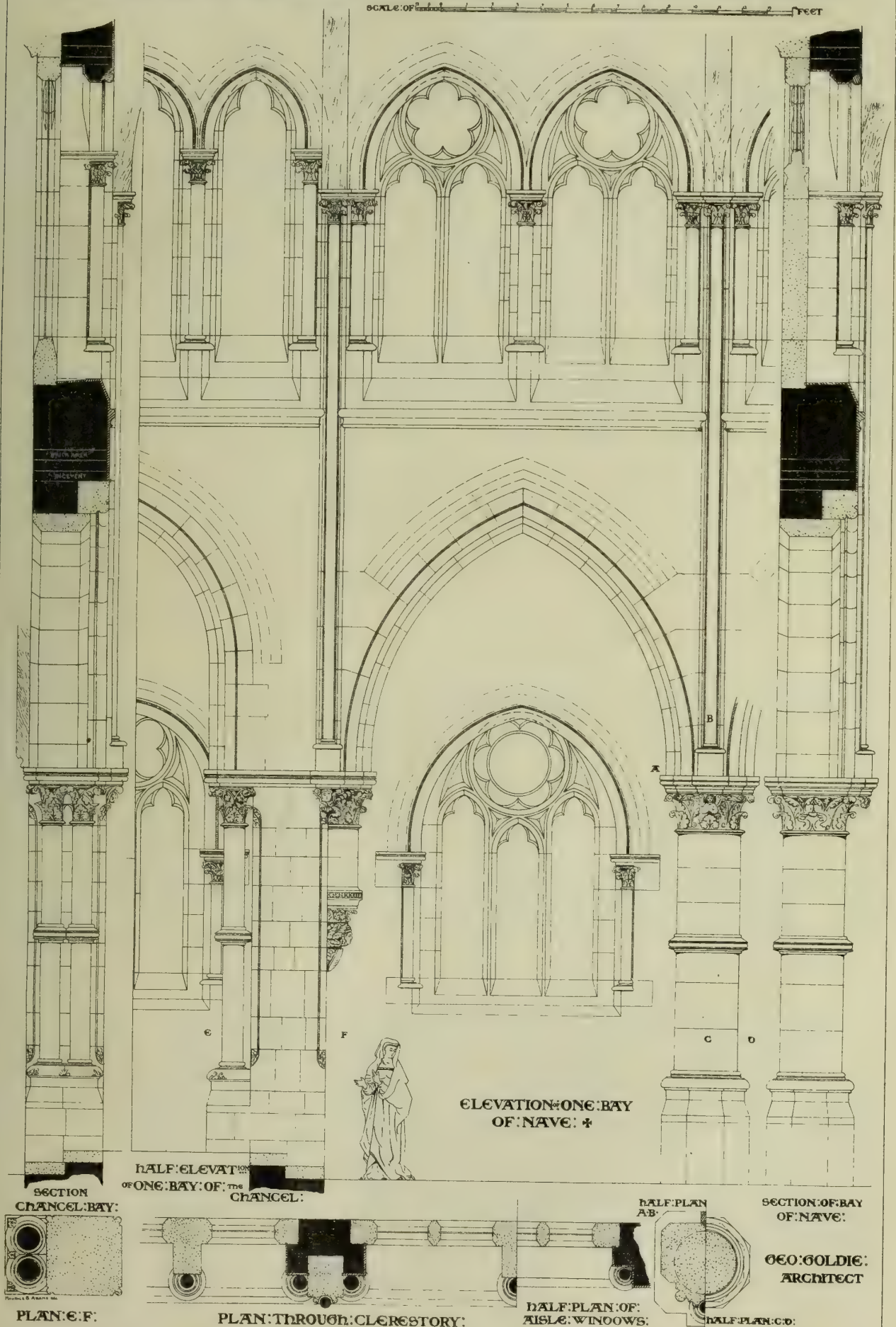
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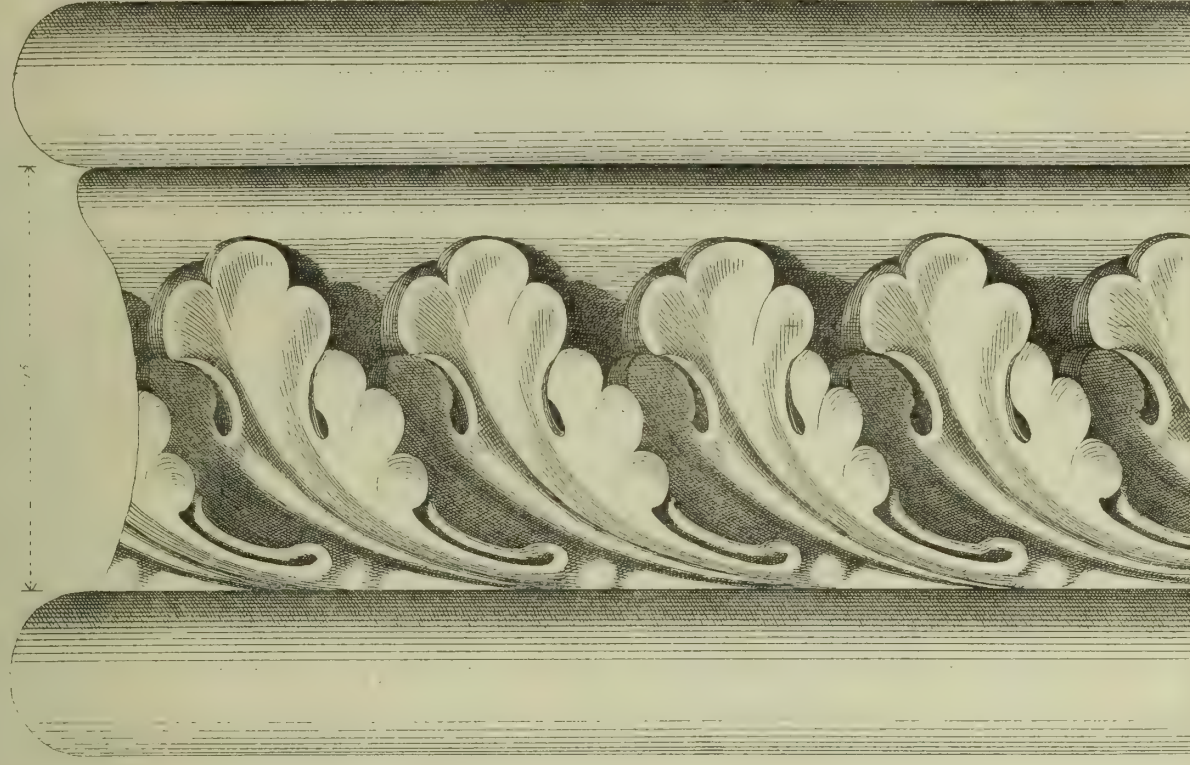
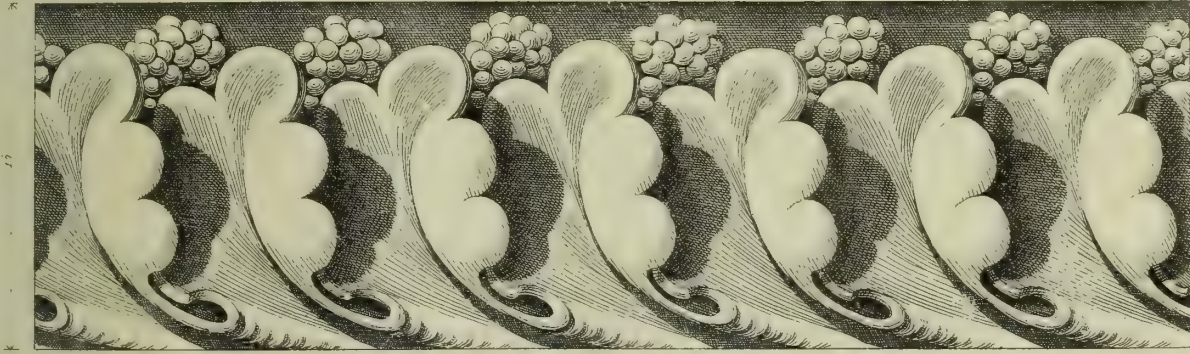
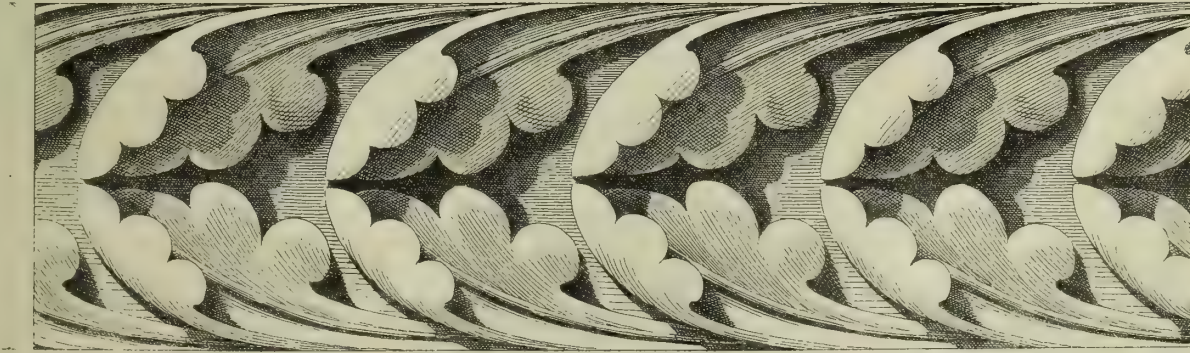
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GEO: GOLDBIE:
ARCHITECT.

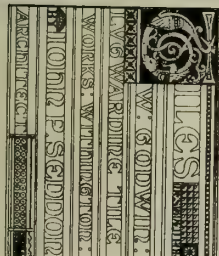
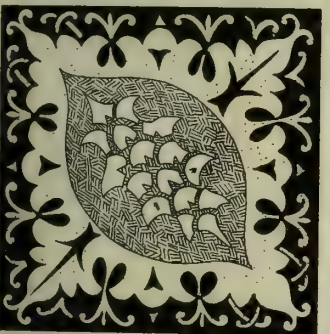
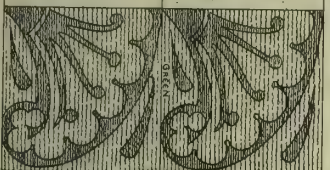
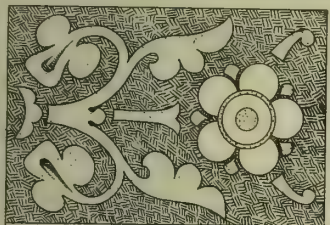
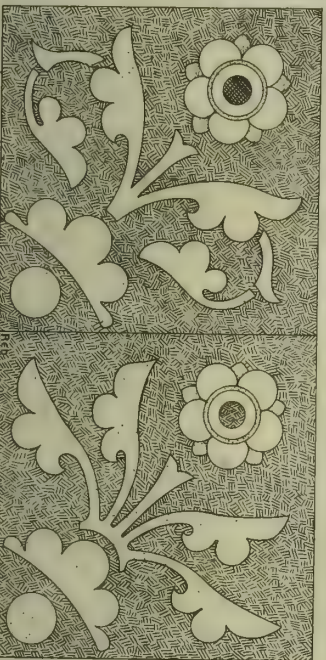
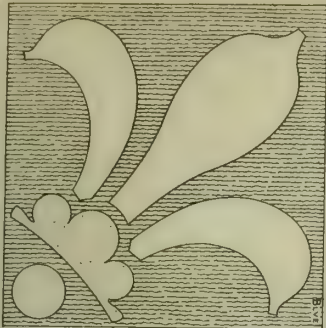
CHURCH OF S. WILFRID, YORK: DETAIL OF CHANCEL AND NAVE:

SCALE OF FEET





DETAILS OF FRENCH CHURCH ARCHITECTURE, 13TH CENTURY.



SCALE OF FEET TO PLAN
SCALE OF ONE FOOT TO DETAILS

Drawn by Miller & Pass 256 Bolton

ARCHITECTURAL DRAWINGS AT THE
ROYAL ACADEMY.

(SECOND NOTICE.)

CHURCH architecture is pretty fairly represented in the small collection of drawings with which we have to deal; but the number of contributors is not large. We have already referred to the competition designs for the proposed Cathedral at Edinburgh, and to one or two other drawings illustrative of this class of work. One of the most prominent remaining exhibitors is Mr. Brooks, who sends the churches of S. Mary, Wednesbury (1115), S. John the Baptist, Kensington (1145), the tower of the same church (1172), and two groups of schools and other buildings, at Clapton (1185), and at S. Columba (1211). All these works are stamped with the originality and power of dealing with mass and feature for which this architect is celebrated. The first-named church, the one at Wednesbury, is, to our mind, the most picturesque. A tower and an apsidal chancel form the chief features of the drawing, and the treatment of the circular angle-turrets which decorate the tower is very masterly and successful. The drawing is comparatively feeble.

Mr. Pearson contributes two drawings of churches—one at Wentworth (1116), and Kirk Braddon, in the Isle of Man (1124). In both these, the decorative features are well concentrated, the large masses being left extremely plain. Mr. Pearson has a great affection for high-shouldered, ugly buttresses, and shows great skill in the designs of his spires and towers. The defect and the merit are both displayed conspicuously in the designs under notice. The same artist sends two mansions (1147 and 1157), one for Crickhowell, which is intensely Mediæval—picturesque, it is true, and artistic, but hardly fit in appearance for the home of a modern family built in the second half of the nineteenth century. The other mansion, Elizabethan in style, is less forbidding, but hardly less artistic. The remaining churches of interest include S. John's Church, Hull (1122), as about to be remodelled by Mr. C. G. Wray. This is a good drawing of an interior, modelled on one of Wren's designs, and treated with a great deal of skill, the present condition of the building being shown on a sketch appended to the view. Mr. Wray will, we fear, be disappointed by the obtrusive effect of his tie-beams if carried out as here shown; and if he cannot dispense with them altogether, we think he will do well to make them less prominent. Mr. Seddon exhibits S. James's Church, Great Yarmouth (1123), a fine design for a large parish church, effective and simple, and marked by bold pinnacles, well introduced. Mr. Seddon also exhibits, to a large scale, the stall-work of the same church—good, but not remarkable, and a portion of the Aberystwith College, a building which he has exhibited before. Mr. Conybeare sends a conspicuous drawing of S. Patrick's Church, Kensington (1127), showing the interior of an apsidal building, with semi-circular arches, and a slightly pointed, waggon-headed roof, richly decorated in colour. The drawing conveys the idea of a good general tone of colour, and an effective interior, but the large rose-windows which take the place of a clerestory seem to us a great mistake; and the roof, if constructed as shown on the drawing, will be apt to exhibit very unpleasant effects of curved surfaces; probably there is some mistake here on the part of the draughtsman.

Mr. Robson's S. Ann's Church, Liverpool (1128), is a bold, simple design in rather Late English Gothic, and with a tower which seems small for the nave. Mr. Pugin's Carmelite Church, Kensington (1129), hung too high for examination, appears to be a graceful design. We may here remark that a considerable number of drawings are this year so hung that it becomes quite impossible to form any real idea of their merits, and the authors of such drawings must pardon us if, consequently, we are obliged to pass them by entirely.

Messrs. Hansom exhibit, in a fine coloured drawing (1164), the interior of the church they are erecting at Arundel. This is a vaulted design, more like a small cathedral than a church, and rather Belgian in its general character. Mr. Somers Clarke, jun., sends S. Martin's Church, Brighton (1166), a bold but rather bare design, and Messrs. Paull and Bickerdike send a large Nonconformist Church (1171) which can hardly be considered a satisfactory contribution to modern church building. Two buildings are included in the view, so different in style and manner as to raise the idea that the two architects engaged had each taken one to design, and had worked independently; the plainer building, probably schools, is the more satisfactory of the two, the church being at once feeble and complicated in design.

A very interesting series of drawings is exhibited by Mr. Robson, the architect to the School Board for London. He sends, in one frame, views of three of the schools which he is building for the board, the designs being, however, exhibited by Stevenson and Robson (1200). They are all executed in stock-brick, with red-brick dressings at the quoins and jambs of the windows, but they vary extremely in other respects. One design has buttresses, pointed heads to the windows, a central turret, and generally a Late Gothic character; a second has the general character of the seventeenth century, brick rustics, low dormers, and a brick belfry; while the third, the most picturesque of the three in its grouping, has segmental heads to the windows, stepped gables, an octagonal staircase turret, and a good deal of Gothic feeling. It is to be regretted that a considerable number of the schools in course of erection for the Board have not been exhibited; several architects of eminence are at work for them, and the comparison of their designs with Mr. Robson's solutions of the same problems would have been interesting.

Of the remaining drawings, one of the most beautiful is that exhibited by Mr. Emerson (1144), showing his picturesque and highly elaborated competition design for the Berlin Houses of Parliament. This design reflects great credit upon Mr. Emerson's powers, though it is perhaps open to the charge of being over ornamented. Near it hangs a good competition design by Mr. Phipps (1146) for the Copenhagen Opera House, and not far off Professor Kerr's effective design for Berlin (1138). Both of these are Classic. Mr. Somers Clarke exhibits Wyfold Court (1168), a good brick mansion, pleasingly treated, and well shown—a design which, though Gothic, is thoroughly modern also. Mr. Edis contributes offices in Thames-street (1206), an hotel at Bournemouth (1159), a small villa (1125), and a competition design for schools (1126). These are all marked with character, and shown in well executed drawings; the most satisfactory contribution is the hotel, which is a half-timbered design, very picturesque, pleasing, and well balanced. Sir Digby Wyatt sends a finely executed study for a Renaissance *Cheminée* (1117), probably an autograph drawing, and well repaying close examination. Mr. Charles Barry exhibits (1118) the quadrangle at Burlington House—very inadequately represented, a fact of which every visitor to the exhibition can satisfy himself as he crosses the quadrangle on entering or leaving the galleries. Messrs. Belcher exhibit their new Currier's Hall (1169), a somewhat bald-looking design, not, however, without effective points; and Mr. P'Anson sends the new Merchant Taylor's School (1180), in which he has departed from the Renaissance architecture which he handles so well, and has given us a Gothic design for a two-storied brick building with a rather lofty central *flèche* and a high-pitched roof. This seems to have been worked out with great care, and to be rather French than English in its character. Mr. Robins's Milton Mount College (1182) is, we think, the best design

he has yet exhibited; an excellent and appropriate building appears to be here represented by a good drawing. Mr. Nicholl's premises in Maiden-lane (1186), a very Late Gothic design, produces an extraordinary and unpleasant effect in the drawing. A little examination serves to show that they may be expected to produce a better result in execution, though we are not advocates for the adoption of the debased style in which they are designed.

If we have not completely exhausted the list of drawings, we have, at any rate, enumerated most of those which challenge notice; and, in concluding our review, we cannot but express our regret that so many of the most important buildings of the day are wholly, or almost wholly, unrepresented. Mr. Waterhouse's Natural History Museum has been commenced since last May. The Post Office, the Colonial Office, the Midland Terminus, and several important works in Manchester, Halifax, Plymouth, and other great towns, have been advanced a stage, yet no sign of them appears on the walls; and except Mr. Street's solitary and valuable specimen of his work at the Law Courts, the immense mass of architecture now in hand, or about to be put in hand, in the shape of Government, municipal, and private secular works, remains unnoticed; and the lesser works (except, perhaps, Edinburgh Cathedral) are left to represent to the world the position of English architecture. This is hardly as it should be; it reflects some discredit on the profession: it diminishes, to a great extent, the interest of the Exhibition, and it is a deficiency which we would fain hope will not be allowed to occur in a future year.

GOSSIP FROM GLASGOW.

(FROM OUR CORRESPONDENT.)

PERHAPS no city in the empire has so many and such varied industries as Glasgow. This is owing partly to its favourable situation—a valley, not only fertile with corn and pasture, but abounding in coal and iron, stone, lime, and clay; and having by the river Clyde an open highway to all parts of the world; and partly to Scotland being of a comparatively small area, unable to afford a Manchester for cotton manufactures and a Leeds for woollen, a Birmingham for iron, and a Sheffield for steel. In Glasgow there is a little of almost everything, and a great deal of many things. To most people beyond our own boundaries it will seem somewhat strange that until three years ago this city of so many and such manifold industries, and with its population of half-a-million, had no public place in which to exhibit specimens of its various products—the manufactures of its workshops, and the raw materials of its neighbourhood. At about that time the Town Council converted Kelvingrove House, a curious old mansion in the "West-end," or Kelvingrove-park, into an Industrial Museum, the accommodation afforded being four halls, each about 40ft. by 20ft. These are now completely filled—two with industrial means and results, one with (Scottish) Natural History—ornithology chiefly—and one with curiosities, antiquities, and other odds-and-ends. In the summer months the museum has been visited weekly by upwards of ten thousand persons. It is supported by the city public rates, and the admission is free. The museum has, so far, been an extraordinary success, but it is now found that the accommodation is wholly inadequate, and further, it has been said by some, that the status is unworthy of a great city like Glasgow. Shortly since, a proposal was brought before the Town Council to have a museum built on such a scale as to meet all probable prospective wants, and withal to be a building of which Glasgow might at least not be ashamed. The proposal was rejected, so meanwhile exhibits must be rejected by the museum in the park.

Apologies of the exhibits, some time ago I saw in the *BUILDING NEWS* an article on "Art-treasures from Cyprus." There are 311 of such Cypriote

art-treasures in the Kelvingrove Museum, Glasgow, —197 of pottery, and 114 of glass. They have been contributed by Mr. Lang, of the Diplomatic Service, I believe a native of Glasgow—*hinc ille lachrymæ ampuille!*

On the evening of the 6th of May what is called "The Kibble Crystal Palace" was opened for a private view. This is an immense conservatory that Mr. Kibble had built near to his residence on the Firth of Clyde, and which about two years ago he offered upon certain conditions as a gift to the City of Glasgow. The City declined the gift upon the terms, and the conservatory ultimately found a local habitation and a new name in the Botanic Gardens. The "Crystal Palace" is in two transepts. The southern and largest, and in which it is proposed to have concerts, lectures, *conversazioni*, flower-shows, &c., is circular in plan, with a diameter of about 250ft. In the centre is a pond of 185ft. in circumference. "Flowers and plants," says the *Evening Citizen*, "are everywhere; one of the transepts is being fitted up with models of ancient buildings; and all through the palace are innumerable statues and busts of people who have been famous in art, or song, or philosophy, or in the life of eager action in the open places of the world." To illustrate lectures there are view-dissolving lanterns which can cover with a sharp, well-defined image, an area of at least 1,260ft., or a disc 40ft. in diameter.

Some months ago I sent you a plan, by Mr. Cunningham, of Liverpool, for public halls intended to be built in the most fashionable part of Glasgow. That plan has, I believe, been considerably modified, and the capital now required is only £60,000, of which about £50,000 have been subscribed for. In the work Mr. Campbell Douglas, of Glasgow is associated with Mr. Cunningham.

That S. George was an English worthy must I suppose be "the why as plain as way to parish church" that we Glasgow Scots—"Scots wha ha'e"—have such an inveterate antipathy to the church and steeple that have the misfortune to bear his name. Sometimes the cry is heard, raze them to the ground; anon, raze the church, but spare the spire; then—insult worse even than destruction—make a stock-exchange of them; and "next and next," pierce the spire and make a canopy of it for the statue of the post Burns. Since the Scottish name of Bruce* doth "honour this corruption," there must be something in it. At least one indignity S. George's Church and steeple will be spared—the Directors of the Stock-Exchange having purchased ground elsewhere. There will likely be an office to be built, and this should give an opportunity for an important architectural work. S. George's Church might be removed to-morrow, and few beyond the proprietary and the congregation would care much about it, but I believe that Glasgow architects would strongly protest against the removal of the spire—perhaps the most original and most beautiful in the City, and the feature that gives character to one of its principal thoroughfares.

Before piercing S. George's spire for a canopy, first catch your statue. Nearly £1,500 having been collected in shillings for a statue of Burns in Glasgow, the committee is now all sixes and sevens as to who is to be the sculptor. Some say give the commission to a man enjoying the highest position in the profession, such as Foley; others, give it to Mr. Ewing, a local artist. "Glasgow has two able sculptors, Mr. Mossman and Mr. Ewing, and Mr. Mossman having done two excellent statues, Mr. Ewing's turn has now come;" and others are for a competition, but limited to Scottish sculptors. Because that an artist has done excellent work he is to be withheld from an opportunity of doing more is an argument that I do not understand, and so will not consider; but I am surprised that it has been said that Glasgow has two able sculptors when it has three. The Atlantes or Caryatides at the Bank of Scotland, by William Mossman (a younger brother), have been pronounced by those best able to judge to be works of the highest excellence. To me it seems that there is no reason why the Burns statue should not be competed for, and that there are several why it should. The fact that it has been contributed to by nearly thirty thousand persons has made it a public matter—not a matter for one artist or another unless he be in a position whose supremacy is undisputed.

I think it likely that our "upper ten" read THE

* This suggestion was recently made by Mr. Bruce, architect, and if the church is to be removed is worthy of consideration.

BUILDING NEWS, for almost immediately after I had said in its columns that Glasgow should be just before she is generous, and that she owed a statue to Campbell before she gave it to Burns, there was held what the newspapers phrased "a most influential meeting;" and it was then and there resolved to take immediate means towards erecting in his native city a statue of the poet of "The Pleasures of Hope;" £500 were at once subscribed, and I suppose that they and Hope are lying together at the bottom of Pandora's box, for neither has been heard of since.

The twelfth Exhibition of the Works of Modern Artists has just been closed. Seven hundred and five works were exhibited, of which thirty-six were "architectural drawings." Of those by local architects, "New Buildings for Scottish Amicable Life Assurance Society," by Douglas and Sellar, early attracted attention, from not only its merit as an architectural composition, but from also its admirable draughtsmanship and colour. "New Warehouse, corner of Gordon and Union-streets," by John Honeyman, would satisfy the curiosity of those who, like myself, have vainly speculated on what may be the complete design of a building that in every step of its progress is showing something both new and true, true at least to the purpose for which it is being erected, and that is more than can be said of many buildings. "Design for Club House," by Alexander Skirving, is a work by a young architect, and rich in promise; although in especial features there may be the exuberance of a youthful fancy, throughout the composition there reigns an undisturbed dignity. The genius is warm yet pure, and indicates that we have not yet seen "the last of the Greeks." As should be expected, there are designs of great excellence by other architects. I have mentioned what appeared to me as specialities.

It is understood that "architectural drawings" are no favourites with hanging committees. In the exhibition now closed they and the sculpture were relegated to the "vestibule," a low-ceiling'd lobby of ten or twelve feet in width. No wonder that many of our best men do not exhibit. Might not the architects occasionally have an exhibition of their own? There is enough of material within their portfolios and upon the walls of their studios; and the exhibition by Mr. Honeyman in London, illustrative of churches in the West of Scotland, shows what even one man can accomplish when there are zeal and energy. This collection, made by Mr. Honeyman, would of itself be a feature that ought to be interesting to not only the profession but the public.

THE PAST AND PRESENT OF ARCHITECTURAL ART.*

(Concluded from p. 529.)

IN the same paper I spoke in the following terms of the greatest of the early promoters, and, in fact, the great hero and Coryphæus of our revival, and of the societies which were formed throughout the country for the furthering of the study of our ancient architecture. "About the time I am referring to, an immense impulse was given to the reformation of architecture by the earlier publications of Pugin. His 'Contrasts,' published in 1836,"—an architectural *jeu d'esprit*, placing side by side, in somewhat burlesqued contrast, selections from Mediæval and modern works,—“while it enraged the majority of our architects, excited others most strongly to press forward toward better things. His 'Three Principles of Pointed or Christian Architecture,' which appeared in 1841, was a gigantic step in advance. It grappled at once with all the fallacies which had corrupted modern architecture, and established a code of rules, founded upon common-sense, utility, and truth; while his 'Apology,' which came out a little later, showed the necessity of falling back upon our national style, and its ready applicability to every requirement of our day. In the meantime the success of his own personal labours was truly astonishing. Not only were the advances he made in the revival of Pointed architecture most rapid, showing genius in every touch—this was, in fact, the smallest of his achievements—he actually revived by his own personal exertions nearly every one of its subsidiary arts: architectural carving and sculpture, stained glass, decorative painting, metal-work—whether in brass or wrought iron—

gold and silver work, enamelling, embroidery, woven textures, paperhangings, encaustic tiles, the manufacture of furniture, and even of ordinary household crockery-ware—all felt the impress of his hand and of his genius.

"Shortly after Pugin became publicly known, the same course began to be vigorously taken up in our own Church. The societies formed in connection with both Universities were followed up by others in all parts of the country. That vigorous periodical, the *Ecclesiologist* . . . did immense service in exposing the desecration and degradation to which our old churches were subjected, and in promulgating correct principles of ecclesiastical architecture and arrangement.

"A noble feeling for the subject rapidly spread itself among all classes. The zeal for church building and restoration greatly outran the increased knowledge, acts of individual munificence multiplied on all hands, and an entirely new state of things came about."

Two more decades have nearly passed over our revival since I thus chronicled its progress; and, if it has had (as has been my own painful experience) reverses to deplore, it has had a continued series of successes to rejoice over; and if its early ardour has at all sobered down, this has served, for the most part, to give steadiness and maturity to its efforts; and anyhow, it now possesses architects and other artists of distinguished talents to carry on the work, and, while it has long held absolute possession of the ecclesiastical architecture of the day, it now adds to this many of the most important of our secular buildings.

Its success has been indeed enormous; yet its failures and drawbacks have been in proportion to it. Its artistic merit has been limited to those who have followed it up with an earnest and generous enthusiasm, for it has unhappily been practically followed up by a mixed multitude who view it as a fashion of the day, by which professional practice is to be obtained, but are devoid of all ardour and love for what they are engaged upon. The consequence is that, while we have a certain proportion of new churches and other buildings which need not shrink from comparison with those of the Middle Ages, we have a swarm of others—mere cold-blooded, heartless travesties—a disgrace to our age, and a disfigurement to our towns; but, worse still, while a minority (as I fear) of our ancient churches have been repaired or restored by men who treat them with a loving care, and with studious and intelligent reverence, a large proportion are left to the tender mercies of the mere pretenders—often not architects at all—who have no knowledge of, or reverence for, the treasures committed to their unworthy hands, and who have done and are doing their best to rob our country of one of its richest inheritances—its genuine and indigenous architecture.

Nor is this the only drawback to the Gothic revival.

It suffers also from a degree of capriciousness, even among its abler and more art-loving followers, who, jealous, perhaps, or contemptuous of others, refuse to co-operate in any steady purpose, and who, morbidly keen in their perceptions of beauty, are apt to follow momentary fancies—now favouring one type, and now another—and, perhaps, reviving styles little allied to their purpose, as if the object of the age were to revive just for revival's sake, rather than to gather in these extraneous beauties to enrich the resources and to widen the capabilities of one received style. This tendency seems to threaten the noble movement with premature decay, though I do trust that there remains earnestness and steadiness of heart enough to avert this danger, and to guide these artistic strivings into a healthy channel, and cause them to add new life to the general movement.

It is, in truth, as yet unsettled whether we should concentrate our revival on one phase of the old style, or whether, as the ancients did with their orders, we should use them *ad libitum*. The one seems somewhat artificial, the other somewhat too eclectic; but *solvitur ambulando*, and perhaps this discursiveness I have been regretting may promote that solution.

I have found, as I went on, that the scheme of my lecture was much too extensive for the time at my command. I had intended to say something of the application of the sister arts to architecture, as well as on the subordinate and allied arts. I must omit this; nor do I much regret it, as I

* Sir GEO. GILBERT SCOTT'S last lecture at the Royal Academy.

trust I shall be succeeded by men better qualified to deal with the subject.

I will close my lecture—itself the last of my long but disjected series—with a few words of advice to architectural students.

First of all, I would repeat what I once heard from that accomplished artist who formerly graced this chair—Professor Cookerell—that the first rule for success in art is the same which the wise man laid down with reference to morals, “Keep thy heart with all diligence, for out of it are the issues of life.” If the inmost heart of the student is purely and earnestly devoted, with generous ardour and enthusiasm, to his work, you may make pretty sure of his success; but, if he follows it up in a cold, perfunctory spirit; from a sense of duty or self-interest rather than of earnest love, whatever may be his success in a merely professional point of view, he will never do any good in a higher and an artistic sense. The first thing, then to encourage is a loving zeal for the art you have chosen.

The next aim is self-culture, and that of a two-fold kind: the cultivation at once of an intimate knowledge of the form of art which you select as your groundwork, and of a personal artistic power to work in it.

In these days of miscellaneous distraction, it is difficult to give advice as to the choice of a groundwork of study. Having no actual style belonging to our age, you must choose between the two Renaissances—the Classic and the Gothic,—as best you may.

It was my own lot, arising from the period at which I commenced, to have been trained in one (at its dearest period), and to have, from the love of it, trained myself in the other; but I will suppose, for simplicity's sake, a single and simple choice. Nor is it for me to dictate, were it in my power to do so, what that choice should be.

What I have to say is that, your choice being made, you must study with all diligence, and with the most assiduous attention, the best and purest examples of the style you have chosen; making yourself thoroughly acquainted with it from its very root to its minutest details, and using every endeavour to catch the true artistic spirit of the style in its best phases.

If Classic architecture (whether antique or as revived) be your aim, you are at some disadvantage from not having within your reach its most authentic examples. Books and the works of our own best architects must supply the need till you have opportunity to study it in its native land.

If Gothic architecture is that on which your loving choice has fallen, you are most happily situated. Then you are not studying an imported art, but that of your own country; you have not to travel widely from home to study its noblest productions, for they are at your very doors; you have not to go through a long course of book-study, treating of examples of art which you have no means of seeing and studying with your own eyes; but, though not rejecting books, you may go from them to the originals and judge of them for yourselves. Even if kept pretty closely in London or its vicinity, you do not want opportunity for the study, from its noblest productions, of the art of your choice. The glorious fane of S. Peter at Westminster supplies an inexhaustible fund for study, while the history of Mediæval art may be followed up by the aid of such examples as the Chapel in the Tower, the Temple Church, S. Saviour's, Westminster Hall, Crosby and Eltham Hall, and other minor examples; while an hour's run will take you to the stupendous church of England's protomartyr, which equals its sister abbey as a fund of artistic study and information. The advice, then, I give to the student of Mediæval art is: Lose no opportunity of studying and carefully sketching from old examples, wherever they may be found; nor, I would add, should you neglect the aid afforded by collections of objects of study such as our museums contain; but study not only the mere fact, but the spirit and sentiment of the style you are learning.

This, however, alone is but the skeleton. You must clothe it with muscles, and breathe into it the breath of life, by the direct culture of your own individual artistic power. Make yourselves artists—not so much artists in the lower sense of being able to make your ideas look well on paper, as in the incomparably more important sense of making your works really noble works of art in reality and in execution. It is of very little importance to any but yourself whether your drawings look well; but it is of infinite importance

that your works, when carried out, should be really worthy of admiration, and should produce the impression on the mind which they ought to produce.

Make yourselves, then, artists, not alone in respect of mere architecture itself, but in respect also of its allied arts; in respect of architectural sculpture, in respect of painted decorations, in respect of figure-sculpture and of figure-painting in forms suited to architecture; of painted glass, mosaic work, metal work, and all the subordinate arts. I do not say that you should really practise these arts yourselves, but by training yourselves in them you will become fitted to direct, guide, and check those you employ, or who are made your art colleagues.

Few, indeed, of us have as yet come up to the standard,—very few have even approached it. I address you as the rising generation of architects, and urge you to do what your immediate predecessors have, for the most part, failed of having the means of doing. Let your new generation go far beyond its predecessors. It is not for us moderns to be content with a standard of our own degenerate age. To “measure ourselves by ourselves, and to compare ourselves with ourselves,” is never the part of wisdom. Set, rather, before yourselves a standard of glorious days of old; and remembering always the right noble *Cætana Patrum*, whose successors you will be, make it your first endeavour to raise yourselves to a level worthy of your parentage, and then to press ardently onwards, if Providence shall permit, to ever new and higher attainments.

THE POLISH BUILDING TRADE.

THE impulse to trade consequent on the conclusion of the war of 1870 was not without its influence on the trade, commerce, and agriculture of the kingdom of Poland in 1871. Immediately on the dispersal of the German armies the labour market was more abundantly supplied, and a far from inconsiderable number of hands returned to Poland who had actually taken part in the war and served in the German armies. Lieut. Col. Mansfield gives some interesting particulars respecting the trade of this ancient kingdom, so far as the building interest is concerned. In the town of Warsaw there are 3 steam mills, 1 paint and varnish factory, 3 brick-kilns, 3 joiners' works factories, and 3 glue factories. The government of Kalish enumerates 186 brick-kilns, and 23 saw-mills; the government of Petrokow, 67 brick-kilns, 75 saw-mills, and 18 lime-kilns and cement-mills; the government of Radom, 7 steam-mills, and 12 brick-kilns; the government of Kielce, 66 saw-mills and 48 brick-kilns; the government of Lublin, 7 saw-mills and 43 brick-kilns; and the remaining governments of Siedlce, Plock, and Lomza, 50 saw-mills and 89 brick-kilns.

With the cessation of building the brickmakers have diminished the number of kilns in operation, and there has been a great rise in the price of bricks; and thus, although the brick trade may be said to be somewhat depressed, the price of the product is largely augmented.

Building Intelligence.

CHURCHES AND CHAPELS.

BIGBURY.—The parish church of Bigbury, Devon, was re-opened on the 2nd inst. by the Bishop of Exeter, after restoration. The church consists of nave, chancel, north aisle, and a chapel called the “court aisle chapel,” on the south side of the church. The original church was built in the thirteenth century, and the only portions of this edifice now existing are the chancel and the western tower; the rest of the church was built about the year 1400, and the work is remarkable for the refinement of its details. The work of the present restoration has consisted of the rebuilding of the nave arcade and a great portion of the chancel and aisle, and the porch. The whole of the roofs throughout were in a thoroughly bad state, and had to be altogether renewed on the model of the original roofs. The chancel seats are of English oak. The windows throughout the church are nearly all new, but great care has been taken to retain every feature of the original building, or to reproduce them. The stone used in the windows is

Polyphant and Beerstone. The cost of the restoration amounts to £1,200, and has been carried out under the direction of Mr. Sedding, architect, of Bristol; the builder being Mr. Pearce, of Modbury.

BITCHFIELD.—The fine old church of S. Mary Magdalen is about to be thoroughly cleansed from the accumulated whitewash of ages, and the fabric carefully strengthened and restored. By the advice of Mr. Ewan Christian, the architect to the Ecclesiastical Commissioners, the carved oak roof is to be exposed by the removal of the plaster ceiling, the decayed timbers are to be replaced, and the old lead recast on the site and relaid. The chancel, built ten years ago, is to be completed by the addition of a floor of Minton's tiles, and choir seats. The north wall of the chancel is to be pierced by a pointed arch, giving access to the eastern end of the north aisle, which will be utilised as an organ chamber, and vestry. The doors and seats will be all new. Messrs. Rudd and Son, of Grantham, are the contractors.

BROMLEY.—The parish church of S. Peter and S. Paul, Bromley, Kent, was reopened on Thursday, the 8th inst., after being closed for some time for restoration. Owing to some ecclesiastical objections to the proposed chancel, none of the walls of the edifice have been interfered with; the only alteration in the external appearance of the church is at the west end. The old western doorway has been divested of its cement dressings, and a new stone label mould, with foliated bosses, has been placed over it. In cutting away the rough-cast for this, the remains of an old window were found, proving that the present west wall is old. The west window of the tower, reopened and renewed, has all its mouldings faithfully copied from the scanty remnants found. The old belfry door, though enlarged as an egress for the congregation, is also a copy of its predecessor. The old lumber-room has been changed into a vestibule opening to the church by the lofty arch that was formerly blocked up by brickwork. The ringers' floor, which was previously below the west window, is now above that and the arch. The western gallery has been altered so as to have a steeper slope. A new pulpit of teak and wainscot oak has been provided, executed by Mr. Forsyth; the reredos was executed by Messrs. Bell and Almond. The old Norman font has been brought out from the north-west angle, and instead of its old brick base it now stands upon five carved columns of Caen stone, with shafts of green Genoa marble. The works have been executed under the direction of Messrs. George and Vaughan, architects, by Mr. Arnaud, of Bromley, the amount of the general contract being £1,717, and the reredos and pulpit have cost £230.

CARDYNHAM.—The church of Cardynham, near Bodmin, Cornwall, was reopened on Friday week. The improvements have chiefly been made in the chancel, which is of greater antiquity than the body of the church. A good east window, of Early Decorated character, has been inserted. It has three lights, and the subjects of the stained glass are the Ascension, the Resurrection, and our Lord appearing to S. Mary Magdalene. The artist is Mr. Jas. P. Warrington. There is also a small two-light window in the north side of the chancel, executed by Messrs. E. and S. Beer, of Exeter, the subjects being the Acts of Charity. The insertion of a new east window necessitated the removal of some high oak panelling—the old altar-piece. Behind it, and at the sides, several interesting features were discovered—an Early English arched tomb in the north wall, three arched sedilia recesses in the south wall; and in the east, two piscinas of good character. This wall had been re-constructed, and two picturesque memorial crosses had been built up in it, their outline just showing in the facing. These crosses have been set up in the churchyard, and the chancel re-built, with restoration of the old features, and newly roofed. The vestry has also been rebuilt. The works have been executed; the masonry by Messrs. Bone and Son, builders, of Liskeard; and the carpenters' and roof work by Mr. Oliver, of Bodmin, under the direction of Mr. Ashworth, architect, of Exeter.

DULWICH.—The corner-stone of the new church of S. Peter, Lordship-lane, Dulwich, was laid on the 1st instant. The church is Gothic in style, and will be built of brick, faced externally with

Kentish ragstone, and internally with ornamental and coloured bricks arranged in patterns. The total length when completed will be 120ft., but it is not intended to finish the whole at once, the present contract (£7,800) comprising the erection of the chancel, organ-chamber, aisles, portion of tower, and the principal part of the nave. The west end will be closed temporarily by brickwork, but it is intended to build a gallery at this end, and to insert a large wheel window. The roof will be open-timbered, of pine, stained and varnished, covered externally with slates. The columns in the chancel will be of Rouge Royal marble, while the ornamental features of the walls of the nave will be executed in Pether's patent bricks. When the funds permit, it is intended to add a spire to the tower, rising to a total height of 172ft. Messrs. Downs, of Union-street, Borough, are the builders, and Mr. Charles Barry is the architect. The present contract will provide accommodation for 700 persons.—S. Saviour's Church, Herne-hill, Dulwich, was recently reopened, after alteration and enlargement. Although only erected in 1869, the church proved to be too small for the requirements of the rapidly growing neighbourhood, and it was found necessary some months ago to enlarge it. The enlargement consists in lengthening the church 6ft., and the erection of a chancel semi-hexagonal in plan. The enlarged space permits of a vestry and organ-chamber on the north side, the organ being removed from the west gallery, where it formerly stood, the gallery being thus made available for an increased number of persons. The former pulpit, which was of wood, has been removed, and replaced by one of Bath stone, richly carved, with Mansfield columns and Devonshire marble intermixed. The reredos is also of Bath stone, the front and sides having arcades in red Mansfield stone, the walls under the windows of the chancel being similarly finished and decorated. The entire length of the church as enlarged is 116ft. The architect is Mr. W. C. Bartlett, of Old Broad Street, and the contractors were Messrs. Wood, of Mile-End. The cost of the enlargement has been upward of £3,000.

GLASGOW.—On the afternoon of the 8th of May, the Cowcaddens "Free" Church was opened for Divine worship. The site is at a corner, and the style is Classic. It has back and side galleries, is lighted by windows under the galleries and in the clerestory, and can accommodate 1,054 persons. The cost, including a hall for meetings, classes, &c., is £8,000. Architects: Messrs. Douglas & Sellars, Glasgow.

GLOUCESTERSHIRE.—The memorial stone of a new Baptist Chapel has been laid at Chalford, Gloucestershire. The style of architecture is Romanesque, the walling and dressings being of freestone, quarried in the neighbourhood. The chapel is to seat 450 persons, and to cost about £1,600. The architect is Mr. Tait, of Leicester, and the builder Mr. Drew, of Chalford.

OLDHAM.—St. Stephen's and all Martyrs', Lower Moor, was consecrated on Wednesday last, by Bishop Fraser, of Manchester. The style is of the Early Geometric Gothic. The external walls throughout are faced with Oldham Edge Stone, and the dressings of Summit Stone. It consists of chancel, 28ft. long by 25ft. wide; nave, 92ft. long by 25ft. wide; north and south aisles, porch, vestries, and organ-chamber. The height to the ridge of nave-roof is 43ft., and the interior presents a very imposing appearance. A tower and spire 114ft. high will form a special feature in the building. The spire will, however, not be finished at present. Accommodation has been provided for over 500, including a great number of free sittings. The cost of the building up to the present time amounts to about £3,500. The work has been let to several contractors resident in this town, whose names we annex. Mr. Henthorn executed the stonework; Mr. Emmanuel Whittaker, carpenters' and joiners' work; Mr. Jackson, slating; Messrs. Sharples and Buckley, plumbing; and Messrs. Edmundson, of Manchester, the glazing. The whole of the work has been executed under the superintendence of the architect, Mr. Thomas Mitchell, of this town, who also prepared the plans for the schools adjoining, which were erected last year.

OLDHAM.—On Friday last, the Bishop of Manchester consecrated the new church of S. Andrew, Oldham, just erected at a cost of £4,400. The church consists of nave, north and south aisles, south transept, chancel, organ-chamber, and vestry, with a tower at the junction of the vestry

and north aisle. The arches of the nave are carried on red Mansfield stone columns, having richly-moulded caps. The interior of the building is plastered, but the exterior is faced with red stock bricks, having ornamental and blue brick bands and a few stone dressings. The roofs are covered with slates of two tints arranged in bands. The chancel is laid with Minton's tiles. The font, which is of elaborate design, consists of Caen stone with shafts of Devonshire marble and bases of red Mansfield stone, and was executed by Messrs. Williams and Millson, of City-road, Manchester. The church is warmed by means of hot air, the apparatus having been provided by Messrs. Shillito and Shorland, of Manchester. The church is seated for 635 persons, the sittings for 530 being free. The work was let in separate contracts.

PECKHAM.—Camden Church, Peckham, is about to be materially enlarged, from drawings prepared by Sir G. G. Scott, R.A. Last year it was proposed either to build an entirely new church or to enlarge the present building, and the latter course having been decided upon, Sir G. G. Scott (who carried out the construction of the chancel some years ago) was consulted, and he recommended the rebuilding of the transepts in harmony with the chancel, with a view of making a permanent improvement, instead of a temporary enlargement. The final drawings of Sir G. G. Scott are now in the hands of Mr. W. F. Meakin (the acting architect), and the projected enlargement, which will provide 400 extra sittings, will be proceeded with at once, at an estimated cost of £3,500.

PETERBOROUGH CATHEDRAL.—Some little time since the north wall of the nave of Peterborough Cathedral settled down to such an extent that the architect to the Dean and Chapter (Sir Gilbert Scott) directed it to be shored up. It has now been determined to underpin it, and the work is being carried out by Mr. J. Thompson, of Peterborough. The workmen employed have reached peat, on which, as it appears, the foundations of the walls were laid without previous preparation. This discovery is considered to account for the settling of the wall.

SALE.—On Monday week the foundation-stone of a new Presbyterian Church was laid at Sale. The building will be in the Early Decorated style, built of parpoint stone with Runcorn stone dressing. The church is to be approached by a good sized vestibule, is sixty feet in length by forty feet in width, and will seat about 600 people. A gallery will be placed over the main entrance. On the north side of the vestibule an occasional room is formed, and at the back of the church there will be a session room, a vestry, a schoolroom, forty-five feet by thirty feet, and a class-room. Messrs. Wilson and Oldham, of Manchester, are the architects.

S. ANDREW'S CHURCH, OLDHAM.—This church was consecrated by the Bishop of Manchester on Friday last. Its dimensions are as follows:—Nave, 70ft. by 28ft.; aisles, 12ft. 6in. wide; chancel, 22ft. long, and the same width as the nave; south transept, 28ft. by 16ft.; tower, 9ft. square inside, placed in the angle between vestry and north aisle. The organ-chamber and vestry are one on each side of the chancel. The roofs are open to the apex, and are plastered between the principals, the height of nave and chancel-roofs being the same—viz., 47ft. 6in. The building is of brick, with stone dressings. The tower has only been carried high enough to form a porch over the entrance, but it is to be completed as soon as the funds will permit. The total cost of the building as now erected is about £4,400, a large amount being expended in foundations, owing to the awkwardness of the site. The pulpit, reading-desk, font, and tiling of chancel were gifts from various friends. The architect was Mr. John Lowe, of Manchester, the work being nearly all done by Oldham tradesmen.

THE CITY TEMPLE.—This large building, designed by Messrs. Lockwood and Mawson, and contracted for by Messrs. George Myers and Sons, is being erected upon the Holborn Viaduct for the congregation of the old Poultry Chapel. The cost of the site and structure is estimated to exceed £56,000. The edifice will consist of two stories, the lower being of the Roman Doric, and the upper in the Corinthian order. The centre of the principal front is formed by a recessed portico. The whole area of the building, with the exception of the staircases in the four angles, is thrown into the gallery, and thus a space of

120ft. in length and 63ft. in width is obtained. The basement contains a schoolhouse, 64ft. by 57ft., and 18ft. in height; also a ladies' committee-room, 41ft. by 25ft. The City Temple, thus arranged, will accommodate 2,500 people. The memorial-stone of the temple will be held on Monday next by Dr. Binney.

WHITBY.—The first portion of S. Matthew's Church, Grosmont, Whitby, consisting of chancel, organ-chambers, and lower part of tower, is now being carried out under the direction of the architects, Messrs. Charles N. Armfield, York Diocesan surveyors, and J. Mitchell Bottomley, of Whitby. The whole of the interior is lined with ashlar work from the Swinestay Moor quarries. The roof is boarded to the curve of the principals, and divided by moulded ribs into panels, which are intended to be ornamented in colour from designs by Mr. Armfield. The east window consists of three lancet lights. The altar will be approached by seven steps. In the south wall will be sedilia and piscina. The whole of the windows are to be filled with stained glass, and the floors laid throughout with encaustic tiles.

BUILDINGS.

COWLEY.—On Tuesday week Prince Leopold laid the foundation-stone of the new National Hospital of S. John the Evangelist for incurables, at Cowley, Oxford. Probably not less than £50,000 will be required for its completion, but the building will be carried on gradually, as the funds may allow. The building will consist of a large quadrangle surrounded by a cloister, with rooms for the accommodation of single patients and patients in pairs. The building will be in the Early Perpendicular style, while the church will be in the Early Decorated style. It is proposed to accommodate 150 patients, with the large staff which will be necessary to aid the class of sufferers which will be admitted, and the church will be spacious enough to contain 1,000 persons. The architect is Mr. C. Buckenridge, 20, Princess-street, Cavendish-square, and S. Aldate's, Oxford, and the builders Messrs. Honour & Castle, of Russell-street, Osney.

LOUTH.—The new hospital and dispensary at Louth was opened on Saturday last by H. Chaplin, Esq., M.P. It is of Gothic design, and consists of inner hall, accident ward, men's and women's wards, children's ditto; and verandahs with fine view of the noble church-tower and spire; kitchen, bath-rooms, lavatories, &c. The dispensary department is quite distinct, with waiting-room, 20ft. by 14ft. Great attention has been paid to ventilation; there are shafts in the walls, and channels in the floors, with sliding-grating. "Galton" stoves have been fixed in the wards. The architect is Mr. John Johnson, of Moorgate-street, London, and the work was carried out by Mr. C. Clark, builder, &c., of Louth, at a cost of £1,500.

SCHOOLS.

MANCHESTER.—On Monday, new girls' schools in connection with S. Thomas' Church, Ardwick, Manchester, were opened by the Bishop of Manchester. The cost of the buildings and site has been £4,200, and accommodation is provided for 380 children. Messrs. Royle and Bennett, of Manchester, are the architects, and Mr. Robert Ellis, of Hulme, the builder. The schools are heated by the "Manchester School Grates," which are now coming into general use, and of which Messrs. Shillito and Shorland, of Stretford-road, Manchester, are the patentees and manufacturers.

NEWCHURCH.—On Saturday last, new national schools at Newchurch, Lancashire, were opened by the Bishop of Manchester. The building is Gothic in style, and has cost £1,400, exclusive of site. Accommodation is provided for 250 scholars. The schools are built of stone, and have open timbered roofs. There is a large general school, 59ft. by 19ft., and an infants' school, 30ft. by 18ft. There are two class-rooms, 10ft. by 12ft., two large lobbies for stores, hats, &c., and two large rooms beneath the infants' school for stores, &c.

QUEENBOROUGH.—The new Elementary Schools at Queenborough, Kent, were formally opened on Saturday afternoon. The new schools were built from plans by Mr. Benjamin Adkins, of Faversham, by Mr. J. G. Naylor, of Rochester. They will afford accommodation for 220 children—60 boys, 90 girls, and 70 infants, and comprise a boys' schoolroom 32ft. by 20ft., a girls' 20ft. by 22ft., a class-room 16ft. by 20ft., and an infant schoolroom 20ft. by 28ft. The total cost is £1,562.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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The charge for advertisements is 6d. per line, of eight words (the first line counting as two). Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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N.B.—American and Belgian subscribers are requested, to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance.

Subscribers receiving their copies direct from the office are requested to observe that the last number of the term for which their Subscription is paid, will be forwarded to them in a coloured wrapper, as an intimation that a fresh remittance is necessary, if it be desired to continue the Subscription.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—P. W.—S. and S.—J. T.—W. and F.—E. S.—J. A.—T. W. A.—H. and C.—J. B. F.—R. O.

A CARPENTER.—The Birkbeck Institution, Southampton Buildings, Chancery-lane, or Working Men's College, Great Ormond-street.

STEPHEN LAVIN.—Unsuitable for reproduction by photo-lithography.

FRED. T. CAMP, Saratoga Spring, New York.—Not considered suitable.

E. WAGER.—The time for BUILDING NEWS Church Planning Competition was postponed to the 1st of July next.

JOHN CRACE FREEMAN, 5, Bridge-road, Battersea.—We do not insert advertisements "in exchange for such articles as the printing office and domestic use require daily; such as white or red lead, hard or soft soap, glue, paints, colours, varnishes, oils, brushes, emery, glass, and sandcloth and paper, crystal washing soda, chemicals and dysaluteries." We never did such a thing, and never intend to. And we beg to inform you that any journal that will do so is not worth advertising in at any price. We believe it is done, and somewhat extensively, in one quarter, where there is a vast display of advertisements, and we suppose that in mistake you sent your letter to *this* office.

R. H. N.—We will insert if suitable.

A DISAPPOINTED COMPETITOR.—You should have authenticated your communication.

Correspondence.

BEADS AND THE BEDEROLL.

To the Editor of the BUILDING NEWS.

SIR,—Allow me to point out that the passage from the "Canons of Calcey" does not refer to beads. It runs thus: "Canonicis horis, expleto officio Synaxeos et vii. beltidum, Paternoster cantetur," which can only be construed thus: "At the canonical hours, at the end of the mass and seven beltidum, a paternoster shall be sung." The Beltidum are presumed to mean prayers sung—*bet-ied* (by transposition)—and are, probably, identical with the Suffragia (pro defunctis) required to be used in 1281 by the Synod of Canterbury on similar occasions—viz., commemorations of departed bishops. The "Sange-red" (something sung) in the Bederoll of far later date was, probably, of the same character.

The Bede-roll was very different from beads. The latter (par precum or precula) are alluded to by Tyndall, the Protestant, thus: "Either he hath no beads at all, or else you shall not hear a stone clink in the hand of him." Knots or beads were forbidden at the Reformation.

The bead-roll was a list of persons to be prayed for in the pulpit every Sunday by name. In the "Order for Preaching and bidding of the Beads

in all Sermons" (1534) certain persons were to be mentioned, whilst the preacher might add other names as it pleased him of devotion. And in 1547 a form of "bidding the common prayers" was proscribed. The Bidding Prayer prescribed in the Canons of 1603, for inviting or urging to prayer, is still used in Cathedrals and the Universities. A Bedesman was one who prayed for his patron or founder. Thus, at Chichester, Bishop Sherborne's Chantry Priest was called his Orator preclar, or Bedesman.—I am, Sir, &c.

MACKENZIE E. C. WALCOTT.

Intercommunication.

QUESTIONS.

[2845].—Measuring Plain Tile Roofs.—In measuring valleys in plain tile roofs, should a running measure be taken for the valley, as the fin. each way alluded to in works on measurement is not sufficient to meet the extra value of the valley tiles?—T. C. H.

[2846].—Portland Cement.—Is Portland cement liable to injury through having ironwork bedded in it?—T. C. H.

[2847].—Stained Joinery.—How should joinery be treated after fixing, so that no stains may be visible in same when stained and varnished?—T. C. H.

[2848].—Hinges for Folding Doors.—Can any subscriber inform me where the following can be obtained?—Hinges for folding doors somewhat similar to Smith's patent door-springs, arranged so that when one door is opened, the other is also opened by a connecting spring.—A SUBSCRIBER.

[2849].—Laps in Wall Plates, &c.—I am obliged by Mr. B. Fletcher's prompt reply to my questions. I am, however, obliged to trouble that gentleman again, as my queries did not elicit the information required. In preparing quantities from drawings—supposing the net length of wall plate, parlin, or ridge to be 300ft. lineal, how many laps are to be allowed in such length? A building may very reasonably be imagined as 150ft. long—as, for instance, a range of stabling or shedding, but it is not to be supposed that the wall plates, &c. would each be 150ft. in one length without a lap, hence the query. Also as to lead work—Having collected from the drawings the several lengths of gutters, hips, valleys, or flashings, how many laps are to be added in proportion to such length? An early reply will be esteemed a favour.—YOUNG SURVEYOR.

[2850].—Efflorescence on Brick or Stone.—What will remove the green efflorescence that (at this season particularly) shows itself on freestone and brick walls that have been exposed during the winter?—CRURCH.

[2851].—Re-Using Plaster of Paris.—Is it possible to re-use plaster of Paris which has once set? Can it be ground up again, or in any way utilised?—G. E. T.

[2852].—Durability of Concrete-Work.—I will thank you, or any reader of the BUILDING NEWS, for proving to me the durability of Portland cement concrete as a building material. The number of the 8th of November last contained a question to the same effect from Mr. Sorby, and Mr. Redgrave answered by proving its hardness and strength. However, many hard and strong materials are not lasting. Roman cement was very hard and strong, and in several instances I have known it to decay, and had to be taken off the walls. Portland cement is not more than 40 years in use here, and may decay like the Roman. A few years ago, I saw an account in the BUILDING NEWS of a concrete building falling as the walls were built. I would thank you, Mr. Editor, for the date of the number.—FRANCIS NUNAN, Main-street, Killarney.

[2853].—Roman Catholic Cathedrals.—I have noticed that several English Roman Catholic cathedrals and churches are left slightly unfinished, a pinnacle or turret being only half built, and then left in that state for years after the rest of the building has been entirely finished, expense being evidently not the cause. I should be glad to know the reason why. I am told (but can scarcely think it correct) that a tax is demanded by the Pope for every church, convent, and school when quite complete, and that this is the usual plan taken in this country to avoid its imposition.—R. H. S.

REPLIES.

[2824].—Colour Wash for Old Stucco Houses.—The motley appearance your correspondent complains of may be remedied by colouring the fronts with Portland cement colouring. Pass the cement through a fine sieve, and mix with beer grounds or bottoms. In colouring with lime, an error is often made in not adding the oil when the lime and water are in a boiling state.—W. R. A., Uckfield.

[2837].—Lightning Conductor.—See pp. 22, 38, 101, 102, 150, and 392, Vol. XVI. of *English Mechanic* (new volume just published, 7s.)—KAPPA.

[2838].—The Building Act.—It is greatly to be regretted that the new Act has not yet been published, but the present Act, with notes, by Edward R. Cook, M.A., Barrister-at-Law, is published by Shaw and Sons, Fetter-lane.—W. W.

[2839].—Headstones Vegetating.—Try the application of a weak solution of "bluestone"—sulphate of copper.—B. G.

[2839].—Headstones Vegetating.—I know of no more effectual method of preventing headstones not painted from vegetating when exposed to the weather, than to make them from such kinds of stone as granite, porphyry, or marble, which, when well polished, give no lodgment to vegetation. Were a better selection of mate-

rials adopted in the manufacture of monuments, we would be saved the infliction of having to look at so much of our contemporary churchyard sculpture through a thick coating of oil paint. A very common and effective mode of removing vegetation from the softer kinds of headstones in the North Country is to lay them flat on the ground for a few months, but this is only a temporary remedy.—J. M.

[2841].—Fixing Chalk Drawings.—A solution of gelatine will give far better results than the use of milk or isinglass. Apply the gelatine solution before drawing. After the work is finished, expose the work to the steam of a tea-kettle.—GULES.

[2841].—Fixing Crayon Drawings.—How have you tried the milk—with a brush? If so, no wonder you dislike it; it invariably smudges the work. Get one of those little scent-dispersers, or "odoriferators," as the perfumers call them, and which are sold for a shilling or eighteen-pence. Hang your drawing on the wall level with your face, and use the instrument as you would with scent—substituting new milk, beginning at the top of the drawing, and directing the tube from side to side till you reach the bottom. Let the drawing dry, and repeat the operation, if necessary. Be careful not to direct the spray of milk too long in one place, or the fluid will collect in little globules, run down, and spoil your work.—FORTY WINKS.

[2841].—Fixing Crayon Drawings.—For the information of "Lux," agent the above, let me inform him that I have found a very thin wash of gelatine spread over crayon and lead-pencil drawings a successful method of fixing the lines. I have also tried milk, mixed with a slight solution of gum-arabic, answer very well, the only defect being that it slightly toned and glazed the paper, giving it an old appearance—an objection from which the former method is entirely free. In using milk, care must be taken that it is fresh and very poor, or it will destroy, instead of preserve the drawings.—JELL.

[2843].—Mr. Brooks's Churches.—It is scarcely probable that, after permitting his beautiful and original designs for churches to be illustrated in the BUILDING NEWS and elsewhere, that Mr. Brooks would issue a mandate forbidding sketching in or about them.—W. W.

STAINED GLASS.

CARDYNHAM.—Several new stained glass windows have just been placed in Cardynham Church, Cornwall. At the east end a three-light window has been inserted, in memory of the late Rev. Thomas Grylls, the stained glass being by Mr. J. P. Warrington, of London. The upper part of the central portion of the window is filled with a design representing the Holy Trinity. Flanking this, and crowning the side openings, are shields with the sacred monogram I.H.S. inclosed in a ground of ferns, and the Alpha and Omega in a wreath of Passion-flowers. The principal opening represents the Resurrection and Ascension of our Lord, and beneath is the memorial inscription. On the north side of the chancel is a two-light window, in the Perpendicular style, by Messrs. E. and S. Beer, of Exeter. The subjects represented are mostly acts of charity, such as "Clothing the Naked," "Visiting the Sick," &c., and each is surmounted by a canopy. A small chancel window by Mr. Warrington has the principal ground of late work character, with decorated intersections of colour upon them, and consists of two openings surmounted by a spandrel.

KILBURN.—The church of St. Augustine, Kilburn, has recently received a noble gift, consisting of the filling-in of the six large east windows with painted glass, by Messrs. Clayton and Bell. The lower tier of windows contain subjects in the life of St. Augustine of Canterbury. The series of subjects begins in the lower part of the left-hand light with St. Gregory meeting the English youths in the market-place at Rome; it then goes across the tier of windows to St. Gregory on his mission to England arrested by the incident of the locust; and ends in the third light with St. Gregory, as Pope, sending St. Augustine as missionary to England. Returning then to the left-hand window, and following the same line across, we have St. Augustine landing in Thanet, preaching before Ethelbert and Bertha, and the baptism of Ethelbert: in the third line again, beginning on the left, the general baptism in the river Swale, St. Augustine consecrated Archbishop of Canterbury, and founding his monastery at Canterbury; and in the arched heads of the windows are the deaths of Ethelbert, St. Augustine, and Queen Bertha. These are arranged as the predella, as it were, of the entire window, after the manner of Italian triptychs. Above, the longer lancets are filled with subjects taken from the life of our Lord. The lower series of subjects are on coloured backgrounds; those of the upper series on white. They have been prepared with the co-operation of Mr. J. L. Pearson, the architect of the church.

LEEDS.—This week a large stained-glass window will be inserted in the east window of All Saints' Church, York-road, Leeds. The window is the gift of Mrs. Hatton, of the Ivy House, York-road, and in memory of her brother, Thomas Schofield, Esq. The window consists of four lights with tracery above; the four lights contain subjects as follow, viz.:—"The Last Supper," "The Crucifixion," "The Resurrection," and "The Second Coming of Christ." The window is very richly coloured, and is the work of W. J. Boer, stained glass artist, of Leeds.

LINSLADE.—The east window in the church of St. Barnabas, Linslade, Bucks, has been recently filled with stained glass. The window is of four lights, with tracery. The subjects of the window are the four principal events in our Lord's life, with their corresponding types. Appropriate texts of Holy Scripture are written in Lombardic writing under the subjects. The artists are Messrs. Heaton, Butler, and Bayne.

WATER SUPPLY AND SANITARY MATTERS.

OXFORD MAIN-DRAINAGE.—On the 1st and 2nd inst. Major Tulloch, R.E., one of the Local Government Board inspectors, held an inquiry at Oxford upon a petition from the Local Board for power to take lands for the purpose of irrigation, &c. Mr. Bailey Denton, C.E., Mr. S. W. Leach, C.E., and Mr. W. H. White, C.E. (engineer to the Board), were examined on behalf of the Oxford Board, and Dr. Odling, Dr. C. C. Pote, the Rev. J. C. Clutterbuck, and Dr. Sankey on behalf of the Visitors of the Littlemore Lunatic Asylum, who were the principal objectors. With respect to the asylum, it was urged that as the water-course from which the asylum derived its main supply of water, and that especially which was used for drinking purposes, was partly surrounded by the land to be taken for irrigation, the quality of the water would be seriously affected, and this view of the matter was supported by Professor Odling, who was decidedly of opinion that it would be impossible for the authorities of the asylum to continue the use of the water. On the other hand, Mr. White, the Surveyor to the Local Board, states that special means have been taken to prevent the sewage contaminating the water of the asylum, and that the nearest point of the asylum is 600 or 700 yards from the sewage land. Mr. Bailey Denton's opinion upon this point was even more decided, but Mr. Denton, anticipating a conflict of authority upon the question, suggests a plan by which the asylum may obtain a better supply of water than it now possesses, viz., by intercepting the spring water, which now flows into the brook, and conveying it to the asylum reservoir. Professor Odling, on being recalled, admitted that the objection he had urged would be satisfied if the spring water were brought through impervious pipes from above the point where the sewage passed on to the land. As to Littlemore and Ifley, the site of the pumping-station is considerably below the village of Ifley, and distant 650 yards from the nearest house, and half a mile from the centre of the village. In the case of Littlemore, the irrigation farm is 700 yards from the church, and Mr. Denton states that no offensive smell will arise from the sewage works on the farm. Mr. Denton, in reply to Mr. Davenport, who appeared on behalf of the opponents of the scheme, said he had considered the alternative sites for irrigation works at Bullington and Byley Wood, and had rejected them on the ground of the increased cost of pumping.

LEGAL INTELLIGENCE.

BARRATT v. WYLIE AND ANOTHER.—PLANS DELAYED IN TRANSIT.—In this case, heard in the City of London Court last week, the plaintiff, a designer, residing at Battersea, sued the defendants, Messrs. Wylie and Lockhead, paperhanging manufacturers, for £1.15s., the value of thirteen designs which he had submitted to them in February last, and which, he alleged, they had kept so long on hand before they returned them that he could not use them for any one else. He would have to guarantee originality of design when offering them elsewhere, and the length of time that defendants had kept them would preclude him from saying they might not have been copied. The delay was attributed by Mr. Howden, the manager, to his having to submit the plans to Mr. Lloyd, one of the defendants' managers in Glasgow, in transit to which place they were delayed by the railway company. His Honour said it was a mere act of courtesy to return the plaintiff's design quickly, and they were only bound now to give up the plans to the plaintiff. There would, therefore, be judgment for the defendant. Referring to an incidental statement made by the plaintiff, that Mr. Howden had suggested to him the making of a claim of £25 for the plans against the railway company, His Honour said that if this were true, he was surprised that a firm which he knew to be of high standing for so many years in Glasgow, should sanction such a thing. It looked something very like conspiracy. It was a general opinion that the railways might be made the victims of any one who chose to cheat them.

IMPORTANT TO THE TIMBER TRADE.—**WILSON v. THE SURREY COMMERCIAL DOCKS.**—This case (which came before the Court of Error in the Exchequer Chamber, Westminster, on Tuesday last, present, Justices Blackburn, Keating, Brett, Grove, Quain, Archibald, and Honyman) raised a question as to the effect of the tender of a delivery order for goods by a sub-vendee to a dock company, when the landing of the goods in question had not been completed, and no landing returns had been received at the head office of the dock. The facts of the case were as follows:—Messrs. A. Pelly and Co. were consignees of a quantity of battens, which had arrived at the defendants' dock, but had not been landed when they sold them to a Mr. Hollis, to be paid for half by cash in exchange for a delivery order and half in one month from the date of the sale. Mr. Hollis gave Pelly and Co. a cheque for the price of the first half, and sold the battens to the plaintiff, handing to him both the delivery order which he had received from Pelly and Co., and also another from himself to the plaintiff. The plaintiff took both these orders to the dock company and requested them to hold the goods for him. There was a conflict of evidence at the trial as to what passed at this interview, but the jury found as a fact that the dock company's clerks distinctly declined to accept the transfers. At that time the battens were not fully landed and delivered to the dock company. Subsequently Mr. Hollis's cheque for the first half of the

goods was stopped, and Pelly and Co. immediately gave notice, as unpaid vendors, to the dock company to stop the goods. The dock company accordingly, relying upon the lien of Pelly and Co., as unpaid vendors, refused to deliver to the plaintiff. The Court of Exchequer, upon these facts, decided in favour of the dock company, and this was an appeal against their decision. Mr. Justice Blackburn delivered the unanimous judgment of the Court, affirming that of the Court below. He said that Pelly and Co., by giving the delivery order to Hollis, no doubt gave him authority to change the possession of the goods, and if that authority had been acted upon, and those who held the goods consented to hold them for Wilson, there would have been an end of the case. But then it must be shown that the dock company had so consented, or, as the expression was, had assented to the plaintiff. Here the jury had found that the dock company distinctly refused to accept the delivery orders. It had been argued that a sub-vendee was in a better position than his vendor, the original vendee; but that would be to give the same effect to a delivery order as to a bill of lading. The second vendee was in no better position than the first, and, against Hollis, Pelly, and Co. had a clear right to revoke the authority given by the delivery order when Hollis stopped his cheque for the price, just as much as if Mr. Hollis had become insolvent and so unable to pay the purchase money. Then it was said that there was a duty imposed on the dock company to give notice to Wilson of the stop put on the goods by Pelly and Co., and that their silence might be construed into an assent to holding the goods for Wilson as amounting to an estoppel. But no such duty was imposed by law upon the company, nor was there any evidence of a custom to that effect.

Our Office Table.

LIVERPOOL SCHOOL BOARD.—At the meeting of the Board on Monday, the Sites and Buildings Committee recommended that the author of the plans sent in under the motto "Once More," should be appointed architect for the schools to be erected upon Ashfield-street site; and that the author of the plans bearing the motto "Measure for Measure," be architect of the schools to be put upon Penton-street site. The committee had been unable to select for adoption either of the plans sent in for Beaufort-street site, but preferring those bearing the mottoes "Spes" and "A. B. C. D.," they recommended that the authors should be invited to send in amended plans. The recommendations were approved.

BUILDERS' BENEVOLENT INSTITUTION.—On Thursday next, the 22nd inst., an election of four pensioners (two males and two females) will take place at Willis's Rooms, S. James's. There are four male candidates, viz., Francis Sandon (seventh application), Daniel Thomas (third application), Richard Grove, and John Thomas. There are eight female candidates, viz., Elizabeth Treveltham (sixth application), Eliza Lambert (fifth application), Arabella Hambrook (fourth application), Sarah E. Bear (fourth application), Ann Williams (fourth application), Elizabeth Silcock (second application), Jane Rumens, and A. M. Williams. The poll will open at 12 o'clock noon, and close at 3 p.m.

INSTITUTION OF SURVEYORS.—At the ordinary general meeting of this Institution, held on Monday evening, 15th inst., Mr. George Eves, of Cambridge, was balloted for and duly elected as a Member. Some donations to the library having been announced, a paper was read by Mr. W. Hope, entitled "Sewage Farming." A discussion ensued upon Mr. Hope's paper, and upon that read at the previous meeting by Mr. Menzies, entitled "Arterial Drainage, Water-works, Water Supply, and Sewage Drainage Works executed at Windsor." A vote of thanks was unanimously given to Mr. Hope for his paper, and after a long debate the discussion was adjourned to the next meeting, which will take place on Monday evening next, the 19th inst., when the following candidates will be balloted for:—As Members: Mr. Dryland Haslam, of Reading, and Mr. John Wimbale, of Walbrook; as Associate: Mr. Spenser W. Gore, of Whitehall-place.

NORTHUMBERLAND HOUSE.—At the last weekly meeting of the Metropolitan Board of Works, a report was presented stating that the select committee as to the purchase of the site of Northumberland House, and for its removal for the new street from Charing-cross to the Thames Embankment, had approved of the Bill, subject to a proviso that the architectural elevations of all buildings to be erected under the Act should be submitted by the Board for consideration by

the Council of the Royal Institute of British Architects previously to the commencement of such buildings. The report was adopted, and the Board shortly after adjourned.

SOUTHWARK BRIDGE.—At a meeting of the City Commissioners of Sewers, held on Tuesday week, the Finance and Improvements Committee reported that they had examined the drawings submitted by the Bridge House Estates Committee relative to the suggested alteration of Southwark Bridge and its approaches, and had conferred with that Committee thereupon. Subsequently they considered a report upon the matter prepared by the engineer, Mr. W. Haywood, who stated that any small improvements in the gradients would, in his opinion, result in disappointment, and that the only satisfactory mode of remedying the existing defects would be to lower the whole of the arches of the bridge, which might be done so as to leave at no place between Upper Thames-street on the north, and Summer-street on the south, worse gradients than 1 in 30. The Committee were, therefore, of opinion that it is not expedient for the Commissioners to agree to the propositions as submitted by the Bridge House Estates Committee.

THE VALUE OF A NEW RIVER SHARE.—At the Auction Mart, on Wednesday, Messrs. Edwin Fox and Bousfield sold, in four lots, one quarter of a King's share in this corporation for the sum of £12,240, the income for the last year having been on this quarter-share £448. The rise in value in this property has been very marked. From having in years gone by been an unprofitable undertaking, its income is now enormous. In 1858 a share sold in the open market at the rate of £19,000; twelve years after, the auctioneers above named sold a share in lots at £38,000; and the result of this last sale shows the price of a share to be nearly £49,000.

DUBLIN EXHIBITION.—The Dublin Exhibition and Loan Museum was reopened on Wednesday. The building has been entirely redecorated, and some alterations made in its internal arrangements. The fountain in the centre has been completed by the addition of statues representing kneeling Nubian slaves sustaining a gas-standard, which will throw at night a bright radiance on the water. The grotto fountain is clothed in fernery, and in the further end of the great nave an organ is placed at the back of the orchestra. Beautiful creeping plants twine round the pillars supporting the galleries, and depend from suspended baskets. The gardens have greatly improved since last season. Sir Arthur and Mr. Cecil again assume the risk of the undertaking. The Exhibition of last year proved successful in a pecuniary sense, a balance of about £1,400 remaining after all the expenses connected with it were defrayed. This sum was devoted by the founders to carrying on the experiment for another year, in the hope that the public interest taken in it may induce the Government to place it upon a permanent basis. The loan museum is replete with rare and interesting objects. The contribution to it from South Kensington is only meagre, that establishment not having made any addition to the specimens sent last year. The Queen has sent a most valuable collection, comprising thirty-one articles. Sir Richard Wallace has lent, besides a few valuable pictures, several splendid specimens of old English plate, and some rare china. Lady Wallace has sent a silver-gilt toilet service of Queen Anne's time, with Venetian mirror. Many other noblemen and gentlemen have also given large and valuable contributions. The Royal portraits which hung in the room devoted to these treasures have been replaced by old paintings from South Kensington, copies of the Raphael cartoons. From the Indian Museum there is a gorgeous collection of robes, arms, gold and silver tissues, and carvings. An entirely novel feature is a collection of furniture illustrating various styles and epochs. There are portraits and other paintings of Lawrence, Eddy, Lely, Grouse, Angelica Kauffman, Hilton, MacLise, Frith, and others, and a valuable collection of old engravings. The industrial part of the Exhibition is rather backward, the exhibitors having deferred their preparations to the latest moment. The English manufacturers are not in such force as last year.

THE CITY CHURCHES.—Commenting on the future operation of the Union of City Benefices Act, the *Saturday Review* enumerates a list of churches that should be preserved, from architectural considerations. "No one," says our contemporary, "but a Lunatic Commissioner would

now propose to pull down the stately S. Andrew's, Holborn, or that majestic fragment of a great Romanesque minster, S. Bartholomew's, Smithfield. What, on the other hand, should we do with the historical S. Magnus, Fish-street-hill, one of Wren's choicest conceptions, and the living monument of that great chapter of our history—the Danish invasions? This church seems safe, but it is not quite secure. On the other hand, there is a cluster of five nearly adjacent churches in the innermost heart of the city, the demolition of any one of which would be a Vandalism, but each one of which has been repeatedly menaced. S. Michael's, Cornhill, with a noble Gothic tower by Wren, and a body gorgeously recast by Sir Gilbert Scott, with Rogers's finest wood carvings and Clayton and Bell's most carefully painted glass, stands very close to S. Peter's in the same street, the traditional successor of the oldest church in London, with a very picturesque spire, and an interior fitted up with more than usual care by Wren himself. The demolition of either of those churches would be an act of barbarous stupidity; so would be that of Wren's one completely Gothic church with a tower hardly inferior to that of S. Michael's, S. Mary Aldermay, now standing clear on the line of the new Queen Victoria-street. S. Michael's, too, and S. Mary Aldermay, have shown vigorous symptoms of revived spiritual activity; so also have the two adjacent churches of S. Edmund the King, in Lombard-street, and of S. Mary Woolnoth, at the corner of Lombard and King William streets. The last-named church is nothing less than an historical monument, being recognised as the *chef-d'œuvre* of Wren's greatest pupil—of whom so few works survive—Hawksmoor. Yet the General Post Office has long been hankering after its site in order to extend a branch office.

CHIPS.

This (Friday) evening, Mr. D. W. Wynfield will read a paper before the members of the Architectural Association on "Taste in Colour." Previous to this, Mr. Edmund Sharpe will meet the members and explain the construction of and the mode of using the cymagraph, and confer with the members as to their annual architectural excursion.

In connection with the Society of Engineers, arrangements have been made for a visit of the Members and Associates, on Monday next, to the works of the Albert Bridge at Chelsea, the Thames Embankment works at the same place, and the new Wandsworth Bridge. The members will meet at the Middlesex end of Albert Bridge at 1 o'clock.

A correspondent of one of the evening papers inquires why Mr. C. M. Ward makes a prominent feature of the Union Jack in his fresco in the Palace of Westminster, representing the landing of Charles II. at Dover, and reproduces it in his sketch of the same subject now exhibiting in the Royal Academy. The anachronism is obvious.

At the last meeting of the City Commissioners of Sewers Mr. Fricker gave notice of the following motion:—"That it be referred to the engineer to report fully as to the relative value of wood and asphalt for paving purposes, together with the probable expense and durability of each."

Kneassall Church has just been reopened, after restoration, under the direction of Mr. Ewan Christian, the architect to the Ecclesiastical Commissioners. The work was commenced a year ago by Mr. H. Clipsham, of Norwell, and a sum of £900 has been expended upon the nave and south aisle, roofs, walls, paving, and flooring, heating, &c. The chancel was restored by the Ecclesiastical Commissioners, at a cost of £205.

Messrs. Cubitt's workmen are now engaged in rearranging the staircase through the dome and lantern of S. Paul's Cathedral.

Michael Angelo's well-known colossal statue of David, hewn out of a single block, which for upwards of three and a half centuries has stood at the gate of the Palazzo Vecchio, Florence, is at length to be removed from its unprotected position. It will be placed in the Imperial Gallery, and to insure its safe passage, rails are being laid down along the streets through which the statue will have to pass.

Mr. J. H. Parker on Tuesday last commenced a course of four lectures at the Royal Institution, on "The Evidence for the Traditional History of Rome from Existing Architectural Remains;" and this (Friday) evening, Mr. Sidney Colvin, M.A., Slade Professor of Fine Art at Cambridge, will give a discourse on "The Limits of Certainty in Taste or in Artistic Judgment."

Mr. Sugden, of Leek, has been directed to prepare designs for the erection of a new Congregational Chapel at Congleton, to cost £4,000.

Portions of the city walls of Gloucester, lying north of the east gate, have been exposed for a length of 42ft., and proved to be about 6ft. deep on the top, increased by three successive sets off to a width of 7ft. towards the base. On the inner side, amongst broken pottery and other rubbish of undoubted Roman character, were found three pieces of Samian ware with the potter's mark upon them, and a few other ancient relics.

Sir Gilbert Scott's hotel, in front of the Midland Railway Terminus in Euston-road, was opened on Monday week. The mere fabric will cost the Midland Company the sum of £350,000, while the decoration and furnishing of the interior will require an additional £150,000. It is intended to accommodate 600 guests.

Steeple Gidding Church, Huntingdonshire, was reopened on Easter Tuesday, having been substantially restored from the plans of Mr. A. W. Blomfield.

The annual dinner of the committee for the improvement of Leicester-square, took place recently at M. Vargues's Paris and Europe Hotel. The chairman, Mr. J. C. Pawle, explained the steps taken for the improvement of locality, and mentioned that M. Vargues had acquired nearly the whole of one side of the square as a site for a Continental hotel, but would not proceed with its erection until the Chancery suits instituted by the committee were decided. Mr. Donald Nicoll advocated the conversion of the square into a flower-market.

The building trades are busy in Melbourne (Australia), but the architecture is hideous. Carpenters and masons are in great demand at ten shillings or more per day. A correspondent is of opinion that any architect who would establish himself there and design a few houses more suited to the climate than the stucco and brick tenements which court the sun and dust, would soon find plenty of clients.

The *Daily Telegraph* of Wednesday contains a long account from Mr. George Smith of some remarkable discoveries which he has made of Assyrian antiquities at Aleppo and in the valley of the Euphrates and Tigris. On one tablet that he found were the names of three Kings of Babylonia, two of which are quite new to history.

At the fortnightly Dean-of-Guild Court, Glasgow, held on the 8th of May, Mr. Whyte, Assistant Master-of-Works, stated that the probable cost of the new buildings, for which at that day's sitting permission to be erected was asked, would be about £123,680. There were twenty-nine applications, and the buildings are of the ordinary character.

The foundation-stones of the first schools to be erected by the School Boards of Huddersfield and Batley were laid on Saturday.

The Lord Chancellor opened the new Town Hall at Winchester on Wednesday. The building has been erected by Messrs. Jeffery and Skiller, of Hastings. A perspective view of the principal front, together with plan of principal floor and full description, appeared in the *BUILDING NEWS* of May 19th, 1871.

The Lord Chancellor will shortly lay the foundation-stone of a new church at Alton, Hants, dedicated to All Saints. Mr. F. C. Dyer is the architect, and Messrs. J. H. and E. Dyer the builders. The church will be built of Selborne stone, faced with Bath stone, at an estimated cost, for nave and chancel, of £2,100.

The Westminster District Board of Works have received a communication from Messrs. Trollope and Winchworth, stating that a client of theirs is desirous of contributing £1,000, towards the cost of making available as a public garden the vacant land between Abingdon-street, and the Thames, and adjoining the Houses of Parliament.

Trade News.

WAGES MOVEMENT.

LIVERPOOL.—Mr. Edward Whitley, the arbitrator between the master plumbers and the operatives of Liverpool on the questions whether work should be by the hour, or as heretofore by the day, and what the rate of wages should be, has sent in his award. He decides upon the hour system; and fixes the rate of wages as follows:—Summer months, 55 hours per week, at 7½d. per hour; winter months (Nov. 13 to Feb. 7), 47½ hours per week, at 8½d. per hour.

LONDON.—The committee of the Central Association of Master Builders have received memorials from men in the various branches of the trade for an increase of ½d. per hour on the present rate of wages—viz., from 8½d. to 9d. per hour. They have expressed a willingness, if the men required more money, to allow them to work longer hours in the summer months. To this the workmen's committee answered that they were anxious for shorter, rather than longer, hours of work, and again urged their request for an advance of wages.

TRADES-UNIONS IN CALIFORNIA.—In California the position of the trades-unions has remained in about the same condition as during the last year or so, only three—the bricklayers, stonemasons, and plasterers, retaining their strength sufficiently to adhere firmly to eight hours as a day's work. The House Carpenters' League, at one time numbering 3,000, has now only fourteen members. In considering this fact, we must also take into consideration the fact that in California and all over the United States, a man when thrown out of employment does not wait patiently until the dispute which occasioned his idleness is arranged. He is a "many-handed man," and turns to something else at once, and it is to be wished his British brother-workman could do the same. The following is the scale of wages in the building trade:—Blacksmiths, 12s. to 18s. per day of ten hours; box factories—men, 8s. to 14s. per day; boys, 16s. to 18s. per week; bricklayers, 20s. per day; cabinet-makers, 12s. to 14s. ditto; Carpenters (house), 16s. ditto; ditto (ship), 16s. to 20s. ditto; hod-carriers, 10s. ditto; labourers, 7s. to 8s. per day without board; ditto, £5 to £6 per month with board; masons, 16s. to 20s. per day; machinists, 10s. to 12s. ditto; painters, 16s. ditto; plumbers and gasfitters, 16s. ditto; stonemasons, 18s. to 20s. ditto; wagon-makers, 10s. to 12s. ditto.

ASHTON & GREEN,

Slates, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal). Prices on Wharf in London.

24 by 12	22 by 12	20 by 10	18 by 10	15 by 9
37½d. 6d.	33½d. 6d.	25½d. 6d.	21½d.	19½d. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8
192s. 6d.	145s.	170s.	117s. 6d.	67s. 6d.

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TENDERS.

BECKENHAM.—For stables, groom's residence, and out-buildings, approaches and boundary walls, at Eden Park, Beckenham. Mr. J. Fogerty, architect.
Foster (accepted) £1,850 0 0

BRIXTON.—For vineries, &c., for Mr. Wm. McArthur, M.P. Mr. J. Fogerty, architect.
Andrews £1,232 0 0
Lascelles 1,072 0 0
Caudler (accepted) 1,020 0 0

COVENTRY.—For the erection of sewage works at Whitley, Coventry, Warwickshire, for the General Sewage and Manure Company (Limited).
Marriott £7,416 0 0

FARNHAM.—For mansion and offices at Warren Corner, near Farnham, Surrey, for Mr. George Wilkin. Mr. Charles John Shoppee, architect, 61, Doughty-street London. Quantities by Mr. Sidney Young.

Henshaw	£5,990 0 0
Brass	5,927 0 0
Macey	5,650 0 0
Corder	5,633 0 0
Birch	5,578 0 0
Jackson and Shaw	5,422 0 0
Goddard and Son	5,334 0 0
Crosley (accepted)	5,378 0 0

GREENTATE.—For new Catholic Church, for the Rev. H. Beswick. Mr. E. Welby Pugin, architect. Quantities supplied by Mr. R. O. Harris.

Jackson	£6,650 0 0
Haigh and Co.	6,210 0 0
Southern (accepted)	5,850 0 0

LONDON.—For alterations and repairs to No. 13, Clare-street, Clare Market, W.C. Messrs. Ebbetts and Cobb, architects.
Carmody £160 0 0

LONDON.—For general repairs, painting, &c., to the New Corn Exchange, Mark-lane. Mr. G. Barnes Williams, architect.

	General Work.	New Lobby.
Mansfield	£850	£78 0 0
Howell	865	87 15 0
Hayward and Son	659	72 13 0
Pitman and Cuthbertson	548	71 10 0

(* Accepted.)

LONDON.—For new Turkish and vapour baths, Buckingham Palace-road, for Mr. Ross. Mr. E. Welby Pugin, architect. Quantities supplied by Mr. R. O. Harris.
Allen £3,408 0 0

NEWINGTON.—For schools, &c., for the district of All Saints, Newington. Mr. Robert Parris, architect. Quantities by Mr. T. Nixon.

Newman and Mann	£3,082 0 0
Mitchell	4,966 0 0
Sharpton and Cole	4,921 0 0
Morter	4,873 0 0
Crockett	4,847 0 0
Marsland and Son	4,633 0 0
Nixon and Son	4,554 0 0
Downs and Co.	4,420 0 0
Callum	4,396 0 0

NEWPORT.—For the erection of a block of ten cottages at Cwmbran, for the Trustees of the Cwmbran Estate. Mr. Capel N. Tripp, architect.

Clutterbuck	£2,000 0 0
Bolt and Co.	1,999 10 0
King and Godwin	1,963 10 0
Coleman Bros.	1,942 0 0
Spring	1,928 0 0
Christopher	1,475 0 0

PRIOR'S LEE, SALOP.—For cottage hospital for the Lilleshall Company (Earl Granville). Mr. Joseph Fogerty, architect, London.

Ashby	£2,896 4 0
Nevett Bros.	2,577 0 0
Marriott	2,390 19 5
Millington (accepted)	2,295 17 6

PADDINGTON.—For the erection of public baths and washhouses for the parish of Paddington, on land situate in Queen's-road, Bayswater. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. L. O. Biddett.

Aitchison and Walker	£25,018	0	0
Bowles	23,577	0	0
Crookett	21,250	0	0
King and Sons	22,237	0	0
Chappell	22,229	0	0
Thompson and Smith	21,987	0	0
Elkington (accepted)	21,300	0	0

SURRY.—For house for Rev. Dr. Rogers, Moore Park. Mr. J. Fogarty, architect.

Dubin	£1,200	0	0
Smith	1,150	0	0
Dunsmore and Knight (accepted)	1,025	0	0
Watson Bros.	977	0	0

SYDENHAM.—For villa residence, plot 12 E, Crystal Palace Park Estate, for Mr. Evans. Mr. John Norton architect.

Taylor and Sons	£2,690	0	0
Oliver	2,621	0	0
Colley	2,417	0	0
Sand and Simpson	2,300	0	0
Blake and Rampton	2,279	0	0
Keastand	2,225	0	0
Elliott	2,197	0	0
Tibbott	2,055	0	0
Aitchison and Walker	2,025	0	0
Moore	1,997	3	1
Blackmore and Morley	1,990	0	0

WEST HAM.—For the erection of schools, Forest-gate, for the West Ham School Board. Mr. J. T. Newman, architect. Quantities by Messrs. Curtis and Son.

Trevener	£9,980	0	0
Read	8,793	0	0
Abrahams	8,748	0	0
King and Son	8,695	0	0
Wicks, Bangs, and Co.	8,649	0	0
North	8,625	0	0
Niblett and Son	8,592	0	0
Rivett	8,492	0	0

WIGAN.—For a mortuary chapel for Mr. William Jarrett Walmesley, Westwood House, Wigan. Mr. E. Welby Pugin, architect.

Hardwick	£2,200	0	0
Williams	2,050	0	0
Jackson	1,999	0	0

WORKINGTON.—For new Catholic Church, for the Rev. Cuthbert Clifton. Mr. E. Welby Pugin, architect. Quantities supplied by Mr. R. O. Harris.

Estimates of Reduced Design.

Nicholls	£8,700	0	0
Hardwick	8,550	0	0
Watts	8,532	0	0
Wilson	8,500	0	0
Watkin	8,450	0	0
Jackson	8,300	0	0
Yates (accepted)	8,275	0	0
Smith	8,250	0	0

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Do. do. 13 by 7	212 6 ..	14s.
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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—ROYAL INSTITUTE OF BRITISH ARCHITECTS.—"Results of a Recent Investigation into Ancient Monuments and Relics." By Mr. J. S. Phené, F.S.A., F.G.S., F.R.I.B.A. 8 p.m.

INSTITUTION OF SURVEYORS.—Adjourned Discussion on the Paper by Mr. W. Menzies, entitled "Arterial Drainage Works, Water Supply, and Sewage Drainage Works, executed at Windsor between the years 1867 and 1873," and that by Mr. Hope entitled "Sewage Farming." 8 p.m.

SOCIETY OF ENGINEERS.—Visit to the Albert and Wandsworth Bridges and to the Thames Embankment Works, Chelsea. 1 p.m.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—1. Discussion on Sir C. A. Hartley's Paper "On the Delta of the Danube." 2.—(Time permitting)—"On Modern Locomotives, Designed with a View to Economy, Durability, and Facility of Repair." By Mr. John Robinson, M.Inst.C.E. 8 p.m.

WEDNESDAY.—SOCIETY OF ARTS.—"On Recent Processes for the Production of Gas for Illuminating Purposes." By Mr. Thomas Wells. 8 p.m.

THURSDAY.—SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—"On the Art Treasures of Italy." By Mr. George Brownrigg. 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—Meeting of Class of Construction and Practice; Subject: "Plasterer." Visitor for the Evening, Mr. Gilbert R. Redgrave. 6.30 p.m.—Meeting of Class of Design; Subject: "Gatekeeper's Lodge." 8 p.m.

COMPETITIONS OPEN.

BOND-STREET.—For the erection of a building on the site of the Clarendon Hotel, to comprise shops on the ground-floor, with suite of rooms or chambers over. Premiums of £50 for the best, and £10 for the second best designs. Mr. Goddard, 1, Great Portland-street, Oxford-street.

CITY OF LONDON. May 25.—The Painters offer the following prizes for competition:—1. For decorative painting, £5 and £3. 2. For painting from natural foliage or flowers, £5 and £3. 3. For freehand drawing and design, £3 and £2. 4. For marbling and graining, £3 and £2. H. D. Pritchard, Painters' Hall, Little Trinity-lane, Queen Victoria-street, E.C.

DEVON COUNTY ASYLUM. May 31.—For plans, specifications, and estimates for additional buildings at the Asylum at Exminster. The architect whose plans may be adopted will be employed to superintend the works, on the usual terms of commission, provided it be found that they can be executed within the estimated amount. The sum of £25 will be given for the second best design, namely, £10 for that of the chapel, and £15 for that of the other buildings. T. E. Drake, Clerk to the Committee, Exeter.

NORFOLK AGRICULTURAL ASSOCIATION.—For a design for Norfolk labourer's double cottage. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NORFOLK AGRICULTURAL ASSOCIATION.—For designs for farm buildings for a Norfolk farm of about 300 acres. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

ROUNDRAY PARK, LEEDS.—For plans and designs for laying out part of the above estate for the purpose of a public park, and the remainder as sites for villa residences. Premiums of 200 guineas for the best, 100 guineas for the second-best, and 50 guineas for the third-best design. C. A. Curwood, Town Clerk, Town-hall, Leeds.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 6s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ABERDARE SCHOOL BOARD. May 20.—For the erection of new schools in Clifton-street, Aberdare, for the accommodation of 1,000 children. R. Orton Grey, Clerk to the Board, Town-hall, Aberdare, Glamorgan.

ALEASTER RAILWAY. May 28.—For the construction of the Alester Railway. Mr. William Clarke, the Company's Engineer, 45, Parliament-street, London, S.W.

ATCHAM UNION. May 23.—For additions to the workhouse at Cross Houses, near Shrewsbury. Mr. T. Groves, Architect, The Priory, Shrewsbury.

BELFAST. May 21.—For the construction of about 1,770 ft. of brick outfall sewer. J. Guthrie, Town Clerk, Town Hall, Belfast.

BEVERLEY. May 31.—For the erection of an 80-quartermalt-kiln and warehouse joining the railway station. Mr. Robert Clump, Architect, 11, Bowalley-lane, Hull.

BOARD OF WORKS, ST. SAVOIR'S DISTRICT. May 21.—For the collection and removal of dust, ashes, &c., and for sweeping and cleansing the streets. H. Sturmy, Clerk to the Board, Board Room, Emerson-street, Southwark.

BUENOS AYRES. June 2.—For the water supply, drainage, sewerage, and paving of the city. Mr. J. F. Bateman, Engineer, 16, Great George-street, Westminster, S.W.

CROSS-Y-CELLO. May 26.—For the erection of a school to accommodate 139 children, and residence. Mr. E. Lawrence, Bank Chambers, Newport.

CROYDON UNION. May 23.—For the enlargement of the workhouse.—Mr. J. Berney, 61, North End, Croydon.

DURHAM COUNTY GAOL. May 24.—For the extension of the east and south wings. Mr. W. Crozier, Architect, Assize Courts, Durham.

FRANKFORT-ON-THAINE MAIN SEWERAGE WORKS. May 31.—Contract No. 49.—For the supply of about ten English miles of sewer invert blocks for 10 ft. and 5 ft. brickwork, together with 2,400 9 in. and 6 in. side Junction blocks. Contract No. 50.—For the supply of about 8,800 lineal feet of sewer pipes, ranging from 9 in. to 15 in. diameter, together with 825 junction pipes, bends, and taper pipes, and 1,000 disc plugs. Engineer's office, 16, Paul's Platz, Frankfurt-on-the-Main.

GRAZELEY, SHROPSHIRE. May 30.—For the erection of a new church. Mr. Thomas Roberts, 2, Church-lane, Bridgnorth.

HUMBER CONSERVANCY COMMISSIONERS. May 24.—For the embankment of Read's Island, in the river Humber, and for the construction of outfall sluices, landing, jetty, and other works there. Edward S. Wilson, Clerk to the Conservancy, No. 6, Whitefriargate, Hull.

KETTERING. May 22.—For repairing, reforming, and metalling Victoria, Albert, and Alexandra-streets, and School-lane. Mr. G. W. Lamb, Clerk to Local Board, Kettering.

LEWES. June 7.—For the erection of a race stand. Mr. J. D. Verrall, The Mulberries, Denmark-hill, S.E.

LICHFIELD. May 24.—For laying 500 yards of new main in the Birmingham-road. Mr. Thomas Perks, Leomansley, Lichfield.

LLANELLY LOCAL BOARD OF HEALTH. May 23.—Contract No. 1.—For the construction of tunnel, about 200 yards in length, and of a brick shaft for sluice-pipes, together with such excavations, masonry, brickwork, and embankments as may be necessary for the diversion of the River Llied, and other works. Mr. Edwin Harry Douglass, Surveyor, at the town-hall, Llanelly.

LONDON COMMISSIONERS OF SEWERS. June 3.—For the supply of cast-iron work. Joseph Daw, Principal Clerk, Sewers Office, Guildhall.

MIDLAND RAILWAY. May 19.—For the erection of wash-houses. Secretary, Midland Railway, Derby.

MIDLAND RAILWAY. May 20.—For the construction of a new road at Bradford, between Bolton-lane and Holywell Ash-lane. Secretary of the Way and Works Committee, Midland Railway, Derby.

MIDLAND RAILWAY. May 20.—For cleaning and painting the station buildings from Wigston to Oakley.

Secretary of the Way and Works Committee, Midland Railway, Derby.

MILDENHALL SCHOOL BOARD. May 22.—For the erection of school buildings at West Row for the accommodation of 218 children, and at Cross Bank for the accommodation of 60 children. Mr. George Isaacson, Clerk to the Board, Mildenhall, Suffolk.

NEW BRENTFORD. May 19.—For alterations and fitting shop-front to the Seventh Mile-stone House. Plans and specifications to be seen on the premises.

NEWMARKET. May 24.—For additions to the White Hart Hotel. Messrs. Clark and Holland, Architects, Newmarket.

SOHAM SCHOOL BOARD. May 27.—For the erection of boys' school in the Ely road, and infants' school in Clay-street. T. Hustwick, Clerk to the Board, Soham.

TALGARH, BRECKNOCKSHIRE. May 20.—For additions and alterations to Pontyval Hall. Mr. W. Jones, Cyfarthfa, Merthyr Tydfil.

WAR DEPARTMENT CONTRACTS. May 20.—For painting, &c., at the Herbert Hospital and Royal Military Academy, Woolwich.—Col. W. D. Gosset, Royal Engineer Office, Woolwich.

WAR DEPARTMENT CONTRACTS. May 24.—For the supply of materials and performance of such work as may be required in painting, &c., the barracks at York, Sheffield, and Hulme, Manchester. Commanding Royal Engineer, Royal Engineer Office, Manchester.

WELLINGTON, SALOP. May 29.—For the erection of new workhouse buildings in Street-lane. Messrs. Bidlake and Fleming, Architects, Wolverhampton.

WELLINGTON (SALOP) UNION. May 29.—For the erection of new workhouse buildings in Street-lane, Wellington. Messrs. Bidlake and Fleming, Architects and Surveyors to the Guardians, Wolverhampton.

WELSHPOOL. June 3.—For taking down a portion of the present town-hall and adjoining buildings, and reconstructing the town-hall. Mr. B. Lay, Architect, Bridge House, Welshpool.

WIGTON. May 19.—For the erection of vagrant wards at the union workhouse. Mr. W. Manduell, Clerk to the Guardians, Wigton.

WOOLHOPE. May 24.—For building a school and teacher's residence. Mr. Chick, Architect, 53, East-street, Hereford.

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THE BUILDING NEWS.

LONDON, FRIDAY, MAY 23, 1873.

FREE BRIDGES.

IN all ages of history it has been an instinct of mankind to erect its cities on the banks of rivers, not always, however, because they were commercially, or, in a military sense, navigable. Thus, Babylon, on one of the Mesopotamian streams; Rome, on the Tiber; Florence, on the Arno; Berlin, on the Spree; Vienna, on the Danube; Paris, on the Seine; and London on the Thames; not to make the enumeration tedious. Hence, all these capitals have drawn an invidious distinction between the different banks of their great streams, and one has invariably been disparaged by the epithet "transpontine." But in few of them, London excepted, has so pertinacious an effort been made to aggravate the division by means of gates and tolls. It is true that we are improving in these respects. Kingston and Kew are free; Blackfriars is open; neither London nor Westminster Bridge ever asked a passenger-tax; and even Southwark is now an open highway. Still, Waterloo, which connects, as it were, the two valves of the very heart of London, is barred by the white-aproned men, and by half-pence and twopences, which turn adrift the currents of traffic in two directions. Well, what is a bridge, no matter of what materials constructed—iron, wood, or stone? It is the equivalent of a natural roadway, the supercession of ferries, and, in a humbler fashion, of stepping-stones; and, in fact, what viaducts and causeways are on land. The history of this expedient, so to describe it, is curious. As roads lengthened, bridges multiplied. The most perfect ferry conceivable could not render them superfluous where the amount of traffic is considerable. Nevertheless, they originated in humble beginnings. As the first "man-of-war" was a canoe, hollowed in the trunk of a tree, so the first bridge was a log thrown across a rivulet; then came platforms of planks, either attached to posts or floated on barrels, upon which a pack-horse might pass, together with foot-passengers. But when vehicles came to be used, an improvement was necessary. So essential were these common conveniences considered, that in olden times persons desiring to be remembered as public benefactors endowed a bridge in their wills. Thus almost the earliest stone structure of the kind was erected, as a thank-offering, by Queen Matilda, at the spot where she had narrowly escaped drowning in the Lea. But local jealousies long interfered with the multiplying of these edifices. One town became, practically, two towns. So late as 1750 London Bridge constituted the solitary means of communication by land between the northern and southern divisions of the British metropolis. Every effort to create another was angrily and jealously resisted. Even the rickety arches of Putney were opposed a hundred years previously, as though the privileges of London depended upon them. The citizens declared that all traffic from one side to the other should pass through the city. A Bill was brought before the House of Commons; one of its members asserted that "if carts were allowed to go over the new bridge, London would be destroyed;" another affirmed that "it would make the skirts of London too big for the body," besides producing sands and shelves in the river: while a third maintained that, if this concession were granted, there might be a demand for even a third bridge somewhere near Lambeth! Such an opposition may appear unintelligible in our days, yet it actually prevailed during a century from that time. London Bridge remained alone, with its narrow carriage and foot ways, scarcely

superior to those of the streets branching from Cheapside. Well, we have "changed all that." There are now nine bridges from Putney to the City—five of them being of iron, in addition to two tunnels. A perfect mania for bridge-building at one time arose. Thomas Paine, the free-thinker, offered to span the Schuylkill with a single arch of four hundred feet span; he did construct a part, which was ultimately used for the Wear, at Sunderland, beneath which vessels of three hundred tons could sail without striking their masts. Stimulated by this example, Telford projected an iron arch for London, 600ft. in span, with a headway of 65ft. above high-water. London was eager to burst the barriers that had so long divided it. So was Paris, which, practically speaking, had hitherto been two cities, with two systems of civilisation and manners. The Pont du Louvre and the Pont D'Austerlitz were no longer opened than they thronged with riders and pedestrians. But no comparison could be drawn between them and even Walker's Vauxhall Bridge, or the Southwark Bridge of Mr. Rennie, or the celebrated stone arch over the Dee, at Chester. All over the world, however, these facilities are acknowledged to be indispensable, and ours is almost the only country in which they are allowed to be private or corporate estates, and burdened by a tax. The semi-civilised states of South America invented, long before we did, the idea of suspension-bridges, of the highest description, for the crossing of rivers and narrow valleys; in China—where the bridge-builders are famous—in India, in Peru, and Chili, hides, ropes, and bamboo basketwork were employed; but we never heard of a toll exacted for their use. Nor on the magnificent way constructed over the Danube at Budapesth, which was a work of infinite difficulty and enormous expense, though a Bill for levying a tax upon it was originally passed by the Hungarian Assembly of nobles; nor on the wonderful wire-bridge across the valley of the Savine, in Switzerland, spanning a space of 870ft.—it is perfectly free; nor is any American bridge, that we are aware of, tolled. Of course, when such prodigious and expensive structures as the Britannia and Conway tubular bridges come within the plan of a railway, their cost must be calculated in the scale of fares; but their case is totally different from that of the metropolitan bridges, which are the only facilities for communication between millions of people, some rich, and others poor, to whom the bar and the turnstile are nuisances, if not oppressions.

NOTES ON STONEMWORK.—VIII.

OOLITIC LIMESTONE.

THE Lias formation lies between the New Red Sandstone, last mentioned, and the Oolite, but it is chiefly useful as a source of lime for mortar and for concrete, and, although wall-stone is derived from some of the beds, the building-stone which it yields is not of great general importance. Professor Ansted says that Oolite is the name given to limestones made up more or less completely of minute egg-shaped particles, generally concentric, and often consisting of calcareous matter accumulated about some minute point of organic origin. According to the same authority, the whole series consist of the following beds, in downward order, viz.,—

Portland stone	Upper
Kimmeridge clay	...	...
Coral rag and Calcareous grits	Middle
Oxford clay	...	...
Cornbrash	...	...
Forest marble	Lower.
Bradford clay	...	...
Great, or Bath Oolite.	...	...
Stonesfield slate	...	...
Fuller's earth	...	...
Inferior Oolite	

The Inferior Oolite (the word inferior is here used in the sense of being lower, or the

lowest in geological order, and has no reference to quality, for some of the best building stone in the whole formation is found in the Inferior Oolite, as, for instance, that of Painswick-hill) includes a thickness of 40ft. or 50ft. of freestone, and in some places more. Professor Hull gives the thickness of the various beds at Leckhampton-hill as follow:

	Ft.
Ragstone.—A rough, shelly oolite, not used for building	38
Upper Freestone.—White or light yellow oolitic limestone, used for ordinary buildings	34
Oolitic Marl.—Soft chalky limestone and marl	7
Lower Freestone.—Fine grained, compact oolitic freestone, white or light yellow, used for building purposes	147
Pisolite, or Pea Grit.—Largely oolitic, friable limestone, shelly and coralline, unfit for building purposes	38
	264

The Inferior Oolite is largely developed in the Cotteswold Hills, in Gloucestershire, and of it have probably been built Gloucester Cathedral, the Abbey Church of Tewkesbury, Sudeley Castle, and other buildings in the Vale of Severn. Besides the Painswick stone there are other quarries in the Inferior Oolite at Bourton, Broadway, Guiting, Stanway-hill, Clevecloud, Sheepscorn-hill, Syreford, Brockhampton, and Loughborough. The Painswick and the Caen stones are much alike in texture.

The great or Bath Oolite is a more extensive formation than that below it; its average thickness being, according to Mr. Hull, 200ft. Its lower portion consists of the Stonesfield slate, a calcareous flagstone occurring in two beds, separated by a loose calcareous sandstone, and quarried for flagstones and tiles near the village of Stonesfield, in Oxfordshire, and at Sevenhampton, near Cheltenham; also at Colley Weston, near Stamford, in Northamptonshire. The oolitic freestones of Burford and Tainton also occur in the lower division of the great or Bath Oolite, and have been used at Blenheim Palace and in the interior of S. Paul's. Stone from this division of the Bath Oolite has been used in ecclesiastical buildings of the thirteenth, fourteenth, and fifteenth centuries in the city of Oxford, and it has stood better than that of more modern buildings derived from the neighbouring quarries of Heddington, in the Coralline Oolite.

The most important quarries of the Great or Bath Oolite, however, are situated along the range of the Somersetshire hills, at Stinchcombe, Minchinhampton, Bathampton, and Bath Baynton, Chippenham, and Douling. The following existing buildings are good specimens of the durability of this stone: the Abbey Church at Bath, Glastonbury Abbey (eleventh century), Wells Cathedral (twelfth to fifteenth centuries).

The Great Oolite ranges through portions of Oxfordshire, Northamptonshire, and Lincolnshire. At Barnac and Casterton, in Northamptonshire, it is a light brown oolitic shelly limestone, weighing in its ordinary state 136lb. 12oz. to the cubic foot; used at Burleigh House, Peterborough Cathedral, Croyland Abbey, the churches of Boston, Spalding, Holbeach, and Moulton, and in the greater portion of the churches of Lincolnshire and Cambridgeshire. The Ketton stone, from quarries near Stamford, is a rich cream-coloured oolite, rather harder and more uniform than that of Barnac. The stone from Ancaster, near Sleaford, in Lincolnshire, is a compact, fine-grained, cream-coloured oolite, of a specific gravity greater than that of Barnac, and also more cohesive. It weighs 139lb. 4oz. per cubic foot, and is worked with the same tools as Bath stone. Bath Baynton stone is chiefly carbonate of lime with oolitic grains, of a cream colour, and weighs 123lb. per cubic foot. A section of the quarry shows Rubble stone, 16ft.; Scallet, 12 to 15ft.; Black and white rag, 5 to 10ft.; Corn grit, 15 to 20ft.;

Ground stone, 16 to 22 ft. The corn-grit is used for dressings; the scallot, which is the finest in grain, is used for ashlar. There are many qualities of Bath stone, and some are very inferior, but those from Coombe Down, Corsham Down, and Box-hill quarries, when well selected, are of good quality. A committee appointed by the Royal Institute of British Architects reported some experiments on oolitic stones in 1863. Cubes of 4 in. sides were taken and subjected to pressure with the following results:

Description of stone.	Weight producing first fracture in 4 in. cube.	Crushing weight of 4 in. cube.	Crushing weight per sq. in.
Corsham.....	Tons. 8-00	Tons. 8-84	lbs. 1,238
Do.	—	8-30	1,162
Do.	7-50	8-10	1,134
Box, best bed	—	5-40	756
Do., ground bed.....	—	8-60	1,204
Do. do.	5-70	5-85	819
Do. do.	—	4-35	609
Caen stone	8-20	15-40	2,156
Do.	7-50	12-70	1,778

Oolitic limestone is largely in request for ordinary architectural purposes. When first quarried it is sufficiently soft to be cut into the shapes required by ordinary toothed saws, carpenters' chisels, gouges, and drags, which is not the case with sandstones, the working of which involves much more labour, effected generally by the mason with his mallet and chisel.

On examining a specimen of Bath or Cheltenham oolite, the spherular grains are found to be either hollow, or they contain as a nucleus a grain of sand or a fragment of shell, or other foreign substance; and the grains vary much in size, ranging from that of the roe of small fish to the size of peas, as in the Pisolite of the Inferior Oolite (from *pisum*, a pea). All the oolites are of marine origin, and are composed of carbonate of lime, with various proportions of carbonate of magnesia, silica, alumina, and iron. The Royal Commission on Building-stones gave the following analysis, made by Professor Daniell:—

	Ancaster.	Bath Box.	Portland.	Ketton.
Silica.....	per cent. 00	per cent. 00	per cent. 1-20	per cent. 00
Carbonate of Lime.....	93-53	94-52	95-16	92-17
Carbonate of Magnesia.....	2-90	2-50	1-20	4-10
Iron, Alumina.....	0-80	1-20	0-50	0-90
Water and loss	2-71	1-78	1-94	2-83
Bitumen	Trace	Trace	Trace	Trace

The specific gravity of each of these kinds of stone was found to be as follows:—

Of Dry Masses	2-182	1-839	2-145	2-045
Of Particles	2-687	2-675	2-702	2-706

The quantity of matter disintegrated, in grains, by Brard's process, for eight days, was as follows:—

	Ancaster.	Bath Box.	Portland.	Ketton.
	7-10	10-00	2-70	3-30

The comparative quantities of water absorbed when saturated, after the air had been extracted from the pores of the stone, so far as that could be done under the receiver of an air-pump,* were as follows:—

	0-180	0-312	0-206	0-244
--	-------	-------	-------	-------

Comparing the weights of 2 in. cubes in the ordinary state of the stone with their weights when saturated with water, the following were the results, the weights being in grains:

Ordinary state	4,585	3,767	4,303	4,412
Saturated	4,920	4,109	4,575	4,715
The differences being	335	342	272	303
And the percentage of weight of water absorbed.....	7-3	9	6-3	6-9

* See note from Commissioners' Report, in No. 6 of this series of "Notes on Stonework," at foot of first column of p. 295.

Experiments were made by the Stone-selection Commission on the crushing strength of these stones, in the manner described in No. 6 of this series of Notes, p. 295, with the following results on 2 in. cubes:—

Name of Quarry.	Ancaster.	Bath Box.	Portland.	Ketton.
Weight producing first fracture.....	cwt. 60-72	cwt. 45-54	cwt. 75-90	cwt. 55-66
Crushing weight.....	83-49	53-13	139-15	91-68

The weights per cubic foot of these four kinds of stone are as follows, that of "Portland" being a mean between 135 lb., top bed, and 147 lb. the best or lower bed:

	lbs. 139½	lbs. 123	lbs. 141	lbs. 128
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The exterior of Byland Abbey, Yorkshire (12th century), is built chiefly of a compact oolite from the Wass quarries in the vicinity. The west front is in good condition, even in the dog's-tooth mouldings and other decorations of the doorways, &c. The north side of Queen's-square, Bath, and the obelisk in the centre, built about 130 years since, are in fair condition. The Circus, built about 1750, of an oolite in the vicinity, is generally in fair condition, except those portions which have a west and southern aspect, where the most exposed parts are decomposed. The cathedral at Oxford (12th century) is chiefly of shelly oolite, similar to that of Tainton, the old work being in good condition, but the later work much decomposed; Merton College Chapel (13th century) of a shelly oolite, resembling Tainton stone, in good condition generally; New College cloisters (14th century), of a shelly oolite (Tainton), in good condition. The colleges, churches, and other public buildings of Oxford, erected during the last three centuries, are chiefly of an oolitic limestone from Headington, about a mile and a half from the University, and are in a general state of decay. The plinths, string courses, &c., on the other hand, are of Tainton stone, and in good condition.

The following are some particulars of oolitic stones given in the report of the Stone-selection Commission before referred to, in addition to those already stated:

Name of Quarry.	County.	Weight per cubic foot.	Size of blocks.
Lodge-hill, Bath.	Somerset	116 0	12 to 36 c. ft.
Baynton, Bath.	Wilts	123 0	To 10 tons.
Drewe's quarry, Bath.	Do.	122 10	To 125 c. ft.
Crannmore, Bath.	Do.	134 4	Large size.
Barnac, Bath.	Northampton	136 12	To 30 c. ft.
Haydon, Bath.	Lincolnshire	133 7	14 x 4 x 3
Raynora, Bath.	Oxfordshire	135 15	Large size.
Windrush, Bath.	Gloucestershire	135 15	5 to 40 c. ft.

Buildings in which used.
Buckingham Palace, S. James's-square, Bath.
Wells Cathedral, &c.
Burleigh House, Peterborough Cathedral
Churches in Lincolnshire & Cambridgeshire
Lincoln Cathedral.
Blenheim Palace, Interior of S. Paul's, and other churches in London.
Windrush Church and buildings in the neighbourhood.

The district of country which yields an imperfect oolite similar to that of Headington, extends many miles to the west of Oxford. The towns of Abingdon, Farringdon, Highworth, Wootton Bassett, and Calne, are situated either upon this part of the Oolitic formation or on the borders of it. The average breadth of the district west of Oxford is nearly four miles, but beyond Highworth it becomes much narrower, and can scarcely be traced beyond Calne, in Wiltshire. The upper beds are the most distinctly oolitic. The coralline beds, from which the whole mass between the Kimmeridge clay above, and the Oxford clay beneath, has sometimes been called the Coral Rag, occupy the middle place between the calcareous freestone beds which lie immediately under the Kimmeridge clay, and the more siliceous beds which rest upon the Oxford clay. The beds of coralline oolite are seldom suitable for any kind of building, being too loose and rubbly to be worked into blocks of any considerable size.

The Bradford Clay is stated by Professor Ansted to be nearly of the same age as the Great Oolite, and consists usually of a pale greyish clay, and inclosing thin slabs of tough brownish limestone. In Yorkshire this part of the series consists of nodules of ironstone, overlying hard blue and fine-grained limestone, which is extremely durable, and has been found well adapted for various economical purposes, especially for works exposed to the beating of the waves, where smoothness of surface is not required.

The Forest Marble, so called from being found at Whichwood Forest, in Oxfordshire, consists of carbonate of lime, sometimes crystalline, and sometimes marly, including about 25 ft. of workable stone.

The Cornbrash consists of clays and sandstones, which ultimately pass into a thin, rubbly stone, tough, and occasionally crystalline.

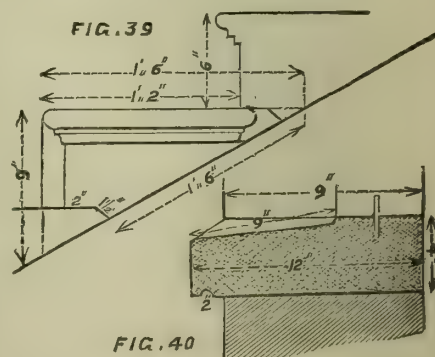
Between the Cornbrash and the Oxford Clay there is often an intervening stratum composed of calcareous sandstone, called the Kelloway rock, which varies in thickness from 3 ft. to 5 ft., but it is seldom oolitic.

The Coralline Oolite, or Coral Rag, has been already mentioned. The thickness of the bed is given by Professor Ansted at about 40 ft.; large portions of it are made up of the organic remains of a single species, and an earthy calcareous freestone, full of fragments of shells, rests immediately upon it, and is surmounted by a fine-grained ferruginous sandstone, slightly oolitic in structure, and which marks the close of the Middle Oolitic period.

QUANTITIES.—XVI.

MASON.—(Continued.)

THIS week give a few illustrations, the better to exemplify the instructions given. I also give a review of the Scottish method of measuring mason's work, as explained hereafter.



SPANDRIL STEPS.—FIG. 39.

There are several methods of measuring spandril steps, but I think that in most general use is to take them as follows:—Measure from out to out for the length, in-

cluding the portion pinned into the wall; for the breadth, take from the edge of the nosing to the acute angle; and for the height, take the dimension from top of step to angle. This divided by two will give the cubical contents of one step. I have shown the extreme dimensions of the stone by dotted lines. Spandril steps are measured in this way, as two steps can be cut out of a rectangular block of the dimensions given.

1/2	5.0	
	1.6	
	9	Portland stone step.
1/2	1.6	
	9	Half-sawing to one end.

1.2	
2	
1.4	

5.0	
1.4	Plain face to top.
5.0	
1.6	Add soffit.
6	
6	Add front of step pinned into wall.
2	
1 1/2	
1 1/2	
5	

5.0	
5	Sunk work in rebate.
4.6	
6	Add to front (stopped).
1.2	
4	Add end.

4.6	
1.4	
5.10	

5.10	
6	Moulded work.

No. 1 mitre to 6in. moulding.
No. 1 stopped-end do.
No. 1 mitred and returned end do.
No. 1 step cut and pinned to wall.
No. 2 mortices for balusters.

Should the moulding not be returned to step, the end would be taken as plain face. The soffit of spandril winders would be measured as circular plain work.

WINDOW CILL.—FIG. 40.

4.0	
1.0	
4	Portland stone cill.
4.0	
1.4	Half-sawing.
2)	1.0
	4
	Add ends.

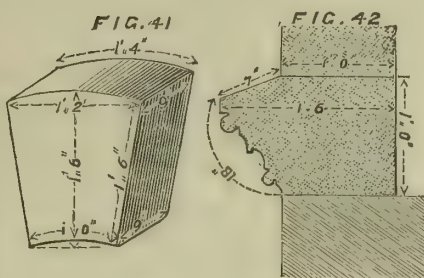
4	
4	
2	
10	

4.0	
10	Plain face.
2)	4
	2
	Add ends
4.0	
9	Plain face sunk in weathering.
	No. 2.—Stops to weathering
4.0	Groove for tongue.
4.0	Throat.

ARCH STONE.—FIG. 41.

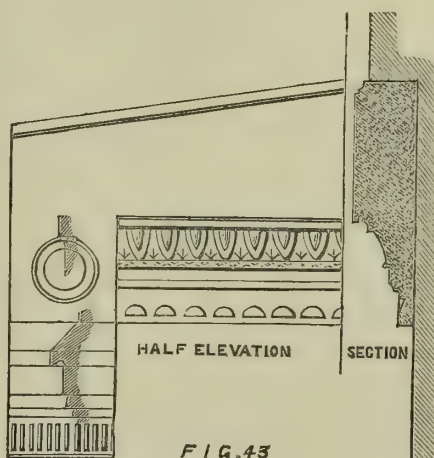
1.2	
9	
1.6	Portland stone.
1.2	
1.6	Half-sawing to back.
1.6	
9	Plain work in one joint,

1.6	
9	Plain work, sunk ditto.
1.4	
9	Circular plain work in beds.
1.6	
1.2	Plain face.
1.0	
9	Circular ditto



CORNICE.—FIG. 42.

3.0	
1.6	
1.0	Portland stone cornice.
3.0	
1.0	Half-sawing bottom.
3.0	
1.0	Bed-top.
2)	1.6
	1.0
	Joints.
3.0	
1.0	Plain face-back.
3.0	
7	Do. Sunk in weathering
3.0	
1.6	Moulded work.



HEAD TO WINDOW.—FIG. 43.

7.6	
2.10	
9	Portland stone.
7.6	
2.10	Half-sawing (back).
2)	2.10
	9
	Add ends.
2)	1.2
	9
	Plain work in beds.
2	1.10
	9
	Sunk work (top).

7.6	
2.6	Plain face (average).
5.0	
6	Add.
5.0	
9	Moulded work.
3.10	2 Stops.
4	Add moulding top.
5.0	1 Mitre.
6	Egg and tongue carving.
5.0	Enriched bead do, 3in. girth.
	2 Circular moulded and sunk panels, 1ft. 4in. diameter.
	15 Small semicircular splayed sinkings as sketch.
2)	1.2
	1.7
	1.2
	Add stone truss.
2)	1.2
	1.7
	Half-sawing back.
2)	1.7
	1.2
	Add one end.
2)	1.2
	1.2
	Add bottom.
2)	1.2
	1.2
	Plain bed.
2)	1.7
	1.2
	Plain face (one end).
2)	1.2
	6
	Add (face).
2)	1.2
	6
	Sunk work in weathering.
2)	1.2
	3
	Add in rebates.
2)	1.2
	1.3
	Moulded face.
2	
9	Narrow circular sinkings, 4in. high, with circular stops.

Since I have commenced these articles, I have had forwarded to me the "Rules and Regulations for the Measurement of Mason Work in Edinburgh, Leith, and vicinity, as agreed upon by the Architects, Surveyors, and Builders" of those neighbourhoods. The perusal of this pamphlet has given me much pleasure, and I regret that some such system as this has not been adopted in the metropolis. Rules for the guidance of all concerned could easily be drawn up at a few meetings of the leading members of the profession and the building-trade, which would dispense with many controversies as to the measurement of certain trades which exist to so large an extent at the present time. My desire in the present articles has been to lay down a basis of action, but I should infinitely prefer such a meeting as that I have just mentioned as one that would meet more with the approval of the profession as a body.

The annexed form I give for the large number of my Scottish readers who are interested in the subject, and who may not be possessed of the pamphlet to which I have made allusion, also for those of my English readers who may have business with our neighbours "over the border." I have only mentioned therein items as to which there is a difference of measurement. As will be observed, I have made no remark on local rubble-stone, the measurement of which is also spoken of in the pamphlet, as it must necessarily differ in many respects from the rules which I have laid down, it being so entirely dependent upon custom, even in our own country—as it differs in many counties. If any of my readers should be, however, sufficiently interested in the subject, I will give it *in extenso*. There are also some general conditions of contract

DESCRIPTION.	METHOD OF MEASUREMENT.	
	SCOTCH.	ENGLISH.
BRICKWORK. Brickwork in partitions, gables, and party walls.. .. .	At per yard super, deducting only for press voids, but not for fire-places, vents, or window bossings.	At per rod of 272ft. super of 1½ bricks thick; the brickwork, where above ½ brick thick being reduced to this standard. Half-brick partitions at per foot super. All openings are deducted, including the fire-places, but not the flues, the extra labour in forming them being taken as an equivalent for the saving in brickwork.
Ditto circular on plan, or in arches and inverts	Ditto, taking the largest size.	Ditto taking the mean circumference.
Plumbing corners of external walls	At per foot lineal.	Not measured.
Reveals of outside doors and windows	At per foot lineal for extra labour.	Not measured in common brickwork. Measured in superior facings with the front.
Superior bricks for face work, pointing, and flushing for white-washing	At per yard super.	At per foot super.
HEWN WORK. All hewn work, except stair-steps, plats, hearths, and pavements ..	Charged for its additional value over price of rubble-building measured on exposed surface, and classed and rated separately, according to size of materials and kind of work.	Stone and labour measured separately, the stone being taken in one item, and the labours classified according to the execution.
Base courses, strings, belts, plinths, narrow copings, and blocking courses	At per foot lineal, specifying breadth, thickness, and workmanship.	As above. Exception made with regard to Yorkshire stone, which is customarily measured according to Scotch method.
Cills, lintels, upstarts, architraves, and mullions	Ditto. Ditto.	Ditto. ditto.
Yabates and corners	At per rising foot, specifying size of stone and description of labour, and where part moulded, the girth of the plain work on the face, and to bottom of cheek of the ingoing to be stated, as well as the nett girth of the moulding.	At per foot cube, labours separately.
Plain ashlar	At per foot super, allowing 3in. for wall-hold at internal angles; 6in. allowed for bevelled cuttings as at "pediments, skews, &c."	At per foot super, measuring the face and making no additions; cuttings taken at what they measure for labour, no allowance being made to the stone beyond what it measures.
Deductions for doors and windows in ashlar, with upstarts and pilasters of stone	Full deduction of void and piers to be made less 1ft. in width, which is understood as an "allowance for headers at ingoing in ashlar work. The price of ashlar to include for headers in general surface."	Full size of opening deducted.
Ordinary cornices and other running mouldings	Measured from extreme points at per lineal foot, the extreme lengths of returns at external and internal angles being taken as an allowance for mitres.	Stone and labours measured as before stated, and the mitres numbered, stating the girth of the moulding.
Special cornices, where there are numerous returns and coping to chimney stalks (when broad stones are ordered)	At per foot super, and labour to edge at per foot run, stating girth and description of work.	Ditto, York stone, measured as before described.
Steps	Numbered.	At per foot cube, labour being taken as before; York stone at per foot run.
Paving	At per foot super, making an allowance of 3in. for every lineal foot of cutting at angles or circles.	At per foot super; no allowance made in stone for cutting; labour to cutting being taken separately at per foot run.

between employer and contractor, to which reference is made as to the payment for the quantities, and to which I may hereafter refer.

B. F.

NOTES ON TIMBER.

MANY years ago it was comparatively easy to import trees from the north of Europe of sufficient size to make topmasts for the largest classes of men-of-war. Now, however, little timber of the required dimensions could be produced, even had we not now given the preference to iron masts. In fact, the mast trade is declining. Canadian yellow pine masts used formerly to be plentiful at 30in. in diameter, but none, or nearly none such, are now to be met with; nor if we wanted wooden stern-posts for our men-of-war could we now procure them from the old sources of supply. These are only one or two instances which might be brought forward to show that if timber of large dimensions is wanted from the ports we have been so long in the habit of dealing with, it will not be readily forthcoming, except at a vastly enhanced cost, and perhaps even then it may be impossible to purchase it. For both oak and fir we have long been almost dependent on foreign or colonial supplies. Oak certainly still comes to our markets from our own native plantations, but the supply is limited, for as trees are felled, the remainder are more

and more looked upon as ornamental trees, not destined for the axe. Although it is usual to speak of fir and pine as "fir timber," still there is a difference between the two—witness Riga fir and North American pine. Du Hamel says pines have the leaves thready and slender, growing in clusters from the same leaf-stalk, while firs have straight leaves, each growing separate, but many growing on the same leaf-stalk, like the teeth of a comb. These are the general characteristics between the two sorts of trees which produce fir timber. The pines grow with their trunks much less tapering towards their tops than the firs; they are therefore, from shape, more adapted for masts than firs. Their wood is also more resinous, and the resin is of a more glutinous nature, and therefore less easily evaporated; it also, in consequence of this quality, enables the timber, to resist better the absorption of water or moisture when exposed to it. The pine is more durable than the fir, and its fracture is, even when partially decayed, much more fibrous, and takes place with more previous warning. Riga fir is not only extremely flexible and elastic, but it is by far the most durable of all pine timbers. The American continent produces red pine, which is often used instead of Riga timber, but so far as London is concerned, the imports have dwindled down to almost *nil*. The red pine thrives well in Scotland, where it is called Scotch fir, but the timber will not bear com-

parison with that imported, although it is often included under the generic name of "Riga." Yellow pine, which is principally imported from Quebec, has neither the flexibility nor the elasticity of the red pine, nor is it so durable, but it is much lighter. For the inside work of houses, such as panels, sashes, &c., it is invaluable, and is eagerly bought up by builders for such purposes. It grows in Great Britain, but it does not thrive in this climate. Norwegian fir is largely imported, principally in the shape of battens and boards, but the wood is generally small, and the Swedish of the same description finds more favour from its larger scantling. Cedar would be among the most valuable of all timber trees were it sufficiently common to be available for building purposes. It is almost indestructible from time, and no insect will ever attack it. It requires a more generous soil than any other of the tribe of pines, and is a timber of very slow growth. Pitch pine is now well known, and has taken its place as a building and furniture wood.

The sap-wood of all fir timber is useless, and generally there is a large proportion of it in comparison with the quantity of heart-wood. But it is a curious fact that there appears to be a difference between the pines and the generality of hardwood timber in this; that a small proportion of sap-wood in fir is indicative of the inferiority of the timber. Thus, the red pine of Scotland has fewer layers of sap-wood than either the Baltic or Canadian red pine. As a general remark, it may be stated that the greater the quantity of sap-wood there is about a tree of any description of fir timber, the better will be the quality of the mature wood.

Larch is imported from Canada under the names of Hackmatack and Tamarack, which have every appearance of being identical with the Scotch larch. Cabinet-work of great beauty has been made from this wood; it polishes well, and when seasoned is not found to warp or shrink. In some of the public buildings of Venice there are said to be single-pieced beams of larch which are 120ft. in length. It must be very durable, for it is almost the only wood which was used in the palaces and public buildings of that city.

Teak is now an important article of commerce. The importation from Mouleim dates since the Burmese war, and its value as a ship-building timber is highly appreciated; but inferior as the Pegu and Mouleim teak is in quality, when compared with the Bombay teak, it is infinitely preferable to the Saul or the Sissoo. All descriptions of teak, if sound, free from defects and sap-wood, are proof against the white ants—a matter of the greatest importance in India—whereas in this market it is valued for its hardness and durability. The teak grows to a great height, 70ft. to 80ft., and more, but cannot be easily obtained of good quality of that size. Jarrol, Toon, and similar Indian woods are not in use in Great Britain, and need not be described.

British Guiana Greenheart is another well-known timber. It is a hard, close-grained wood, having, like teak, an oily feel to the touch. Its specific gravity is about equal to that of the African oak, but it is decidedly superior to it in strength, toughness, and durability. These, however, are not its chief advantages. Its great value consists in its being completely exempt from the attacks of worms. It is exceedingly hard, and difficult to work as planking. There is another Guianian timber, the Siruaballi, of a softer texture, and much used for planking, as it is also said to be able to resist the ravages of the worm.

At whatever period timber is felled, it requires to be thoroughly seasoned before it is fit for the purposes of carpentry. This object of seasoning is partly to evaporate as much of the sap as possible, and thus to prevent its influence in causing decomposition, and partly to reduce the dimensions of the wood, so that it may be used without inconvenience from its further shrinking. Timber seasons best when

placed in dry situations, where the air has a free circulation round it. (Evelyn, in his "Sylvia," has some advice on this head, as applicable now as when he wrote it.) Gradual drying is a better preservative than a sudden exposure to warmth, even of the sun; for warmth, abruptly applied, causes cracks and flaws, from the sudden and unequal expansion produced in different parts.

Two or three years' seasoning is requisite to produce lightness and durability in the woodwork of buildings. It must be observed that seasoning in the common way only removes a portion of the aqueous and volatile matter from the wood. The extractive, and other soluble portions still remain, and are liable to ferment, though in a less degree, whenever the wood reabsorbs the moisture. Such, indeed, is the force of capillary attraction, that wood exposed to the atmosphere in our climate never gives up all its moisture. There are so many methods of preserving wood, each patentee having reason to think his own process the best, that it will be as well to refrain from investigating their respective claims to excellence. It is the opinion of some that woods abounding in resinous matter cannot be more durable than others, but the reverse of this is proved every year in the pine forests of America, where the "light wood," as it is called, consisting of the knots and other resinous parts of pine trees, remains entire, and is collected for the purpose of affording tar, long after the remaining wood of the tree has decayed. In the salt mines of Poland and Hungary the galleries are supported by wooden pillars, which are found to last unimpaired for ages, in consequence of being impregnated with the salt, while pillars of brick and stone, used for the same purpose, crumble away in a short time by the decay of their mortar. Wooden piles, driven into the mud of salt flats and marshes, last for an unlimited time, and are used for the foundations of brick and stone edifices. The application of salt in very minute quantities is said rather to hasten than prevent the decay of animal and vegetable bodies. Yet the practice of docking timber, by immersing it for some time in sea water, after it has been seasoned, is generally admitted to promote its durability. There are some experiments which appear to show that, after the dry-rot has commenced, immersion in salt water effectually checks its progress, and preserves the remainder of the timber. If care be taken to renew the coat of paint as often as it decays, wood on the outside of buildings, may be made to last for centuries, but painting is no preservative against the internal, or dry, rot; on the contrary, when the disease has begun, the effect of paint, by choking the pores of the wood, and preventing the exhalation of vapours and gases which are formed, tends rather to expedite than prevent the progress of decay. Indeed, sound, well-seasoned wood will last longer unpainted than painted, for it is impossible to thoroughly dry it, and a day in a newly-built house causes moisture to be absorbed. To show the difference between seasoned and unseasoned wood, it may be remarked that unseasoned English oak (from experiment) weighs 62lb. 8oz. per cubic foot; seasoned from thirteen to twenty years, it weighs 45lb. 9oz. per cubic foot. French oak, unseasoned, 68lb. 2oz.; seasoned, 48lb. 0½oz. African oak, unseasoned, 64lb. 1oz.; seasoned 13 to 20 years, 60lb. 3oz. Teak, unseasoned, 48lb 11oz.; seasoned 19 years, 42lb. 2½oz. Dantzic fir, unseasoned, 39lb.; seasoned 32lb. 9½oz. These statistics will explain why builders are so anxious to procure dry materials, and how it is that so much objection is made to sap-wood.

HISTORIC ART STUDIES.

By DR. G. G. ZERFFL.

ETRUSKAN ARCHITECTURE.

(With Illustrations.)

THE Etruskans were undoubtedly of Aryan origin. Two distinct immigrations of Pelasgians into the valley of the Arno may be traced. The first, about 1650 B.C.; the second, about 800 B.C., or between three and four hundred years after the Trojan war. The valley on the western slopes of the Apennines resembles a vast burial-place of antediluvian animals. The bones of bears, wolves, hyenas, panthers, elephants, mastodons, and the skeletons of whales, are found in such abundance that the peasants of our own times believe them to have been planted there by invisible spirits. The soil is full of numerous petrifications imbedded in marl and slate. Earth-fires abound. Storms and inundations are very frequent and destructive. These phenomena produced a gloomy mythology, which took its origin in Persian, Assyrian, Egyptian, and Greek legends. The Etruskans submitted to the inexorable dominion of an organised hierarchy. They possessed two orders of divinities. The veiled gods with "Asar" at their head, and twelve lower gods, in analogy with the Scandinavian and Egyptian theogonies. They believed in a hell, but in no Elysium. The Etruskan creed was without any comforting hope. Wild passion was the distinguishing feature of their gods. Their priests are said to have attacked the Romans with poisonous serpents and burning torches. At their funerals the Etruskans had no dances, but sanguinary combats. The superior divinities were nearly all winged, like the Persian and Assyrian divinities, kings, and priests. Their plastic art and architecture was influenced by the impressions of a gloomy religion, and the terrifying aspect of volcanic phenomena.

The Etruskans were, however, an eminently practical, matter-of-fact people. Their imagination was less cultivated than their ability to battle with nature. They had in spring to stop the gushing waters of the overflowing rivers, and in summer to provide water for the parched valleys. At an early period they learned to improve their walls, to defend themselves against the elements and their enemies. Figs. 1—3 show us this improvement. In Fig. 1 we have the primitive polygonal walls of Kossa; in Fig. 2, those of Populonia, showing a transition to free-stone construction in horizontal layers; which reached, in the walls of Todi (Fig. 3), the perfection of the "opus quadratum" of the Romans. The Etruskans used wood long before they built in stone, as may be seen in the clumsy shape of their columns (Figs. 4—6). One of the most important monuments is the so-called Cucumella, at Vulci, because it furnishes us with some remains of Etruskan columns. They are in a decidedly proto-Doric style. They were not fluted; the tapering of the shaft was very sudden (Fig. 4); the basis of the column (Fig. 6) consisted of two plinths and a large torus; the neck was marked with several rings; an ovolo and a fillet united the shaft to a powerfully-projecting abacus (Fig. 5). The proportions are without grace, and the idea of support is not expressed with sufficient harmony. Figs. 7 and 8 represent the gate of Volterra. Though we can trace vaulted constructions in India, Greece, and Mexico, the Etruskans were undoubtedly the first to use wedge-shaped stones for vaults and arches. The gate is full of majesty and simplicity. The carved heads adorning the keystone and the two extreme ends of the arch are very characteristic, and remind us of the Mexican aqueducts, with skulls as waterspouts, inserted in the Kyklopean walls. Figs. 9 and 10 are aqueducts at Tusculum. The construction of the vault (Fig. 10) is that of the Akropolis of Mykenæ, formed in the most primitive mode by horizontal layers of stones. Fig. 11, the mouth

of the great Cloaca at Rome, constructed, at the latest, 600 B.C., has stood for more than 2,400 years as an undisturbed monument of the technical excellence and the engineering talent of the Etruskans. Our sketch shows the mouth of the Cloaca at the Tiber, 12ft. broad and about 15ft. high, with its treble arch. Fig. 12 is the Gate of Perugia, which may be set down as the oldest European attempt at arcades, which formed so distinguishing a feature in the Early Christian style, after having served the Romans in constructing their viaducts and aqueducts. The gate is called the "Porta Augusta." The ornamentation of the pilasters and the frieze are in the Archaic style. Figs. 13 and 14 show us the Capitoline Temple of Jupiter, in a pure Etruskan style, reconstructed according to the description of Vitruvius. In Fig. 14 we give the ground-plan. The inclosed space (800ft. in circumference) was nearly square, provided with three cellas, of which the central was consecrated to Jupiter, the one on the left to Juno, and that on the right to Minerva. The front was formed by a deep colonnade. The whole was covered with a lofty roof, resting on slender columns, placed at considerable distances from one another. Everything is out of proportion, and in a compressed shape. The triglyphs are insignificant, and too closely set; the metopes without dignity. The pediment (Fig. 13) was adorned with a profusion of figures in burnt clay; the columns, the frieze, and the pediment were of wood. The crowning quadriga and the bigas on the sides of the roof were heavy, and unartistically constructed. Next to works of utility, the Etruskans distinguished themselves in the construction of tombs, burial-chambers, graves, and mounds. Their mounds, formed of stone and earth (Figs. 20 and 21), resemble those scattered all over the world. The most remarkable of these constructions is the Cucumella at Vulci (Fig. 21), a tumulus 200ft. in diameter, surrounded by a stone wall. A square tower crowns the top, and at its side stands a circular tower. Fig. 15 is the façade of the tomb at Norehia. These façades resemble the fronts used in Egyptian, Persian, and Jewish tombs, with the addition of Greek—more especially Doric elements. The pediment rested on four columns and two side pilasters. The triglyphs were surmounted by a row of dentils; the gable was ornamented with a leaf-pattern; the corners with inverted volutes were decorated with carved faces. The whole is analogous to the front of the Capitoline temple of Jupiter, and bears traces of a struggle after symmetry, and an incapacity to understand the laws of proportion. Differing from these tombs with their façades, we have those hewn in rocks, forming catacombs, as those of Bomarzo (see Figs. 16 and 17). Columns (Fig. 16) or pillars (Fig. 17) support the arched or flat ceiling. Occasionally we find even imitations of wooden rafters in these tombs. A third form of Etruskan tombs is given in Fig. 18—front view, and Fig. 19—side view. These monuments are scattered over Etruria in all shapes and sizes, and are found especially in Vulci and Cære. They rest on columns with Ionic volutes, whilst the cornice on the sides reminds us of the decorative patterns of Egypt. In Figs. 22 and 23 we have the supposed tomb of the Horatii and Curiatii, between Rome and Albano. The high substructure is square, provided with five pyramidal towers, of which the middle one is of larger dimensions than the others. The plan of the tomb may be seen in Fig. 23. Strange influences may be traced in Figs. 24 and 25. They are Nuraghas on the island of Sardinia; oblong or circular tombs with a pyramidal superstructure, often to a height of 40ft., rising from the centre. Such daghopa-like constructions are found in India, Phœnicia, Ireland, and Peru. The interiors of these Nuraghas are provided, like the Egyptian pyramids, with several chambers. (See section of tomb, Fig. 25.) A door visible (Fig. 24) in the superstructure leads, by a

The trustees of the parish of Whitstable have decided not to rebuild the parish church. The rough-cast is to be removed from the tower walls, so as to ascertain their exact state, previous to inviting tenders for rebuilding the west end of the building.

spiral staircase, into the upper compartments. That rock-hewn, subterranean tombs were also constructed by the Etruskans, may be seen in Figs. 26 and 27, a tomb, covered with mighty stone plates, found in 1823 near Corneto. The construction is gigantic. Fig. 26 shows the ground-plan, and Fig. 27 the section. The roof, consisting of heavy, flat stones (2), rests on octagonal pillars (1), crowned with cubic capitals (3). On a platform built of stone was found a suit of armour (a), two bronze shields with engraved ornamentation, several bronze vessels (b, c), spears (c), shields (m), and a lamp (l), arranged in a certain order. The great care the Etruskans devoted to their dead is apparent in the complicated northern Nekropolis of Vulci. Fig. 28 (ground-plan) and Fig. 29 (section). We pass through a gate (A) and a vestibulum (B), to the second entrance (K), reaching thus the subterranean chambers (L, M), which communicate with a kind of central hall, the ceiling of which is provided with "cassettes," hewn into the rock. On both sides of the vestibulum (C, D, and E) we have several chambers. That in E is decorated with pilasters, in a style half-Egyptian and half-Indian, whilst the chambers leading into it (see Fig. 29) are provided with a half-cupola, carved into the rock. On the walls, hewn in tufa, traces of polychrome decorations are perceptible. Amongst the tombs at Cære we have one, the "tomba delle Sedie" (Fig. 30), so called from the chairs and stools hewn into the rock, which deserves the attention of archaeologists. It consists of six chambers, the ceilings of which are imitations in stone of cross beams forming soffits (lacunaria). In Fig. 31, the tomb of the Tarquinii, we have the reproduction of one of the Indian temples on a small scale. The huge pillars supporting the ceiling, provided with soffits, are all hewn out of the rock. The tomb is now called "Tomba delle Cardinale." The Etruskans were especially distinguished by a want of idealisation. They could neither in their architecture nor in their plastic art attain to those laws which regulate the relations of the isolated parts to a harmonious total. They had Greek legends and patterns at their disposal, they even cherished them, but they never became conscious of the spirit of beauty. Anything utilitarian they understood thoroughly; in everything monumental they failed. In ceramic and bronze works, in embossed silver and gold vessels, they excelled. They possessed narrow, bigoted minds, crippled by superstition and fear. Earthquakes, inundations, and storms, contrasting with the exuberant luxury of the Italian vegetation, drove them to sullen despair with regard to the instability of all earthly things. Life was too fleeting, death too certain; and this was the cause why they neglected the monumental, and tried to fill their short existence with useful works.

THE PRESENT POSITION OF GOTHIC ARCHITECTURE.*

THE important question will naturally suggest itself: Has our revived Gothic realised in any degree the high hopes and bright anticipations which in its earlier days were formed of it? Is it in a fair way of becoming in due time our national architecture of the future, a fit exponent of the expansive culture of this nineteenth century? This is the great question; but it is one which there appears to me to be much difficulty in answering decisively. There can be no doubt but that the confluent streams which have joined the main river of our English Gothic have materially deflected its original current, and given to it a direction which its earliest advocates neither intended nor foresaw. It is by no means certain, however, that this strange mixture of styles is a necessarily evil thing for the future of our art. Many noble lessons, and many fresh and exquisite combinations of form, may be drawn from the magnificent examples of Pointed architecture with which most portions of the

Continent abound. It would be folly to reject these, and to confine our studies to our own insular type of Gothic. Such a course, even if practicable, would prove fatal by its exclusiveness.

But if the prevailing system of eclecticism in architecture has its uses, it has also its abuses; and it must be confessed that the latter are making themselves very apparent just now. The frequent and capricious changes which have characterised Gothic work of late years do not augur well for its future supremacy. We see on all sides a restless craving for novelty and sensation. New phases appear quickly upon the scene, live their little day, and are then cast aside for no better reason, apparently, than to make room for something more fresh and striking. Our very advantages are apt to become a snare to us. Modern science has placed the art-treasures of the world before us, and, like children, we turn from one beautiful plaything to another, unable to be content with either. The fact is, as it appears to me, architecture is in great danger of becoming merely a thing of fashion and caprice, much in the same way as millinery is. Unfortunately, the results are widely different. Our creations will survive the transient fashion of the day, and will, if designed upon no higher principles, remain only as monuments of the rage or folly which happened to obtain at some particular date. If our architecture aspires to something more noble than this, it must rest on a more enduring foundation. It must be founded on, and must express in its features, the immutable principles of truth, fitness, and beauty, if it is ever to become a living art to us in the same deep sense that both Greek and Mediæval art were to their founders.

One of the most prominent defects in our present system of working is the want of some united action between us. Every architect now doeth whatsoever seemeth good in his own eyes (provided his clients allow him) in the matter of style, and too often indulges in what is fantastic and eccentric, in the hope of being original. In the case of men of great ability, this unlimited freedom is not so objectionable, as they have the faculty of seeing what is appropriate and in harmony with the spirit of their designs. With less skilful designers, however, the results arising from this condition of things are too often glaringly crude and incongruous. Now, if some recognised agreement existed amongst us as to the best path to pursue, this condition of things could not exist, and we might entertain a reasonable hope of seeing a general movement of progress all along the line, and not, as at present, fitfully and in various directions.

Although it is undesirable, if indeed it be possible, that the individuality of the designer should be lost; nevertheless, there exists among certain schools a pernicious habit of placing the artist before the art in the case of a few favourite men. This is manifestly wrong: the elevation of the art should be our first consideration, the individuality of the artist second. We need, therefore, I think, some generally-accepted code of laws and precedents to govern and direct our efforts. Let us, for example, agree upon some particular phase of Mediæval art; and taking that as our point of departure, extend and develop it until it becomes capable of answering all the numerous requirements of our time. Let us, as the style expands, engraft upon it such features from other sources as we may see fit, carefully keeping them subordinate to, and in harmony with, the ruling principles of the master style.

There is another point in which the Gothic school runs into extreme, and that is in the quality of what I must term "quaintness," for want of a better title. That this quality is possessed in a very large degree by most Mediæval buildings, is unquestionable—indeed appears to be inseparable from them. It must be remembered, however, that this is mostly the result of accident and of the mellowing effects of time; and that, do what we will, we can never impart to our new buildings the picturesqueness of the old work. Indeed in some ancient buildings there is nothing to recommend them but their age and the harmonising influence of time; yet what a wondrous charm hangs about them!

... "There is a power
And magic in the ruined battlement,
To which the palace of the present hour
Must yield its pomp and wait till ages are its dower."

It is a grave question if far too much time and thought are not thrown away in the effort to produce these effects, and if internal convenience

is not too often sacrificed in the attempt. If the results of this were discernible in greater beauty of form, or in a more perfect proportion of parts, there would be nothing to say against it; but unfortunately, the uppermost thought in the artist's mind too often appears to be merely the desire to make his work quaint and eccentric—very much lower qualities than those just mentioned. Indeed, it is questionable if this does not tend to lessen our sympathy with really beautiful form, for there is a large mixture of coarseness running through it. Certainly some of our latest buildings in Gothic seem to have been designed with but little regard to either beauty or proportion. Quaintness has a constant tendency to degenerate into mere ugliness, and it is to be feared there is much truth in the accusation of Professor Kerr, that there exists an incredible worship of the ugly amongst us. Just at present, too, to the best of my judgment, this strange mania is rather on the increase than otherwise. The "old china style," if I may so term it, is spreading amongst us, and we see men search every quarter of the globe for examples of quaint, curious, and ugly objects to copy from. The present attempts to introduce the long, square-headed windows and broken pedimented gables of Queen Anne's reign, the lumpy furniture of the Cromwellian era, and the ingenious but semi-barbaric ornament of China and Japan, indicate the extravagant lengths to which a certain school is inclined to go in its search after novelty.

While the progress of the revived style has been, on the whole, continuous and well marked with respect to ecclesiastical architecture, it must be confessed that we have not made nearly so much advance with our secular buildings. Here we are more left to our own resources, not having so many examples to guide us, and being obliged to initiate buildings in the new style of a type and for purposes unknown in those more primitive times. In some of the country mansions recently erected, however, the style has been adapted to the requirements of the case with the utmost felicity. It is in our civic architecture that our failures have been most conspicuous. Too many of our hotels, railway-stations, club-houses, &c., are but shells of the type of ordinary town house, with a thin outward veneer of Gothic detail altogether wanting in the true sentiment of the style. It is here, too, that those vagaries of which we have been speaking are to be found in the greatest abundance, and where there is most need of some more settled and acknowledged art authority to direct it. In one very conspicuous instance our revived Gothic has not been found equal to the occasion. I allude, of course, to Mr. Street's design for the new Law Courts. If there ever was a signal opportunity for displaying the capabilities of the style, this was the one; and I think I speak the general verdict of the profession when I say that the result is a failure. The building, if executed as designed, will be feeble and disjointed, lamentably wanting in that grandeur of conception and unity of parts which should characterise a great public edifice. I say this with regret, and with a high respect for Mr. Street's great talents, and for the eminent services he has rendered Mediæval art.

Let us not, however, be too much discouraged by this failure; it does not prove that the revived Gothic is unsuited to modern wants, still less that it is worked out. I believe the style to be still young and full of vigour; but we must look around us and note our shortcomings well, so that we may rise through our very failures to higher things. The most urgent need of the style at present, then, appears to be more uniform and combined action on the part of its professors, guided by a recognised and accepted series of canons, with sufficient influence to curtail the vagaries and eccentricities that at present disfigure it. Thus we shall form a common platform on which to work in the development of that ideal architecture which earnest men strive for in the hope of seeing it realised in the fullness of time.

In conclusion, with your permission, I will quote from Professor Scott's recent lecture the following able summary of what I have so vaguely and indifferently endeavoured to express to you. Referring to the revival, he says:—"Its success has been indeed enormous; yet its failures and drawbacks have been in proportion to it. Its artistic merits have been limited to those who have followed it up with an earnest and generous enthusiasm, for it has unhappily been practically followed up by a mixed multitude who view it as a fashion of the day, by which professional

* From a Paper read by Mr. W. M. MITCHELL, at meeting of the Architectural Association of Ireland, April 24, 1873.

practice is to be obtained, but are devoid of all ardour and love for what they are engaged upon. Nor is this the only drawback to the Gothic Revival. It suffers from a degree of capriciousness even among its abler and more art-loving followers, who, jealous perhaps or contemptuous of others, refuse to co-operate in any steady purpose, and who, morbidly keen in their perception of beauty, are apt to follow momentary fancies—now favouring one type, and now another—and, perhaps, reviving styles little allied to their purpose, as if the object of the age were to revive just for revival's sake, rather than to gather in those extraneous beauties to enrich the resources and to widen the capabilities of one received style. This tendency seems to threaten the noble movement with premature decay, though I do trust there remain earnestness and steadiness of heart enough to avert this danger, and to guide these artistic strivings into a healthy channel, and cause them to add new life to the general movement."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the ordinary general meeting of this Institute, held on Monday evening last, Mr. Horace Jones, Vice-President, in the chair, Mr. F. H. Caiger, of 5, Gloucester-street, W., and Mr. George Scamell, of 18, Great George-street, Westminster, were elected Fellows, and Mr. A. E. Gough, of 28, Craven-street, Strand, was elected an Associate.

It was stated that the dinner announced to be given at Willis's Rooms on the 11th June was postponed to the 21st, partly owing to the inability of the President to attend on the first-named date, and partly in consequence of another dinner occurring on the 11th, which would preclude the attendance of many gentlemen to whom the 21st would be more convenient. It was further announced that the annual conversation of the Institute will take place on the 3rd of July.

Mr. JOHN S. PHENE, F.R.I.B.A., F.S.A., F.G.S., F.R.G.S., then read a paper

ON RESULTS OF A RECENT INVESTIGATION INTO ANCIENT MONUMENTS AND RELICS.

Mr. PHENE divided his subject into monuments illustrative of public rites of sepulture; of private interment; those for the performance of ceremonies; and those for sacrificial worship. His investigations on the Earl of Glasgow's estates enabled him to lay before the meeting a plan and sections of a tumulus, the principal features in which were: the general construction of the mound; a radial arrangement of the tombs; a mixed species of sepulture by the same operators, and at a common date,—in short, as the result of a single ceremony; and a rude knowledge of mechanical forces, judiciously applied. The tumulus is in the Great Cumbra, the larger of two islands east of the southern end of the Isle of Bute, in the Firth of Clyde. The tumulus is at the extreme north of the island on which it is placed,—a position probably chosen as having in an easterly direction from it a prominent conical hill, the neighbourhood of such hills having been customary places for interment, and for the exercise of sepulchral and other rites. The construction is unusual, and displays labour and intent. The original surface soil was of a very dark colour, and each sepulchre stood on a separate mound of bright sea-sand; each tomb was also carpeted with a complete layer of fine white quartz pebbles, which time had detached from the red sandstone conglomerate of the coast, and which still abounds on the shore of Ayrshire. The mounds of sea-sand were almost uniform in extent, and of a common level, and appeared to have been heaped over their sides all round as soon as deposited, having between them and over their slopes a thick layer of the dark-coloured original surface soil, which served to retain all in their positions. The slope of the mounds was almost that taken by sand when heaped up and unmolested by other forces—about 32 deg.; and on the summit of each heap was placed a red sandstone cist, consisting of four stone slabs, which in every case retained a true vertical position. The dimensions of these cists were approximate to each other, except in one case; they are of a size common to sepulchral chambers of this class, which have the characteristic of being hardly able to contain a full-sized human body, even when doubled up and compressed. Each cist was covered with a slab of the same material, reaching considerably over the external dimensions of the wall slabs, and apparently irregularly rubbed or worked so as to discharge rain or

moisture from the centre towards the edges, or else selected from an accidental tendency to this form. In one case such economy of labour was clearly shown, by the use of a water-worn slab for the cover, which possessed these general features. These slabs were all in a true horizontal position, but were so adjusted as not to rest on the vertical or wall slabs, from which their weight was discharged by an arrangement of uncemented masonry which carried them. The whole had then been heaped over with a third soil, quite distinct from the other two, the source of which was displayed by an adjoining hollow in similar soil, which on measurement was found to correspond very nearly with the cubical contents of the tumulus, and somewhat resembled it—an inverted outline of the one tolerably representing the other. The largest and most important cist was in the centre of the tumulus, and placed nearly due north and south. It contained the unburnt, and apparently uninjured, bones of a man of full stature. Due north of this cist was a small one, which contained the also unburnt and perfect bones of a youth, and a few fragments of diverse pottery. The peculiarity of the masonry is its involving probably the earliest style of arrangement which led to the use of the discharging arch. And if we take this as the rudest, and an example of the more finished of the Pictish arches in the Orkneys, we shall find their almost exact counterparts in Mexico. The author said that he had met with similar methods of discharging the superincumbent weight of the cover from the lateral slabs in Argyllshire and in Roxburghshire. As illustrating private and domestic modes of sepulture, in contra-distinction to evidently public and official ones, Mr. Phéné next described a small tumulus on Timpendean Moor. Observing that some tufts of heather rose above the rest in something of a circular outline, he had had the vegetation removed, when a number of slight mounds, like mole-hills, were seen. At about a foot in depth these were found resting on blocks of granite between two and three feet in length, and nearly a foot in breadth and thickness, which were found lying as radii; they were pointing to a common centre, but at some distance from it. Within them was a flat area, of an oval form, the external part of which was also irregular; an appearance which, on removing the soil, was found to arise from a number of loose stones in a tolerably uniform position, but looking as though they had been levelled or fallen down from time. The external measurement of these in the longest direction was about 30ft. across, the perfectly smooth area within them being about 5ft. less. Mr. Phéné had all the soil removed from the latter, and found, at about the same depth, a very perfect paving of stones, neatly placed, and having a smooth upper surface; these were laid upon a light-coloured, unwrought soil, and from a few inches to nearly 2 feet below that was the rock. On the pavement being removed in portions, a dark patch was observed in the soil, under which was charcoal, and beneath that black and decayed wood, evidently part of a stake about 4in. in diameter, and penetrating into the earth nearly 2ft. below the underside of the paving. A careful examination of the still undisturbed pavement showed, in several similar positions, deficiencies in the stones, beneath which were corresponding patches of charcoal surmounting the remains of decayed oaken stakes, the holes for which, in more than one case, had perforated the soft rock beneath. These holes were equidistant from each other, and showed an uniform measurement from each to the circumference of the oval. The Eildon Hills lie to the north of this monument, and by the side of the post nearest in their direction, and a foot under the pavement, was found an inverted British urn, about 10in. high, filled with burnt human bones and charcoal and the mouth resting on the natural rock. At the exactly opposite one was found a small whorl, or it might be an amulet, as the perforation in the centre was small. Nothing else was found here; but it would seem that this was a burial beneath the domestic hearth, or at least within the extent of the house covering. There was an assimilation in the arrangement of the outer stones to dwellings still seen in the most northern of the Hebrides; and it appeared to the author that the oaken posts would have formed the ribs, or rafters, on which a thatch would have been fixed, the distance across, between the posts, being about 20ft. Similar buildings are referred to by Professor Wilson, in his "Prehistoric Annals of Scotland," as being found near Loch Etive, in Argyllshire;

but it does not appear that these were searched below the circular paved floor for sepulchral or other relics, though the remains of the oaken stakes were discovered. Of the class of monuments which seemed to be ceremonial, Mr. Phéné described a monument of remarkable dimensions and design, on the Duke of Argyll's estate near Inverary. The major portion of this great monument had been covered with a tumulus, the earth forming which still remained in large quantities where the heavy but disturbed stonework once forming the covering of the chambers lay strewn about, though that more readily reached had been spread on the rather thin soil of an arable field in which the monument stands. The great entrance was obviously external, from the pent-house form of the large granite slab over the northern chamber, the section of which is almost in exact agreement with that of the large terminal stone at the south end of the tumulus. The author said he called this the great entrance, as it had in front of it a much narrower chamber or doorway, against which was rolled a huge rounded stone. The width of this entrance approximated to several openings found in the obstructing stonework, which had divided the great way into a series of chambers, one of which obstructions separated the first and second chambers, situated at the northern end of the tumulus. At the south end of this second chamber there certainly appears to have been a permanent barrier, but, on excavating down to the foundations, the author saw reason to believe that this had either merely covered a secret mode of transit, or that some alteration had taken place at the time of the central and adjoining chamber having been broken up, as it evidently had been, probably by treasure-searchers. This central chamber was similarly secured by a solid barrier at the south end, though no doubt there was here also a concealed channel of communication, which, not having been discovered by the treasure-seekers, was probably the cause of the destruction of the side walls of this chamber, the east and west walls of it being only traceable by the slabs which had formed them lying near at hand; and as amongst these stones were others which were somewhat thin, as compared with those agreeing with the lateral stones still in position, these thinner slabs may have formed a domed roof to this chamber, as the position is that in which we find the central and domed chamber in the three-chambered tumulus, opened the same year by Dr. R. Angus Smith, in the same county, and which is also the position of the domed chambers at Lough Crew, and in the Boyne tumuli. In conclusion, Mr. Phéné glanced at the historical evidence in favour of sacrificial worship in Britain.

A brief discussion ensued, and the thanks of the meeting having been accorded to Mr. Phéné for his paper, the meeting terminated.

BUILDERS' BENEVOLENT INSTITUTION.

AN election of four pensioners, two men and two women, on the funds of this institution, took place yesterday (Thursday) at Willis's Rooms, King-street, S. James's, the President, Edwin Lawrence, Esq. (Lawrence Brothers), in the chair. There were eleven candidates—four men and seven women, but there were eight female candidates up till within the last few days, but one of them, Mrs. Ann Williams, is dead. The poll opened at 12 o'clock and closed at 3 p.m., when the scrutineers (Messrs. Stirling and Hall) announced the result of the voting to be as follows:—Males: Francis Sandon (seventh application), 2,378; Daniel Thomas (sixth application), 1,186; Richard Grove (first application), 112; John Thomas (first application), 940. Females: Elizabeth Treveltham (sixth application), 2,656; Eliza Lambert (fifth application), 1,720; Arabella Hambrook (fourth application), 3,153; Sarah E. Bear (fourth application), 625; Elizabeth Silcock (second application), 2,752; Jane Rumens (first application), 1,282; A. M. Williams (first application), 618. The chairman therefore declared the successful candidates to be: Francis Sandon, Daniel Thomas, Arabella Hambrook, and Elizabeth Silcock. This makes a total of 47 pensioners now on the funds of the Institution—20 men and 27 women, the males receiving £25, and the females £20 a year. Votes of thanks were passed to the President, to the scrutineers, to the Treasurer, George Plucknett, Esq. (of the firm of Cubitt and Co.), and to the Secretary (Mr. A. G. Harris), for the interest they severally take in the welfare of the Institution.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE CONSERVATIVE HALL, BOSTON.

We give illustrations this week representing the exterior and interior of the new Conservative Hall and Club Buildings at Boston, Lincolnshire. The architects are Mr. Geo. Gilbert Scott and Mr. John O. Scott.

The Conservatives of this town have long wished for greater accommodation, and having secured a block of buildings covering a site of more than 600 square yards in Southend, close to the Market-place, consulted with their architects upon the desirability of restoring a fifteenth-century half-timber house known as the "old Flemish House," which occupies nearly one-half of the ground. The wish was, if possible, that this fine and interesting relic should remain; and it is very gratifying to see that, being strongly supported and advised to restore as near as could be to its original external appearance, they proved themselves not only conservative in name, but in deed.

And here it will not be out of place to give a few words about this old house and its surroundings. Pishey Thompson, the Historian of Boston, remarks: "We have not even any traditions respecting the former occupants or proprietors of this very ancient building." In the place of any positive information relative to this building, we may be excused a little theorising relative thereto. First, then, as to the peculiarities of its locality:—Its west front had a road or street passing before it now known as Southend, a main street of the town; the north side of the building had and has an ancient lane running beside it, forming a branch from Southend, and called Sibsey-lane; another lane, termed Shod Friars-lane, also branches from Southend, and passes along the south front of the old building; here then are three sides of this old building detached from all other buildings; and as to the fourth or east side, there was close to it an old building which the historian, Pishey Thompson, remarks, "was supposed to have been part of the Dominican friary, but which, we think, was an ancient warehouse." This building, after being converted into a "Jersey school and house of correction" in 1595, "received very considerable repairs in 1712," and "the interior, at least the ground-floor, appeared to remain in nearly its original state." Why Mr. Thompson should suppose this old building to the east of "Shod Friars Hall" to have been an ancient warehouse is not known; but when it was pulled down, after 1818, a finely-carved head in stone, of large size, was taken out of the walls, and the same became the property of the late Mr. Jephtha Pacey, and was exhibited in the Boston Assembly Rooms at a Polytechnic Exhibition upwards of thirty years ago; and after the death of Mr. Pacey it passed into the hands of a collector of curiosities, a Mr. Ball, who had a miscellaneous museum in "Main Ridge," Boston, where it can still be seen.

It may be presumed that the wall which furnished this head was more likely to have been part of an ecclesiastical building (the Dominican Friary) than an ancient warehouse. Shod Friars-lane, the southern boundary of the old building, being now restored, has, a few yards to the south of it, what Thompson, the historian, states "is supposed to have been the gatehouse of the Friary. The front of this building was taken down and modernised in 1820, but the interior yet contains many interesting portions in arches and columns and parts of the old walls." If, then, the old gaol to the east end of the building now being restored was a portion of the Old Friary, and if the gatehouse to the same was to the south of it, the lane now called Shod Friars-lane could only have been a small open space or courtyard, the gatehouse and other portion of the Friary being connected by buildings or by a blank wall, thus cutting off any continuation eastward from Southend beyond that wall.

Could, then, this old building, having a main road or street to the west, a courtyard or open space to the south, Sibsey-lane and a "messuage, a garden and a great orchard under it—once Sibseys" to the north, whilst it connected with or approached closely to the Dominican Friary on the east—have been the hospitium of the Friary, or an hostelry frequented by the Hanseatic merchants who in olden times traded to the port?

Returning now to the immediate building under restoration, a careful investigation has dis-

covered fragments and existing clues for nearly every feature; and, although the original exterior of this fine old building will be so strictly adhered to, the interior has required entirely remodelling, of which the following is a short description:—

On the ground floor an entrance hall 15ft. by 9ft. 6in. in centre of front facing Southend, with a convenient shop on each side, leads through double swing glass doors to a stone staircase 6ft. wide, well lighted by large windows, to be used chiefly by members of the club, and beyond this to cloak-room, retiring room, room for heating apparatus, and offices, and another stone staircase which has a separate entrance on the north side in Sibsey-lane, for the convenience of the general public resorting to the great hall and school of art. The first floor is occupied by the reception-room, reading-room, and club-room *en suite*, and in the case of the club-room, it was found desirable to cut away the second floor to give greater height and light, the oversail forming a gallery round three sides of the room, which will be lined with bookcases. This room, which is 30ft. by 20ft., is open to the timbers of the roof, and will have a very unique and pleasing effect. The second floor is taken up by the upper part of club-room, a large room to be used for the purposes of a school of art, and a spare one for the convenience of students, and the usual offices. The gallery of the great hall also encroaches some way on this floor into the old house, and but a little way into the hall, enabling an audience to hear and see distinctly through a four-centred arch in the end wall of hall. This describes pretty fully the remodelling of the old house. The rest of the site has had to be cleared of the small cottages, and it is on this part that the large hall for concerts, theatricals, &c., is being erected. On the ground floor there are four shops, having entrance from the two lanes which bound the sides of the site, the kitchen, with lift into the hall, scullery, dressing-room for ladies and gentlemen, stage entrance, stairs, and offices, and below these rooms there is ample cellarage.

The floor of the hall is the level of the first floor of the old building, and is entered by two large double doors—one belonging more especially to the club and distinguished visitors, and the other for the general public. The hall is 62ft. long by 34ft. wide, not including the stage, which goes some distance beyond, there being an arch that forms the opening or commencement of the stage somewhat similar to the one which allows the gallery to encroach on the old building. It is lighted by six large windows, three on each side, and partly heated by two open fireplaces, and has a handsome timber roof, which, with the walls, it is intended to decorate.

Externally the treatment is designed to be in keeping with the restored portion—both of them to be found in the Low Countries—only that one will be the half-timbered structure, filled in with brick hogging, plastered, and colour-washed, and the other of red brick, with scarcely any stone dressings, divided up into long plastered panels, arched at the head.

The chimney-stacks will be built of smaller bricks than those used for face of walls. The roofs are to be of red tile throughout. The total expenditure is estimated at rather more than £5,000. Mr. Sherwin, of Boston, is the builder.

S. MICHAEL'S CHURCH, BOURNEMOUTH.

We are enabled to give a perspective view, with plan, of this church, as designed by R. Norman Shaw, A.R.A.; but Mr. Shaw being on the Continent, we are not able to give any particulars, which we hope to do on his return in two or three weeks' time.

CHURCH OF S. WILFRID, YORK.

We give an additional sheet of details of this church this week. For six other sheets of illustrations of the same building, see BUILDING NEWS for the last three weeks, and for description see last number of BUILDING NEWS.

ETRUSCAN ARCHITECTURE.

For particulars of this interesting sheet of historical buildings, &c., see Dr. Zoriff's article, page 583.

GRANARIES AT LANGNAU, SWITZERLAND.

For particulars of this very interesting sheet of engravings, see article, "Swiss Wood Construction," p. 603.

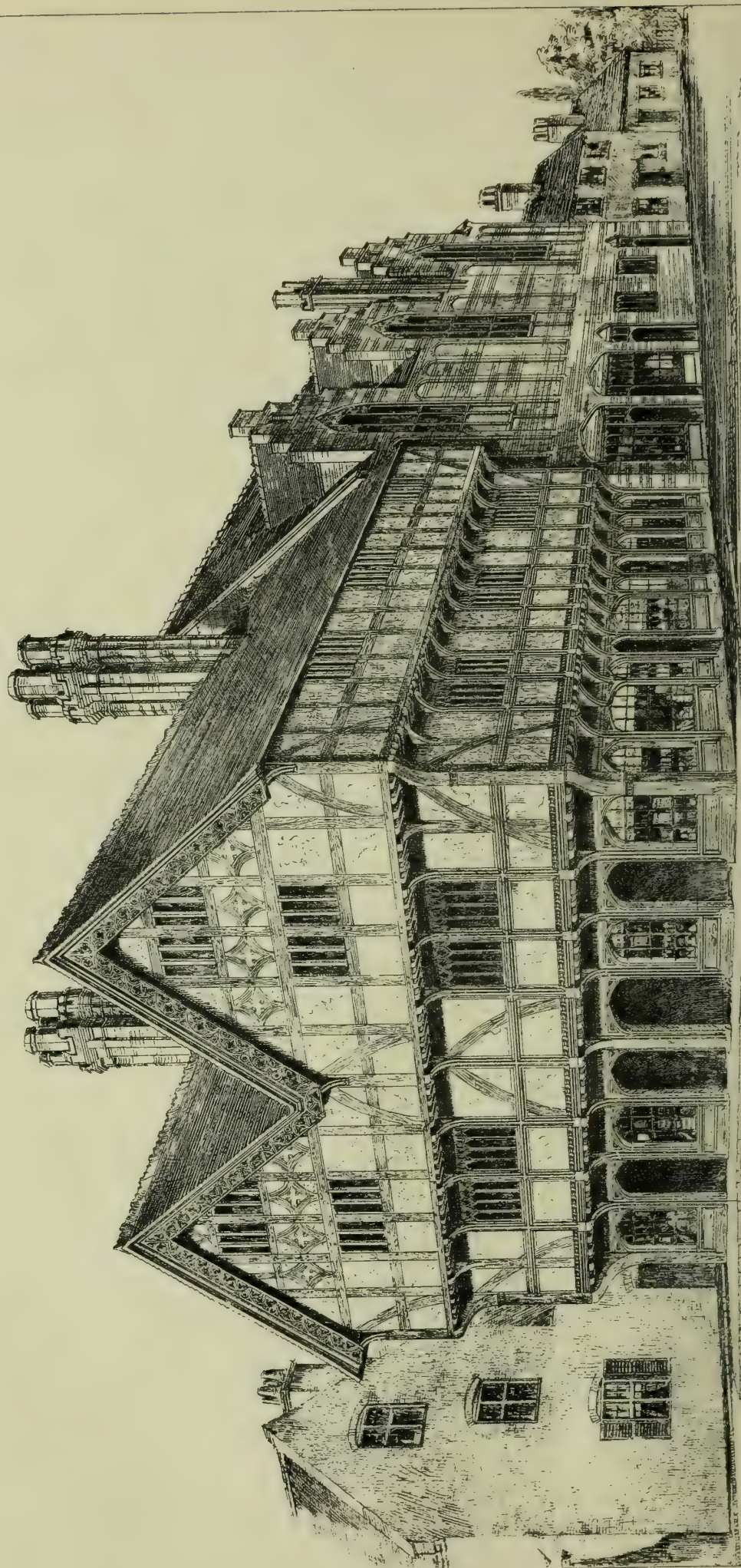
Civil Engineering.

LEEDS.—The new iron bridge at Leeds is completed. The design was originally submitted in competition by Mr. T. Dyne Steel, to whom the first premium of one hundred guineas was awarded. The estimated cost (£10,489) became gradually added to until the actual cost has amounted to something like £18,000. In lieu of the old stone bridge there is now a graceful single span across the river, built on the skew, with an angle of 11½ deg. The several arches have given place to one 102ft. 6in. long, the centre of which is 12ft. 6in. above the ordinary water line. Good approaches and easy gradients are secured. The arch springs from stone abutments of rusticated masonry. Through the north abutment there is a 7ft. culvert, and on the south (for the bend of the river) a 10ft. culvert. Additional safety and stability are imparted by inside girders and cross girders of wrought iron, covered with Mallett's patent buckled plates. The minimum tensile strain of wrought iron employed in the construction of the bridge is 20 tons to the square inch. The face girders are of cast iron, and effect is given to the ironwork by ornamental scrolls introduced into the spandrels. The cast-iron parapets are perforated. The total width between the parapets is 60ft. About 180 tons of cast iron, and from 270 to 280 tons of wrought iron, have been consumed in the erection of the bridge. Viewing the whole work—the construction of the new works, the demolition of the old bridge, the dredging, and the sinking of foundations, the purchase and pulling down of old property necessary to the bridge and its approaches, and the settlement of demands for compensation—an outlay of about £50,000, it is estimated, has been incurred. The contractor has been Mr. David Nichols, Leeds, whose tender was £15,319; Messrs. Butler and Pitts, Staningley, furnished the ironwork; and Mr. Coslett has been the clerk of the works.

THE INSTITUTION OF CIVIL ENGINEERS.—The seventh and concluding ballot of the session of this Society for 1872-3 took place on Tuesday evening, the 20th of May, Mr. Hawksley, the President, being in the chair. At this meeting there were elected as Members, Messrs. George William Keeling, Engineer of the Severn and Wye Railway and Canal Company, and John George Mair, Grosvenor Road Engine Works; and as Associates, Messrs. William John Fraser, Railway Iron Works, Bromley-by-Bow; Arthur Henry Heath, Stud. Inst. C.E., Assistant Engineer, Great Northern Railway; Lewis Jackson, Resident Engineer on the Bolivar Railway; Elias William Jones, Neath; John Milton Lewis, late on the Contractor's Staff of the Poti-Tiflis Railway; Frederick Harry Mort, Stud. Inst. C.E., Westminster; George Edward Ormiston, Assistant Engineer, Government Reclamation Works, Bombay; John Hunter Rhind, Ex-Engineer, P.W.D., India; George Henry Roberts, Rochdale; Frank de Mierre Turner, Slough; George Waller Wilcocks, Westminster; Francis Windham, Stud. Inst. C.E., Redbourne Hill Iron and Coal Company, Frodingham; and Sir William Wright, Chairman of the Hull Dock Company. It was reported that in the current month the Council had transferred Messrs. Alexander Richardson Binnie, Richard Henry Brunton, and Edward Harry Woods from the class of Associates to that of Members, and had admitted Messrs. Charles Arthur Friend, Edward Fyfe Griffith Griffith, Herbert Septimus Harington, Frederick Sharp, Harry Scott Taylor, Charles Tickell, Augustus Bythessea Todd, Claude Vincent, George Edward Vint, and George Kempthorne Watts as Students. The additions to the roll during the session have included 17 Members, 138 Associates (of whom 24 were previously Students), and 74 Students; the losses, by death and otherwise, have comprised 1 Honorary Member, 2 Members, 13 Associates, and 18 Students; and 13 Associates have been transferred to the class of Members. The register now contains the names of 15 Honorary Members, 780 Members, 1227 Associates, and 272 Students, making a total of 2294. Twelve months ago these numbers were respectively 16, 757, 1136, 246—together 2155. There has thus been a gain of 139 of all grades in the past year, being an increase at the rate of about 6½ per cent. per annum.

NEW CONSERVATIVE CLUB BUILDINGS

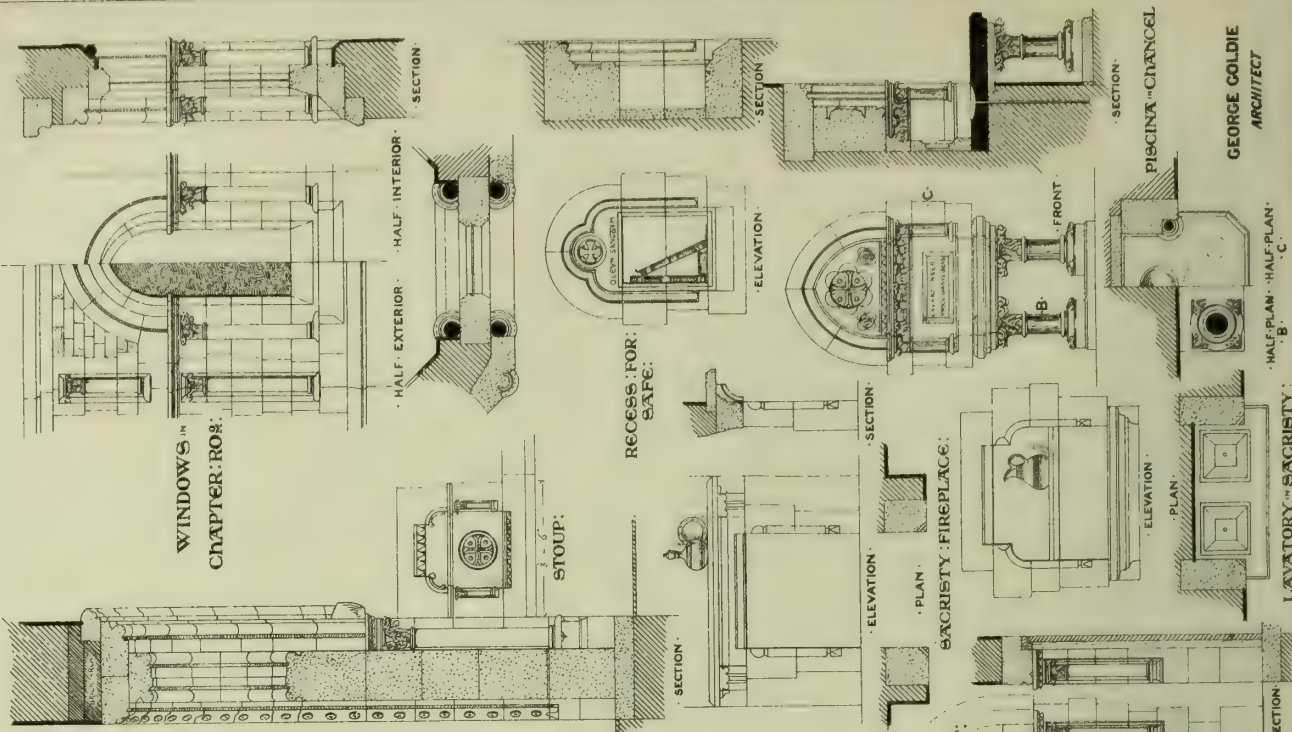
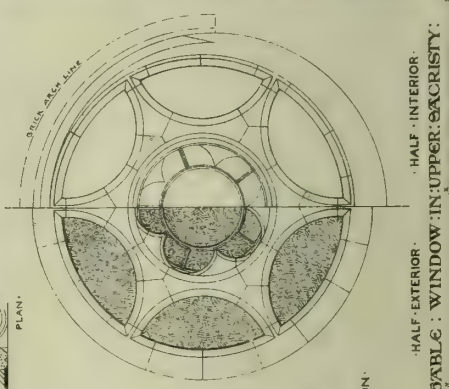
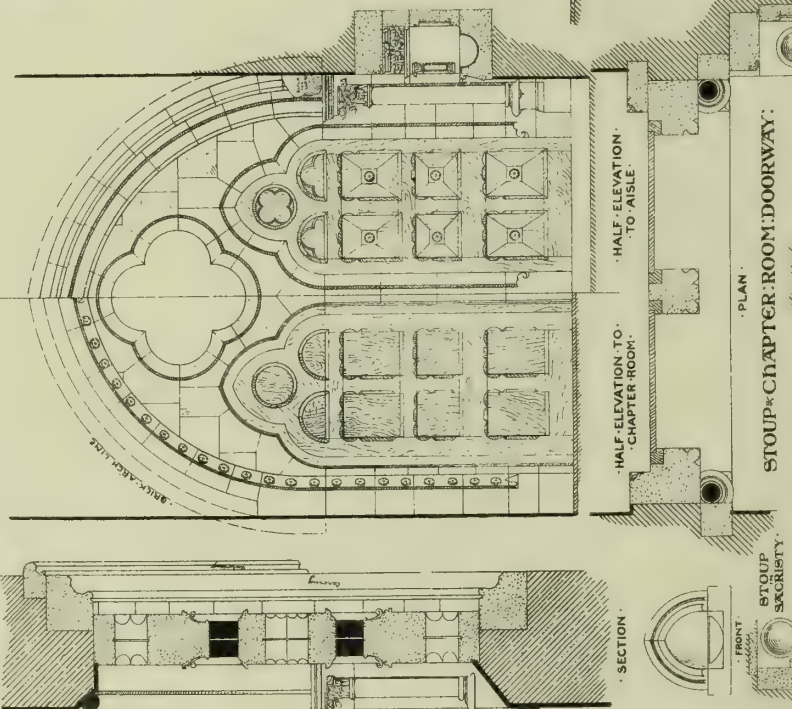
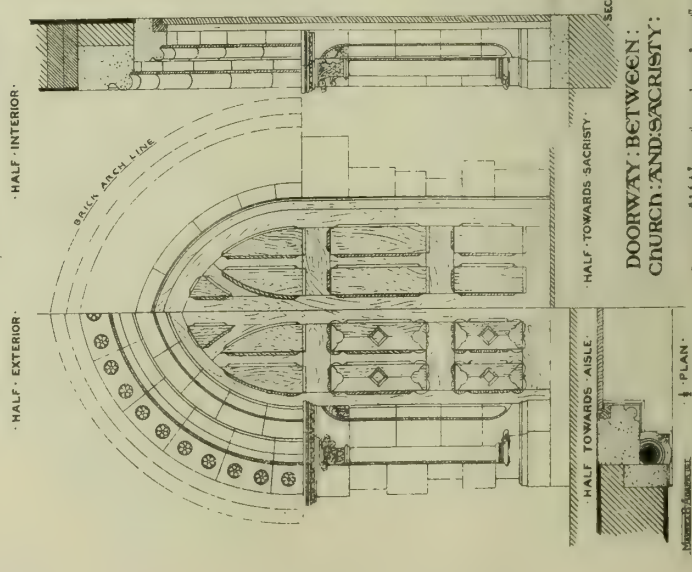
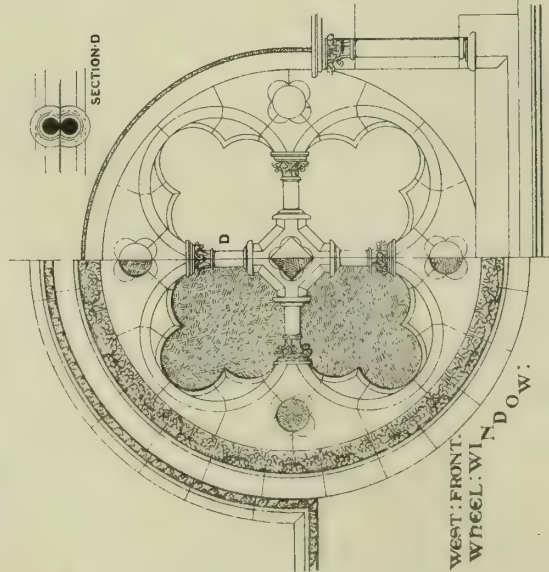
BOSTON



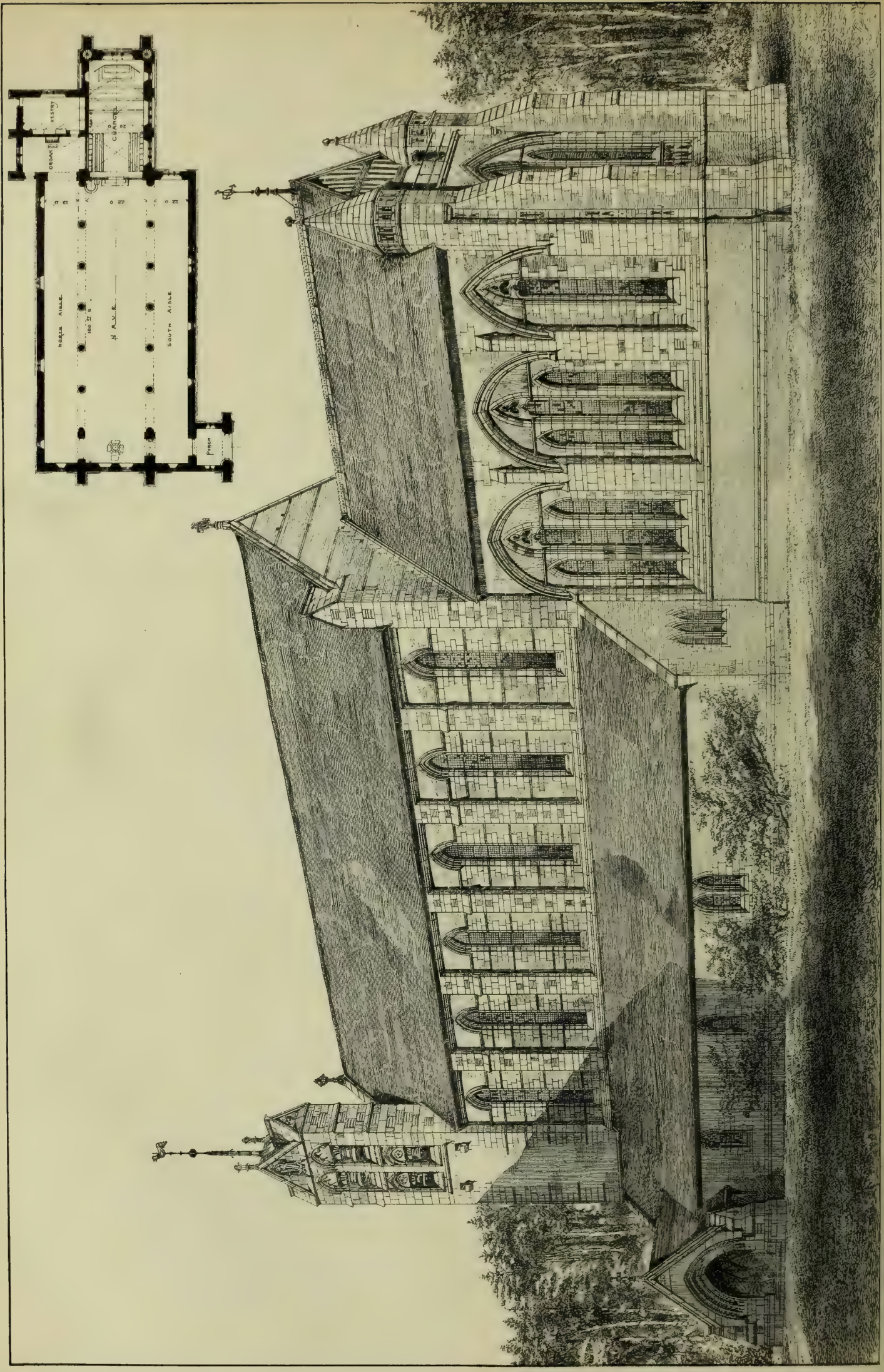
GEO. GILBERT SCOTT JUN. } ARCHITECTS
JOHN O. SCOTT }

CHURCH OF S. WILFRED: YORK:

VARIOUS DETAILS:



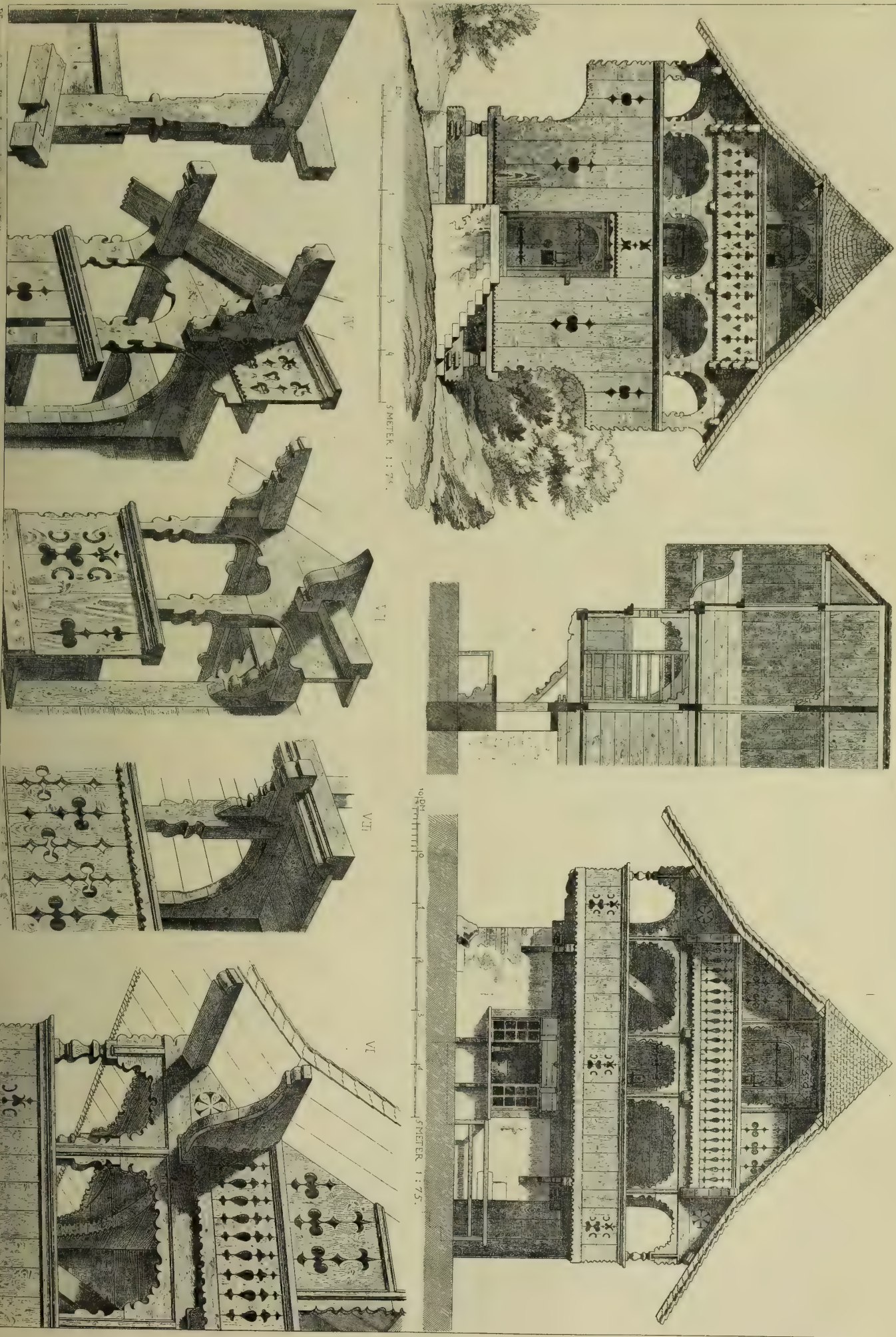
GEORGE GOLDIE ARCHITECT
PHOTO LITHOGRAPHED & PRINTED BY JAMES ARNOLD, 51 GRAFTON ROAD, W.C.

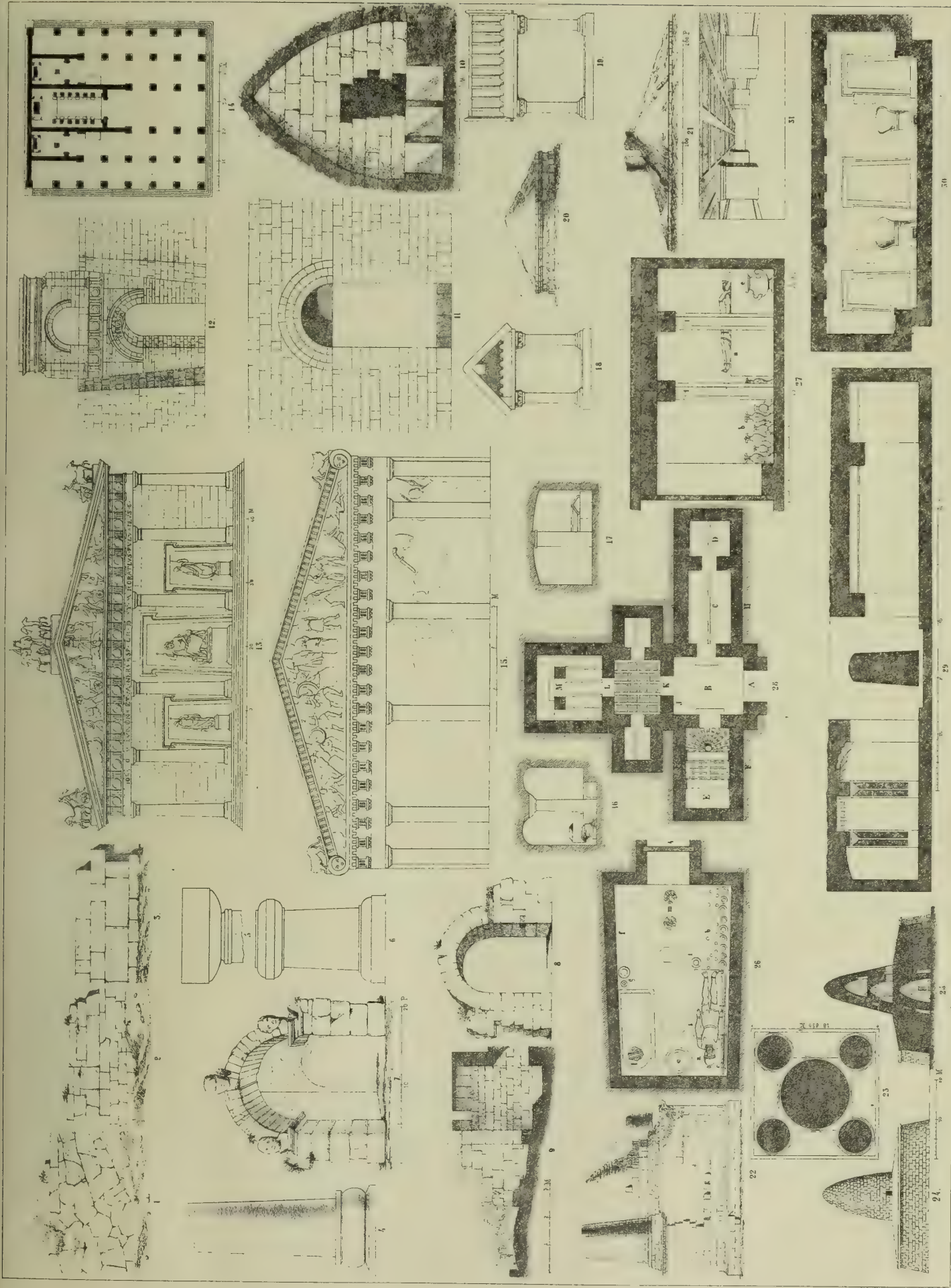


Whitman & Sons. Photo. Taken by the Queen & Mr. Holman.

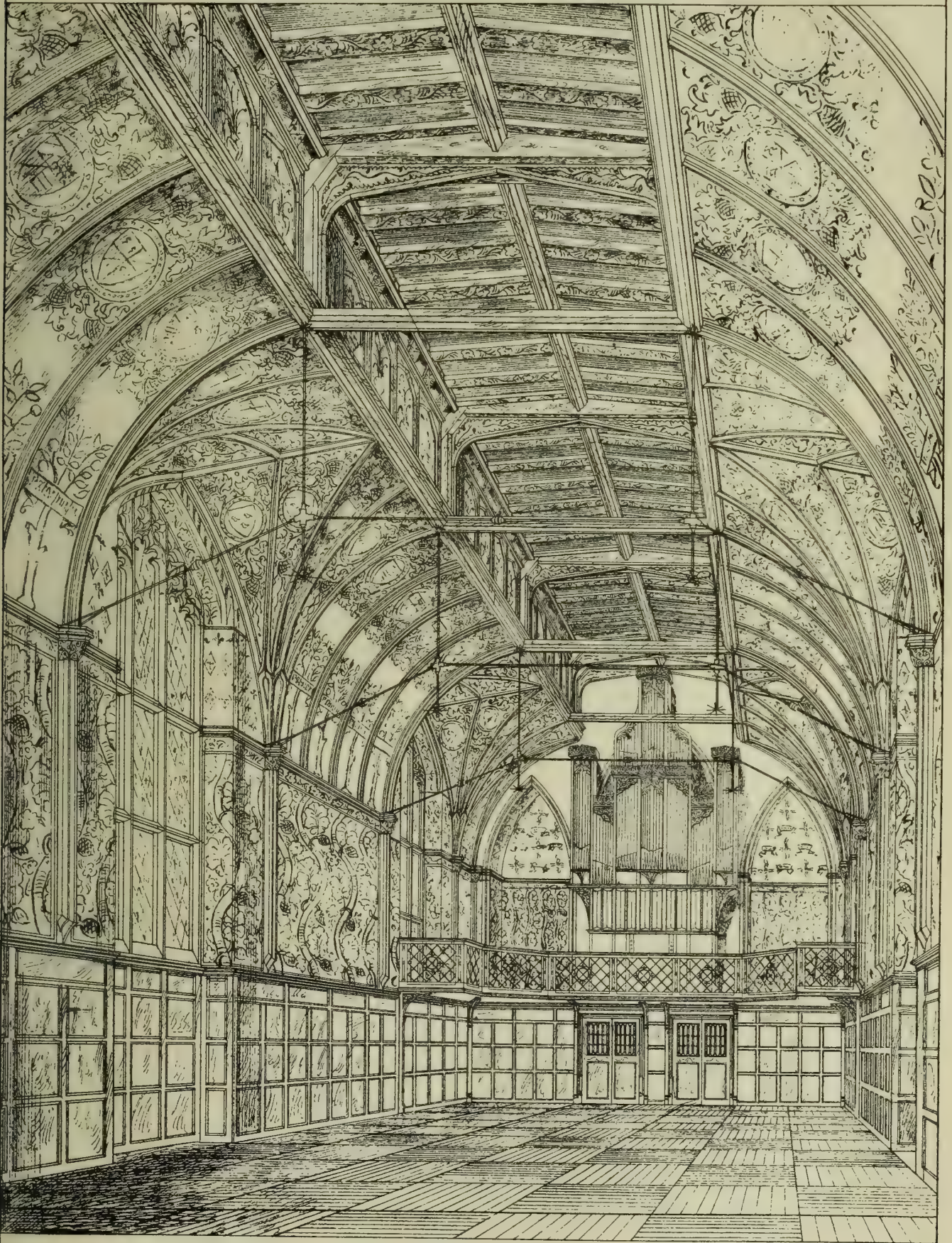
St. Michael's Church, Burnham.

R. Norman Shaw, A.R.A. Archt. & Coll.





NEW CONSERVATIVE CLUB BUILDINGS BOSTON.



INTERIOR OF GREAT HALL LOOKING SOUTH

GEO. GILBERT SCOTT JUN. } ARCHTS
JOHN O. SCOTT }

ARCHITECTURAL ASSOCIATION.

ON Friday evening last, the members of this Association met considerably earlier than usual, for the purpose of considering the arrangements for the annual architectural excursion. After hearing a statement by Mr. Edmund Sharpe, it was decided that the members should visit Grantham, Newark, and Southwell Minster, with the churches and other buildings of interest in the neighbourhood. The excursion will be, as hitherto, under the guidance of Mr. Sharpe, and the date fixed is the third week in August.

Mr. Sharpe then proceeded to explain the best mode of using the cymagraph. We need not here give his remarks on this head, as in the BUILDING NEWS for Feb. 28 last (No. 947 p. 259) we illustrated and described the mode of using this ingenious and useful instrument, and the description was supplemented by an admirable article by Mr. Sharpe himself, in the BUILDING NEWS for the following week, p. 265. On the general subject of Mediæval mouldings, Mr. Sharpe said that it afforded a wide and interesting field for inquiry. Did (he asked) the Mediæval builders lay down their mouldings on any systematic geometrical plan? This appeared to be so, within certain limits: what were those limits? These were mysteries to be discovered only by doing what he had attempted to do himself—viz., by collecting a large number of examples. There was another point about the study of mouldings which Englishmen were interested in nationally. There was no country in the world where mouldings were laid out, studied, and practised, as in this country. On the Continent, Gothic art was not studied beyond the Transitional period. Their mouldings were very few and very simple. In the investigation of this subject there was no society in the kingdom from whom so much might be expected as the Architectural Association. The archaeological societies of the kingdom contributed very little practical information on matters of this kind. The subject was pursued more for amusement than for the attainment of a real knowledge of the subject.

On the motion of Mr. PAICE, a hearty vote of thanks was accorded to Mr. Sharpe for his remarks, and for the interest manifested by him at all times in the welfare of the Association, and votes of thanks were also accorded to Messrs. Blashill and Ridge for leading the discussion on competitions at the previous meeting; to Messrs. Phené Spiers and Lacy W. Ridge for permitting the members to visit their new Board Schools at Bow and Bromley respectively three weeks ago; to Messrs. George and Henry Godwin for conducting the members over the new church of S. Luke's, South Kensington, a fortnight ago; and to Messrs. Corbett and McClymont for allowing the members to visit their works, and some new mansions and houses in the neighbourhood, on the same occasion.

Mr. D. W. WYNFIELD then proceeded to lecture on

TASTE IN COLOUR.

Mr. WYNFIELD, after some introductory remarks, said that, as a painter, he had chosen this subject, and he proposed to treat it especially in reference to our domestic surroundings. It might be thought at first, perhaps, that colour and taste in colour were not of much consequence to the world at large. That, however, depended entirely upon the value that was put upon art. Before his present audience, he took it for granted that he need not expatiate on the advantages of art, and that architects felt that art was a necessity of civilised man, and that one of the most exquisite effects we could derive from art was that which was afforded by harmony and taste in colour. In the development of art, it was of the greatest possible advantage that there should be a favourable atmosphere, so to speak. Nothing was more likely to develop an insight into the true principles of art than the artistic character of the objects which surrounded us in our daily life. If we looked at the best periods of art, when the greatest artists lived, we find that their homes, and everything that surrounded them, were more or less of a beautiful character. We knew what the temples of Greece were; we knew from the remains and from the sculpture how beautiful their composition was; and we might imagine that the colour was equally beautiful. Everything that surrounded the Greeks was suggestive of the beautiful. In the Middle Ages, we find the same state of things in Italy and Flanders, and in all the countries in which art attained its highest eminence. In England, up to recent times, one could

not say that there was much art to be seen in connection with our daily surroundings. We were, however, making considerable progress. With regard to colour, there had been very little attention paid to it until recently, in reference to the decoration of our rooms and of our furniture, and in the dress of the people. But considerably more taste was being shown at the present day. He did not know whether architects had the opportunity of doing much to develop that taste; he presumed, from the fact of domestic decoration being generally in the hands of tradesmen, that architects had not much opportunity; but if at any time they had to give advice upon matters of decoration, it was to be hoped, for the interests of art, that the painter's services would be more in requisition. In regard to choice of colour in the decoration of rooms, much of course depended upon the character of the rooms themselves, the objects for which they were intended, the amount of light and shade which they received, and so forth. Effect was produced by various means—by mere light and shade, and by colour. Of course the greatest object in the decoration of a room was to enhance the appearance of the persons or objects occupying the room, and it was remarkable how very much this was disregarded at the present time. Almost invariably we found that our drawing-rooms were papered with white paper—about the very worst that could be thought of for enhancing the beauty of the complexion, or setting off the colours of the dresses. Of course an artist in painting a picture had a command over all his materials, and he might put in a white background if he liked, but then he could arrange the complexions and dresses of his figures to suit the white background; but in a room the effect of a white background was only to deepen and intensify anything put in contact with it; it would, for instance, show at its utmost disadvantages any complexion which was naturally not very delicate. An extremely dark background had of course the effect of lightening anything brought in contrast with it, and would render the complexions of the people in a room whiter and more ghastly than they ought to appear. It would be found, as a general rule, that some neutral colour was that which was most calculated to enhance the appearance of the objects of the room. With regard to the choice of colour, contrast of tone was one of the greatest means of bringing out beauty, for there was no such thing in existence as absolutely pure colour; it was not even known chemically. We had no pigments which were absolutely pure. All the purest colours had a tendency to range in the direction of either what artists called "warmth" and "cold"—blues, for instance, being always a little greenish or purplish. It was impossible to find pure colours in nature, and it was the last thing we should seek to find in art, for the more a colour was broken the more beautiful it was in appearance. In nature we did meet with some objects which approached near to absolute purity and brilliancy of colour, but these objects were always found in the smallest quantities. The brightest flowers, birds and butterflies were very few indeed compared to the enormous number of the species by which they are surrounded. In the decoration of a room the object should be to show off to their utmost the contents or occupants of a room. Taste in colour was a great point to be observed, but this, again, was a matter which could only be spoken of relatively. Contrast was not to be found by any kind of positive definition, but rather by experience in the matter of arrangement. In considering the kind of decoration most appropriate to any particular room, due regard should be paid to the particular character of the room. The kind of decoration that would be suited for a drawing-room would not be suited for a dining-room, the two rooms being appropriated to purposes so dissimilar. In studying that particular school of colour which attained the greatest reputation, viz., the Venetian, it was noticeable how very strongly colour was sought for and obtained in the buildings themselves, and in their adornments and decorations. One saw what a mass of colour there was in the interior of S. Mark's, Venice, and almost the same degree of richness in colour was observable in the interiors of many of the palaces of Italy. From the examples of stuffs and papers of the time of Titian and Veronese we could judge to some extent of the glow and beauty of colour in everything connected with the daily life of the people. The Venetians, it was well known, had an extensive

commerce with the East, and early imbibed a great deal of the Eastern taste for colour, and Eastern nations were always noted for their skill and success as colourists. Among the favourable "signs of the times" in art matters, Mr. Wynfield remarked that great improvement was being shown in ladies' dresses of late years, which were becoming specially remarkable for beauty of colour. The fashionable colours at the present time were about as lovely in tint and tone as could be wished for, and it was to be hoped that the present taste would continue, for if so ladies would not easily be led to revert to the emerald greens, magentas, and bright sky-blues that they used formerly to wear. Of course form was as important as colour—and perhaps more so to architects; and here he, as a painter, could not but bear testimony to the improvement which had taken place in the last few years in respect to the actual buildings erected in London and elsewhere. He did not pretend to understand the merits of the different styles, but he could only say that the great mass of buildings which have been put up during the last twenty or thirty years, whether ecclesiastical, civic, or domestic, were very much more beautiful than the specimens of architecture which prevailed in the previous decades. It was to be hoped that the improvement would continue, and that London would be, before long, as beautiful as the wealth of this country could make it. If asked how it was possible to ascertain the exact colours which were beautiful, he could only say that that was a matter which naturally must be, to a certain extent, innate in the colourist, as far as invention was concerned, for the great colourist *invented* colour; but those who were not great colourists would have to take the usual course adopted in the acquirement of every sort of instruction namely, that of studying and copying from the best examples. There were splendid examples of the decoration of interiors in Italy. From these much could be learnt as to the best colours to employ, and from the works of our best painters in the present day perhaps more. He trusted that architects would avail themselves of every opportunity of increasing the means for the decoration of the homes of the people whenever they had an opportunity of doing so, and that they would endeavour to bring into requisition more and more the services of the painter in this direction. Mr. Mathews having desired Mr. Wynfield to prolong his remarks by giving some sort of idea of what he would consider a good arrangement of decoration for a house, Mr. Wynfield proceeded to say that the decoration of a drawing-room should be, as far as possible, capable of being so modified as to look equally well in summer and winter. In summer time the hangings, for instance, should be lighter than in winter, and the same might be said of the coverings of chairs, and other pieces of furniture. Of course, the more permanent features of the room, such as the walls, &c., should be in such colours as to suit equally well either season. A very good colour for the walls of a drawing-room was some neutral grey or fawn-colour, or a pale, quiet green, or something of that sort—something which should not be too dark and yet not too light. If a frieze round the top of the room could be afforded, it was worth having, for it usually looked well. With regard to woodwork, Mr. Wynfield considered that all imitation-grained woods were to be abominated. The natural wood should be either stained and varnished, or, what perhaps looked better, painted. The real wood was always beautiful, and it was not easy to say why the imitations should always be ugly; but it was so. Plain painting always looked much more beautiful, and always harmonised better with the decoration of the room. Woodwork might be painted lighter or darker than the tone of the walls, according to taste; both would look well. As to the carpet, it should be either lighter or darker than the walls, and not too vivid in colour. As regards the design of the carpet, his audience would not need to be told that the realistic designs of ferns, flowers, and birds' nests for walking upon were simply frightful to the artistic mind; for the notion of treading upon such things was not at all in keeping with the idea of the nature of a carpet. Mr. Wynfield said he did not like those rooms in which everything was of the same colour; he thought it was advisable to introduce variety as much as possible. With regard to the decoration of dining-rooms, there might be a considerably larger amount of decoration, because the light in the room (which was often used after

dark) was more concentrated in the centre, and the decoration was not so likely to detract from the effect of the figures.

DISCUSSION.

Mr. PAIN remarked that architects ought to feel very thankful indeed for a painter of Mr. Wynfield's position giving his advice and information on the difficult subject of colour treatment. In England we had a splendid heritage as far as architecture was concerned, although coloured architecture seemed to be at a discount with us, but he imagined that no one would say that we as a nation were deficient in our sense of colour. Undoubtedly, a great deal of prejudice against the use of colour, in our churches especially, was of Puritan origin, and the one great obstacle to the more extended use of artistic coloured decoration was to be found in that ever-present objection—enhanced cost. He should like Mr. Wynfield to have entered more into detail, and would ask him whether he approved of dados or chair-rails being carried round rooms; whether he liked a free style of decoration, or whether on walls he liked foliage, &c., to be treated in a stiff or conventional manner; as to paperhangings, what style did he consider looked the best—the Japanese style, the French style, or the conventional style? Again, what did Mr. Wynfield think of papering the walls of churches, and of church-decoration generally? Almost any church you went into in France or Germany was one mass of colour, contrasting very greatly with the cellar-like and whitewashed walls of our own church interiors. What did the lecturer think of the external decoration of houses? Was there any need, when the façade of a house wanted painting, for its being painted all white? He had great pleasure in moving a vote of thanks to Mr. Wynfield for his lecture.

Mr. WYNFIELD said that for convenience he would endeavour to reply to some of the questions asked. He thought that dados were very beautiful things, and suitable for almost all rooms—certainly for dining-rooms, drawing-rooms, billiard-rooms, studies, &c. As to their materials, of course this depended upon the scheme of decoration adopted for the rooms. Very beautiful dados could be made of stamped and embossed leather. Dados of coloured wood were always beautiful, and those of common wood painted to correspond with the doors, &c., always looked well. As to floral decorations, he did not like the realistic treatment, because the first artistic necessity of an object was that it should look like what it was, and a wall should look like a wall, however much it was decorated. The decorations on a flat surface should never look as if in relief. As to the Japanese style of paperhangings and decorations, he thought it exceedingly beautiful. As to ceilings, he was strongly averse to white ceilings, except in such situations as halls or staircases, where light was needed. He thought that most ceilings would look better for being decorated, and papered ceilings could be made to look very well. White and gold looked very well in ceilings, and where colour was used, it should never be too dark, as it had a tendency to drag the ceiling down, and lessen the apparent height of the room. With regard to the decoration of churches, he thought that paper was quite as capable of being introduced there as anywhere else. Where the interior of the church, however, was much broken up, and there was a plentiful play of light and shade, it was questionable if any colour was wanted: at any rate, in such cases very little colour was needed. He knew portions of our English cathedrals where colour had been introduced greatly to the detriment of the architecture. Where there were plenty of very large unbroken surfaces, colour might be introduced, but even there it should be done with caution. As to the external decoration of houses, he hoped for the time when our buildings would not need external painting, all effects of colour being obtained constructively by the choice of coloured materials.

Mr. EDMUND SHARPE, F.R.I.B.A., in seconding the motion, said that as the author had not broached the subject of ecclesiastical decoration in his remarks, the discussion was, perhaps, a little wide. The lecturer's advice generally had been of so neutral a tint that he would be captious indeed who would venture to find fault with him. He had great pleasure in seconding the vote of thanks to Mr. Wynfield, for he had given eminently safe advice as to ecclesiastical decoration. He heartily indorsed what Mr. Wynfield had said on this particular point.

He thought the tendency of the age was rather too much in the direction of strong colour, and this, like a tendency to strong drink, was a vicious one. Was it possible to apply colour successfully, even where there was not much play of form? It did not seem so, judging from the flagrant instance at S. Cross, Winchester. In this example the zigzags which surround the circular windows were so treated that no one, standing at a distance, could tell whether they were due to colour or to form. In such cases as this, he thought there could not be a doubt that colour was wrongfully used. He thought it was a good rule to lay down that where form was abundant, colours should be sparingly used; in fact, a pretty good rule would be to say that colour, in the sense in which he now spoke of it, should be laid on only flat surfaces; and probably there might be flat surfaces in churches where colour could be introduced in the temperate manner indicated by the lecturer. As to the greater prevalence of colour in Continental churches, referred to by Mr. Pain, he was rather disposed to think that the contrary was the case. He believed that the use of colour was becoming very much more prominent in our own public buildings at home, and it was being much less used abroad. Without pretending to criticise the proposed scheme for the decoration of S. Paul's, he was quite sure that if carried out, that wonderful and strange misty effect which was seen at present in looking up to the roofs would be destroyed directly the paint was applied. It was this strange misty effect which caused S. Paul's Cathedral to look, for its size, higher than S. Peter's.

Mr. Lacy W. Ridge and Mr. Phené Spiers having made some remarks, the Chairman put the motion to the meeting, and Mr. Wynfield having briefly replied on one or two other points raised, the meeting terminated.

VENETIAN PAINTING.*

IT is not an insignificant, though a slight detail, that the predominant colour of Florence is a sombre and cold brown, while the predominant colour of Venice is that of mother-of-pearl, which conceals within its general whiteness every tint that can be placed upon the palette of a painter. To represent in art the spiritual strivings of the Renaissance was the task of Florence and her sons; to leave a pompous monument of Renaissance splendour was the achievement of Venice. Without Venice the modern world could not have produced that flower of healthful and unconscious beauty in painting which is worthy to stand beside the serene product of the sinless Greek genius in sculpture. Athens from her Parthenon stretches the hand to Venezia enthroned in the ducal palace. The broad brows and earnest eyes of the Hellenic goddess are of one divine birth and lineage with the golden hair and proud pose of the Sea-queen.

It is in the heart of Venice, in the House of the Republic, in the so-called Ducal Palace, that the Venetian painters, considered as the interpreters of proud magnificence, fulfilled their function with the most surprising success. Centuries contributed to make the ducal palace what it is. The massive colonnades and Gothic loggias on which it rests date from the thirteenth century; their sculptures belong to the age when Nicolo Pisano's genius was still in the ascendant. The square fabric of the palace, so beautiful in the irregularity of its pointed windows, so singular in its mosaic diaper of pink and white, was designed at the same early period. But the inner court and the façade which parts the lateral canal, display the handiwork of Sansovino, a Florentine of the Renaissance, who adopted Venice as his home, and whose talent, excited by the magnificence of the Republic, created a style of architecture almost arrogant in its fusion of a broad and vast design with superfluity of costly decoration. The halls of the palace—spacious chambers where the Senate assembled, where Ambassadors approached the Doge, where the Council of ten deliberated, and the Council of Three conducted their inquisition, are walled and roofed with pictures of inestimable value, encased in framework of sculptured oak, overlaid with solid gold. Supreme art, art in which fiery imagination vies with tender and delicate skill,

is made in these proud halls the minister of mundane pomp. That the gold brocade of the ducal uniform, that the scarlet and crimson of the Venetian noble, may be duly harmonised by the richness of their surroundings, it was necessary that canvases measured by the score of square yards, and made priceless by the authentic handiwork of Titian, Tintoretto, Veronese, should blaze upon the gilded walls and roofs. A more insolent display of public wealth, a more lavish outpouring of human genius in the service of mere pageantry, cannot possibly be imagined. Supreme over all allegories and histories depicted in those multitudes of paintings, sits Venezia herself enthroned and crowned, the personification of haughtiness and power. Figured as a regal lady, with golden hair tightly knotted beneath a diadem around a small head proudly poised upon her upright throat and ample shoulders, Venice there takes her chair of state under resplendent canopies, as mistress of the ocean, to whom Tritons and sea-nymphs and Neptune offer pearls; as empress of the globe, at whose footstool wait Justice with the sword, and Peace with the olive-branch; as queen of heaven, exalted to the clouds. They have made her a goddess, those great painters—have produced a mythus, and personified in native beauty that bride of the sea, their love, their lady. On every side, above, around, wherever you turn in these vast saloons, are seen the deeds of Venice, whether painted histories of her triumphs over the Emperors, the Popes, the Turks; or allegories of her grandeur—stupendous scenes in which the Doges, Grimani, and Loredani, and Gritti, and Contarini, and Friuli, and Dandoli, perform acts of faith, with S. Mark for their protector, and with Venezia for their patroness. Surging multitudes of saints in Paradise, massed together by Tintoretto and by Palma, for the display of imposing effects of light, grand attitudes, gorgeous nudities, and mundane pomp of many-hued apparel, mingle with elaborate mythologies of Greek and Roman origin, fantastic arabesques, and charming episodes of pure idyllic painting. Religion in these pictures was a matter of parade, an adjunct to the costly public life of the Republic. We need not conclude that it was unreal. Such as it was, the religion painted by the Venetian masters is, indeed, as real as that of Fra Angelico or Albert Dürer. But it was the faith, not of humble men or of mystics, not of profound thinkers or ecstatic visionaries, so much as of courtiers and soldiers, and merchants and statesmen, to whom religion was an element of life, a function among other functions—not a thing apart, a consecration of the universe, a source of separate and supreme vitality. That Tintoretto could have painted the saints in glory, a countless multitude of surging forms, a sea whereof the waves are souls, as a mere background to state ceremony, shows the prosaic point of view, the positive and realistic attitude of mind, from which the Venetian masters started when they approached a religious subject. Paradise is a fact, reasoned Tintoretto; and it is easier to fill a quarter of an acre of canvas with a picture of Paradise than of any other subject, because the figures can be so conveniently arranged in concentric tiers round Christ and Madonna in glory; therefore I will fill that end of the Council Chamber with my Paradise. Without more ado he did it. There is a picture by Guardi, which represents a kind of masked ball taking place in this chamber. The gentlemen are in periwigs and long waistcoats; the ladies wear hoops, patches, fans, high heels, and powder. Bowing, promenading, flirting, diplomatizing, they parade about; while from the billowy surge of saints, Moses with the Tables of the Law, S. Bartholomew holding up his poor flayed skin, the Magdalen with her dishevelled hair and adoration of ecstatic penitence, look down upon them. Tintoretto must have foreseen that the world of living pettiness and passion would perpetually jostle with his world of painted sublimities and sanctities in that vast hall. Yet he did not on that account shrink from the task. Paradise existed, therefore it could be painted; if it filled the space better than another subject, put it in the place appointed; if the fine ladies and gentlemen below feel out of harmony with the celestial host, so much the worse for them.

In the Ducal Palace, the Venetian art of the Renaissance culminates. That art has been described as decorative; and truly here, at all events, it lends itself to the purpose of gorgeous ornamentation. Yet long before it culminated in this final splendour, the painting of Venice had been forming a

* From an article in the last number of the *Westminster Review*, published by Tribner and Co. 59 Paternoster-row.

tradition of pompous art, in which the spirit of the Renaissance, as the spirit of free enjoyment and magnificent expansion, found its expression. To trace the history of Venetian painting is to follow through its several stages the growth of that mastery over colour and physical magnificence which blossomed finally in the works of Titian and his contemporaries. Under the Vivarni family of Murano, the Venetian school of painting began with the imitation of pure nature, and with the selection from the natural world of all that it possessed of brilliant, luminous, salient with qualities of strength and splendour. No other painters of the fourteenth century in Italy employed such glowing colours, or showed such predilection for the careful representation of fruits, rich stuffs, architectural canopies, jewels, landscape backgrounds. Their piety, unlike the mystical asceticism of the Siennese and Florentine masters, is marked by sanity, solidity, vivacity, joyousness. Our Lady and her court of saints live, move, and breathe as if on earth. They do not swim before ecstatic eyes as in the visions of Angelico or Duccio. There is no atmosphere of traced solemnity surrounding them, like that which gives peculiar charm to the pietistic pictures of Van Eyck and Memling—artists who, by the way, are more nearly allied than any others to the spirit of the first age of Venetian painting.* What the Vivarni began, the two Bellini, with Crivelli, Carpaccio, Mansueti, Basaiti, Catena, Cima da Conegliano, Bissolo, continued. Bright colours in dresses, distinct and sunny landscapes, broad backgrounds of architecture, polished armour, gilded cornices, young faces of fisher boys and country girls, grave faces of old men brown with sea-wind and sunlight, withered faces of women hearty in hale old age, the superb manhood of Venetian senators, the dignity of patrician ladies, the gracefulness of children, the rosy whiteness and amber-coloured tresses and black eyes of the daughters of the Adriatic and lagoons—these are the source of inspiration to the Venetians of the second period. Mantegna, a few miles distant, at Padua, was working out his idea of severely classical design. But he scarcely touched the manner of the Venetians with his influence, though Gian Bellini was his own son-in-law, and though his genius, in grasp of matter and in management of thought, soared far above his neighbours. Leonardo at Milan was working out his problems of psychology in painting and offering to the world solutions of the gravest difficulties in the delineation of the spirit by expression. Yet not a trace of Leonardo's subtle play of light and shadow upon thoughtful features can be discerned in the work of the Bellini. Their function was a different one. All the externals of a full and sumptuous existence fascinated their imagination. The problems that they undertook to solve were wholly in the region of colouring—how to depict the world as it is seen, a mirage of varying lustre and of melting hues, a pageant substantial to the touch and concrete to the eyes, a combination of forms defined by colours more than outlines. Very instructive are the wall-pictures of this period, painted not in fresco but on canvas by Carpaccio, Gentile Bellini, and their scholars, for the decoration of the Scuole or Guildhalls of the Companies of S. Ursula and Sta. Croce. They bring before us the life of Venice in all its complexity. They indicate the tendency of the Venetian masters to express the shows and splendours of the actual world, rather than to realise an ideal of the fancy or to search the secrets of the soul of man.

Gian Bellini brought the art of this second period of Venetian painting to perfection. In his altar-pictures the reverential spirit of early Italian art is combined with a feeling for colour and a dexterity in its treatment peculiar to Venice. Bellini cannot properly be called a master of the Renaissance. He falls into the same category as Francia, Fra Bartolommeo, Fra Angelico, Perugino, who adhered to mediæval modes of thought and sentiment, while attaining at isolated points to the freedom of the Renaissance. Bellini's ground of superiority was colour. In him the colourists of Venice found a perfect master, and no one has surpassed him in the difficult art of giving tone to pure and luminous tints in complex combination. There is one picture of Bellini's at Venice

in the Church of San Zaccaria, Madonna enthroned beneath a gilded canopy with Saints, in which the art of the colourist may be said to culminate in unsurpassable perfection. The whole painting is bathed in a soft but luminous haze of gold; yet each figure has its own individuality of treatment—the glowing fire of S. Peter contrasting with the pearly coolness of the drapery and flesh-tints of the Magdalen. No brushwork is perceptible. The whole surface and substance has been elaborated into one harmonious homogeneous richness of tone that defies analysis. Between this picture, so strong in its smoothness, and any masterpiece of Velasquez, so rugged in its strength, what a wide abyss of inadequate half-achievements, of smooth feebleness and feeble ruggedness, exists! Giorgione, did we but possess enough of his authentic work to judge by, would be found the first true painter of the Renaissance among the Venetians—the inaugurator of the third and great period. But he died young, at the age of thirty-six, the inheritor of unfulfilled renown. The part he played in the development of Venetian art was similar to that of Marlowe in the history of our drama. He first cut painting wholly adrift from mediæval moorings and launched it on the waves of the Renaissance liberty. While equal as a colourist to Bellini, though in a different and more sensuous region, Giorgione, by the boldness and inventiveness of his conception, proved himself a painter of the calibre of Titian. His drawings, like those of his great successors, are miracles of form evolved without outline by massive distributions of light shade, suggestive of colouring. Time has destroyed his frescoes. Criticism has reduced the number of his genuine easel pictures to half-a-dozen. He exists as a great name. Of the undisputed pictures by Giorgione the grandest is his *Monk at the Clavichord*, in the Pitti Palace at Florence. The young man has his fingers on the keys; he is modulating in a mood of grave and sustained emotion; his head is turned away towards an old man who stands by him. On his other side is a boy. These two figures are but foils and adjuncts to the musician in the middle; and the whole interest of his face lies in its intense emotion—the very soul of music, as expressed in Browning's *Abt Vogler*, passing through his eyes. This power of painting the portrait of a soul in one of its deepest moments, possessed by Giorgione, is displayed again in the so-called *Begrüssung* of the Dresden Gallery. The picture is a large landscape. Jacob and Rachel meet and salute each other with a kiss. But the shepherd lying beneath the shade of a chestnut tree near a well at a little distance has a whole Arcadia of intense yearning in the eyes of sympathy with which he gazes on the lovers. Fate has dealt less unkindly with Titian, Tintoretto, Veronese, than with Giorgione. The works of these supreme artists, in whom the Venetian Renaissance culminated, have been preserved to us in vast numbers and in excellent condition. Chronologically speaking, Titian precedes Tintoretto, and Tintoretto is somewhat anterior to Veronese. But for the purpose of criticism the three painters may be considered together, as the representatives of three marked aspects in the Venetian Renaissance.

Let us first briefly characterise their qualities, and then proceed to more detailed remarks upon their several styles.

Tintoretto, called by the Italians the Thunderbolt of Painting, because of his vehement impulsiveness and rapidity of execution, soars above his brethren in the faculty of pure imagination. It was he, too, who brought to its perfection the poetry of chiaroscuro, expressing moods of passion and emotion by brusque lights and luminous half shadows and opaque darkness, as unmistakably as Beethoven by contrasted chords. Veronese elevated pageantry to the height of art. His domain is noonday sunlight ablaze on gorgeous dresses and Palladian architecture. Titian, in a wise harmony, without the Æschylean fury of Tintoretto or the sumptuous arrogance of Veronese, realised the ideal of pure beauty. Continuing the traditions of Bellini and Giorgione, with a breadth of treatment, a wisdom of moderation, a vigour and intensity of well-balanced genius peculiar to himself, Titian gave to colour in landscape and the human form a sublime yet sensuous poetry which no other painter in the world has reached. In his *Assumption* of the Virgin, his *Bacchus* and *Ariadne*, his *Venus of the Tribune*, his allegory of the *Three Ages*, Titian achieved the most consummate triumphs of Venetian art. Tintoretto and Veronese are

both of them excessive: the imagination of Tintoretto is too passionate, too seething; the sense of splendour in Veronese is overpoweringly pompous; Titian's exquisite humanity, his large and sane nature, gives their proper value to the imaginative and the pompous elements of Venetian art without exaggerating either. In his masterpieces, composition, thought, colour, sentiment are carried to their ultimate perfection, as the many-sided expression of one imaginative intuition, by which the supreme artist gives one harmonious tone to all the parts of his production. Titian, the Venetian Sophocles, has infused into his painting the spirit of music, the Dorian mood of flutes and soft recorders, making his power incarnate in a form of grace.

Round these great men—Titian, the Sophocles of painting, perfect in his harmonising faculty, unrivalled in his empire over colour; Tintoretto, the archangel of Chiaroscuro, the Titian of audacious composition, the priest of a passionate imagination; Veronese, the poet of insolent and worldly pomp—are grouped a host of secondary but distinguished painters: the two Palmas, idyllic Bonifazio, Paris Bordone, the Robusti, the Callari, the Bassani, and others, whom it would be tedious to mention. One breath, one afflatus inspired them all. Superior or inferior as they may relatively be among themselves, each bears the indubitable stamp of the Venetian Renaissance, and produces work of a quality that raises him to a high rank among the artists of the world. In the same way the spirit of the Renaissance passing over the dramatists of our Elizabethan era, enabled intellects of average force to take rank in the company of the noblest. Ford, Massinger, Heywood, Decker, Webster, Tourneur, Marston, are seated on the steps of the throne at the feet of Shakespeare, Marlowe, Jonson, Fletcher.

In order to penetrate the characteristics of Venetian art more thoroughly, it will be needful to enter into detailed criticism of the three chief masters who command the school. To begin with Veronese: What is the world of objects to which he introduces us?

His canvases are nearly always large, filled with figures of the size of life, massed together in brilliant groups, or extended beneath white marble colonnades, enclosing spaces of blue sky and silvery cloud. Armour, shot colours in satins and silks, brocaded canopies, banners, plate, fruit, sceptres, crowns, everything in fact that the sun can shine upon, form the habitual furniture of his pictures. Rearing horses, dogs, dwarfs, cats, when occasion serves, are brought in to add reality, vivacity, grotesqueness to his scenes. His men and women are large, well-proportioned, vigorous, eminent for pose and gesture rather than for grace and loveliness, distinguished by adult rather than adolescent charms. Veronese has no choice type of beauty. We find in him, on the contrary, a somewhat coarse display of animal force in men, and of superb voluptuousness in women. He prefers to paint women draped in gorgeous raiment, as if he had not felt the majestic beauty of statuesque nudity. His noblest creatures are men of about twenty-five, manly, brawny, full of nerve and vigour. In all this Veronese is not unlike Rubens. But he never, like Rubens, appears to us gross, sensual, fleshy; he remains proud, pompous, powerful. He raises neither repulsion nor desire, but displays with the cold strength of art the empire of the mundane spirit. All that is refulgent in pageantry, all the equipage of arrogant wealth, the lust of the eye and the pride of life, such vision as the fiend offered to Christ on the mountain of temptation, this is Veronese's realm.

Again, he has no flashes of imagination like Tintoretto; but his grip on the realities of the world, his faculty for poetising prosaic magnificence, is greater. Veronese is precisely the painter suited to a nation of bankers, in whom the associations of the counting-house and the exchange mingled with the responsibilities of the Senate and the passions of princes. Veronese never painted vehement emotions. There are no brusque movements, no extended arms, like those of Tintoretto's Magdalen in the *Pietà* at Milan. His Christs and Marias and martyrs of all sorts are composed, serious, courtly, well-fed, sleek personages, who, like people of the world accidentally overtaken by some tragic misfortune, do not stoop to distortions or express more than a grave surprise, a decorous sense of pain. The Venetian Rothschilds undoubtedly preferred the sumptuous to the imaginative treatment of sacred subjects. To do him justice, Veronese does not

* The conditions of art in Flanders—wealthy, bourgeois, proud, free—were not dissimilar to those of art in Venice. The misty fogs of Belgium have some of the atmospheric qualities of Venice. It is the different *habitus* of the Flemish and Venetian nature which distinguishes their painting. As Van Eyck is to the Vivarni, so is Rubens to Paolo Veronese.

make what would in his case have been the mistake of choosing the tragedies of the Bible for representation in his pictures. It is the story of Esther, with its royal audiences, coronations, processions; the Marriage-feast of Cana; the banquet in the house of Levi, that he selects by preference. Even these he removes into a region far from biblical associations. His *mise en scène* is invariably an idealisation of Italian luxury—vast open palace courts and loggias, crowded with guests in splendid attire and with magnificent lacqueys. The same love of display led him to delight in allegory—not allegory of the deep and mystic order, but of the pompous and processional, in which Venice appears enthroned among the deities, or Jupiter fulminates against the vices, or the Genii of the arts are personified as handsome women and blooming boys. Tintoretto is not at home in this somewhat crass atmosphere of mundane splendour. He requires more thought and fancy as a stimulus to creation. He cannot be contented to reproduce even in the most lustrous combination what he sees around him of gorgeous and magnificent and vigorous. There must be some scope for poetry in the conception, for audacity in the composition, something in the subject which can rouse the prophetic faculty and evoke the seer in the artist; or Tintoretto does not rise to his own altitude. Accordingly we find that Tintoretto, in abrupt contrast with Veronese, selects by preference the most tragic and dramatic subjects that can be found in sacred or profane history.* The Crucifixion with its agonising Deity and prostrate groups of women sunk below the grief of tears; the temptation of Christ in the wilderness, with its passionate contrast of the grey-robed Man of Sorrows and the ruby-winged voluptuous fiend; the temptation of Adam in Eden, a luxurious idyll of the fascination of the spirit by the flesh; Paradise, a tempest of souls, a drift of saints and angels, "ruining" like Lucretian atoms or gold-dust in sunbeams "along the illimitable inane," and driven by the celestial whirlwind that performs the movement of the spheres; the destruction of the world, in which all the fountains and rivers and lakes and oceans of earth have formed one foaming cataract, that thunders with cities and nations in its rapids down a bottomless gulf, while all the winds and hurricanes of the air have grown into one furious blast that carries souls like dead leaves up to judgment; the plague of the fiery serpents—multitudes coiled and writhing on a burning waste of sand; the Massacre of the Innocents, with its spilt blood on slippery pavements of porphyry and serpentine; the Delivery of the Tables of the Law to Moses amid cloud on Mount Sinai—a white, ecstatic, lightning-smitten man emerging in the splendour of apparent Godhead; the anguish of the Magdalen above her martyred God; the solemn silence of Christ before Pilate; the rushing of the wings of Seraphim; the clangour of the Trump that wakes the Dead: these are the awful and soul-stirring themes that Tintoretto handles with the ease of mastery. He is the poet of infinity and passion; the Prospero of arch-angelic Ariels; the Faust of spiritual Helens; the majestic scene-painter of a theatre as high and broad and deep as heaven and earth and hell. But it is not only in the region of the vast and tempestuous and tragic that Tintoretto finds himself at home. He is equal to every task that can be imposed upon the imagination. Provided only that the spiritual fount be stirred, the jet of living water gushes forth pure, inexhaustible, and limpid. In the Marriage of Bacchus and Ariadne, that most perfect idyll of the sensuous fancy from which sensuality is absent; in his Temptation of Adam, that symphony of greys and browns and ivory more lustrous than the crimson and the gold of sunset skies; in his miracle of S. Agnes, that lamb-like maiden with her snow-white lamb among the soldiers and the courtiers and the priests of Rome, Tintoretto has added one

more proof that the fiery genius of Titianic artists can pierce and irradiate the placid and the tender secrets of the soul with more consummate mastery than falls to the lot of those who make tranquillity their special province. Paolo Veronese never penetrated to this inner shrine of beauty, this Holiest of Holies where the Sister Graces dwell. He could not paint waxen limbs, with silver lights and golden, and transparent mysteries of shadow, like those of Bacchus, Eve, and Ariadne. Titian himself was powerless to imagine movement like that of Aphrodite floating in the air above the lovers, or of Madonna adorning Christ in the Paradise, or of Christ himself judging by the silent simplicity of His divine attitude the worldly judge at whose tribunal He stands, or of the tempter raising his jewelled arms aloft to dazzle with meretricious lustre the impassive God above him, or of Eve leaning in irresistible seductiveness against the fatal tree, or of S. Mark down-rushing through the air to save the slave that cried to him, or of the Mary who has fallen asleep with folded hands from utter exhaustion of agony at the foot of the Cross. It is in these attitudes, movements, gestures, that Tintoretto makes the human body an index and symbol of the profoundest, most tragic, most poetic, most delicious thought and feeling of the inmost soul. In daylight radiance of colour, he is surpassed, perhaps, by Veronese. In perfect mastery of every portion of his art, in solidity of execution, in firm unwavering grip upon his subject, he falls below the level of Titian. Hundreds of his pictures are unworthy of his genius—hurriedly designed, rapidly dashed in, studied by candlelight, with brusque effects of abnormal light and shadow, hastily daubed with colours that have not stood the test of time. He is a gigantic improvisatore—a Gustave Doré or a John Martin on the scale of Michael Angelo: that is the worst thing we can say of him. But in the swift intuitions of the spirit, in the purities and sublimities of the prophet-poet's soul, neither Veronese nor Titian can approach him.

How, lastly, are we to speak of Titian? Who shall seize on the salient characteristics of an artist whose glory it is to offer nothing over-prominent, who keeps the middle path of sanity and perfection? Just as complete health may be defined as the absence of any obtrusive sensation, just as virtue has been defined as the just proportion between two extravagances, so is the art of Titian a golden mediocrity of joy unbroken by brusque movements of the passions, a well-tempered harmony in which no thrilling note suggests the possibility of discord. When we think of Titian we are irresistibly led to think of music. His Assumption of the Madonna, the greatest single picture in the world, if we exclude Raphael's Madonna di San Sisto, may best be described as a symphony—a symphony of colour, in which every hue is brought into melodious play; a symphony of movement in which every line communicates celestial sense of rhythm; a symphony of light in which there is no cloud; a symphony of joy in which saints, angels, and God himself sing Hallelujah. Tintoretto, in the Scuola di San Rocco, has painted an Assumption of the Virgin with characteristic energy and impulsiveness. A group of agitated men around an open tomb; a rush of air and clash of seraph wings above; a blaze of light; a woman borne with sideways-swaying figure from darkness into splendour; that is his picture: all *brío*, bustle, speed. Quickly conceived, carelessly executed, this painting bears the emphatic impress of its author's impetuous soul. But Titian has worked on a different method. On the earth among the apostles there is energy and action enough; ardent faces straining upward, impatient men raising impotent arms, and vainly divesting themselves of their raiment as if they too might follow her they love. In heaven is splendour that eclipses half of the archangel who holds the crown, and reveals the Father of Spirits in a halo of golden glory. Between earth and heaven, amid a choir of angelic children, stands that mighty mother of the faith of Christ, that personified Humanity, who was Mary and is now a goddess, ecstatic yet tranquil, not yet accosted to the skies, but far above the grossness and the incapacities of earth. The grand style can go no further than is this picture—serene, composed, meditated, enduring, yet full of dramatic energy and of profound feeling.

To talk about Titian is a kind of profanity. He does not stir the imagination like Tintoretto, or sting the senses, or awake unquenchable ardours in the soul. But he gives to the mind

joy of which it can never weary, pure, well-balanced pleasures which cannot satiate, a satisfaction not to be repented of, a sweetness that will not pall. It is easy to tire of Veronese; it is possible to be fatigued by Tintoretto; Titian waits not for moods or humours in the spectator. Like Nature, like Phœdrias, he is imperishable.

In the course of this attempt to analyse the specific qualities of Tintoretto, Veronese, and Titian, we have wandered from the main subject we proposed to treat—the character of the Renaissance as exemplified by the Venetian masters. It was necessary to do so, because the points of difference between them are personal, while their point of accord is complete participation in the spirit of Renaissance liberty. Nowhere in Italy was art more absolutely emancipated from servile obedience to ecclesiastical traditions than at Venice. Nowhere was the Christian history treated with a more vivid realism, harmonised more naturally with Pagan mythology, or more completely disinfected of mediæval mysticism. The frank liberty, the scientific positivism, the absolute sincerity, the candid and joyous acceptance of all facts in human and physical nature, which were the greatest qualities of the Renaissance, found no obstacle whatever to their free development in Venice.

HOW THE NEW TOWN-HALL, BOLTON, IS DECORATED.

THE decorations of the Great Hall and principal rooms are of an ornate character, and have been executed by Messrs. W. B. Simpson and Sons, of West Strand, London, whose designs submitted in competition with those of Messrs. Crace, Clayton, and Bell, and several other of the leading decorators, were selected by the committee, and have been ultimately carried out. The style adopted is founded on Greek types, rather than those of the Roman or later and less severe Italian styles, and is similar to that employed by Sir G. G. Scott at the new Foreign Offices in London. The aim of the decorators has been to produce throughout an effect at once rich and harmonious, and special regard has been had in each instance to the several uses and requirements of the different rooms. In the Great Hall, for example, its purposes as a place for public meetings, concerts, and balls, has been borne in mind in the selection of the prevailing warm and brilliant colours, and of the inscriptions, arms, and other details which all have reference to its public use.

The Mayor's dining-room is bright and cheerful in its general aspect, as a banqueting hall should be, and it lights up well at night; while the colouring of the council-room is of the quieter and somewhat graver quality needful for a chamber of consultation and debate.

The Great Hall.—The deeply coffered ceiling is treated in light and aerial tints. The large pendant centre ornaments are richly gilded and the panels decorated with honeysuckle ornament on a deep cerulean ground, while the mouldings bordering and inclosing them are either decorated with echinus and leaf enrichments or massively gilded. The oak-leaf border which forms a bold intersecting band and from which the gas-pendants spring is tinted a delicate green and relieved with gilding. Supporting the ceiling is the groined coving surmounted by a cornice with modillions and pierced at intervals by windows, also fully coloured and gilded, and the pendentives of the cove are filled with boldly drawn terminal figures painted in chiaroscuro with outstretched wings and gold trumpets. Beneath are the upper walls and lofty entablature, the general colouring of which is kept light, and like most of the work, relieved with gilding. On the frieze of the entablature and running entirely round the hall, the following texts are inscribed in lettering of gold and deep red: "Except the Lord build the house, they labour in vain that build it; except the Lord keep the City, the watchman waketh but in vain." "Blessed are the nations whose God is the Lord, and the people whom he hath chosen for his own inheritance." The walls down to the level of the gallery are formed into panels of a warm cream tone, diapered with a pattern of simple but effective design in soft colour and gold, and surrounded by borderings. Between each panel is a tall pilaster of deep red, the capital and base being richly gilded, and the shaft embellished with foliated scroll ornament, in vellum colour and gold, springing out of vases of classic form, which are supported on tripods. Be-

* Perhaps the most profound characteristic of Tintoretto is that he attempts to depict situations that are eminently poetic. The poet imagines a situation in which spiritual or emotional life is paramount, and a sense of the body subordinate. The painter selects a situation in which the body is of first importance, and a spiritual or emotional activity is suggested. But Tintoretto grapples immediately with poetic ideas, and often fails in his attempt to realise them completely. Michael Angelo did the same. His sculpture in San Lorenzo, compared with Greek sculpture, is an invasion of the proper domain of poetry or music. Moses, in the picture of the Golden Calf in Santa Maria dell'Orto, is a poem and not a true picture. The lean pale ecstatic stretching out his emaciated arms, presents no beauty of attitude or outline. Energy of thought is conspicuous in the figure.

neath the pilasters a dado of inlaid parquetry runs round the galleries.

The gallery fronts are deeply moulded and decorated in light and cool colours, and under them are groined soffits, which are filled by hexagon-shaped panels, containing the several quarters of the British Arms emblazoned on a blue field, and surrounded by honeysuckle scroll work in vellum colour and gold on deep red. Below these again are lunettes coloured in shades of green, and in each a circle bearing either the arms or cypher of the corporation of Bolton, while the panels under them are decorated in colour to correspond. The small ceiling over the orchestra at one end of the hall is richly ornamented in vellum colour, gold, and pale blue, with pendentives on either side having circular medallions with the names of the Muses.

The Mayor's Dining Room.—The decoration of the ceiling consists of honeysuckle scroll work on blue ground, filling the panels and surrounding the circular medallions, in the centre of each, which have in them figures painted in monochrome on maroon ground, and representing the principal planets. Round the room the deep entablature is richly ornamented in colours and gold, and beneath it is a rich arcaded border in amber colour, pale blue, brown, and gold, with circular panels at intervals, in which are figures illustrating the months and the four elements. The local colour of the walls is a deep apricot, they are powdered with a honeysuckle pattern in purple grey and gold, alternated by red stars and bordered by dark green fret borders. Around and over the skirting is a surbase with silhouettes of edible animals and birds arranged in classic fashion in panels of rich gold colour, and confined by blue and white lines. The skirting and doors in this room are painted in shades of dark bronze, green and black, and the mouldings gilded, and the lofty columns at either end are ivory tinted and elaborately decorated and gilded. In the arched head, above the entrance, are the arms of the boroughs as well as those of the County Palatine and of the City of Manchester, all emblazoned proper.

The Council Room.—The ceiling, which is subdivided into numerous panels, is richly decorated; the elephant's head—emblem of the Corporation—being introduced, with gold and honeysuckle scroll-work round it. Some of the panels are ground of a brilliant red, while others are contrasted in sober black, and the whole bounded by a bold laurel border, massively gilded and supported by a deep cove, which is filled by a trellis diaper in vellum and salmon colour relieved with gold. The entablature runs beneath, and is coloured a warm drab enriched with gold and ornaments. The frieze in it is panelled with a series of tablets bearing the names and dates of office of the Mayors of Bolton from "Darbshire," the first Mayor in 1838, to "Cannon," the present one, who last year also occupied the aldermanic chair.

At intervals, around the walls beneath, arranged in canopies, and painted on gold ground, are emblematic female figures representing fifteen of the industries of the locality, and under them again the walls are divided into panels of deep red, relieved with scrolls in black and gold, and alternated with narrow flat pilasters in brown and pale blue. A handsome inlaid oak wainscoting forms a substantial and effective base to the whole.

Behind the Mayor's chair, in the lunette over the entrance recess, the borough arms are emblazoned, flanked on either side by the Royal arms and those of the Duchy of Lancaster.

ANCIENT ROMAN ARCHITECTURE.

MR. J. H. PARKER, C.B., gave the first of a course of four lectures on the archaeology of Rome on Tuesday week, at the Royal Institution. He began by stating that his intention was to give a general sketch of the subject, together with the important evidence afforded by existing remains, of the truth of the old history of Rome. Long study of the history of architecture generally, and of that of Rome in particular, has led him to the conclusion that the work of each century or half-century may be traced from the time of the foundation of the city to the present time. At the time of the first kings of Rome, contemporaries of the kings of Israel and Judah, men's wealth consisted chiefly of cattle, and they lived in wooden huts of temporary character, easily moved. They collected together

for mutual protection against enemies, and generally chose the top of a hill for security. When this was surrounded by natural cliffs, they had sufficient protection; and when the stone was hard enough, it was only necessary to cut doorways through the cliffs; while in other places the edges of the hill were scarped or cut into vertical cliffs. In Rome there are instances of both kinds. The Capitoline Hill had natural cliffs, but on the Palatine they were mostly cut, and walls built up against them to support the earth. These walls, 50ft. high, rest upon a ledge of the tufa rock which forms the subsoil of Rome. Portions of such ancient wall, still remain perfect; and those of Roma Quadrata on the Palatine can be traced on three sides of an oblong space at the north end of the hill, separated from the southern side by a wide and deep fosse, showing that it was the arx or citadel, according to the custom of the early time, when each fortified city consisted of the arx, with a triple line of defence round it, the town with a double line, and the pasture ground with a single line only, these defences being usually at different levels. The fortifications of Roma Quadrata could only have been intended for defence against an enemy on the opposite hill of Saturn, and would be perfectly useless when the two hills were united in one city, and inclosed in one wall, shortly after the foundation of the city, as we are told, by Livy. Amongst the numerous photographic illustrations specially commented on during the lecture, were the remains of these walls, the Lupercal, or Wolf's Cave; the Tarpeian Rock, the place of public execution; the great prison of the kings, and parts of the *agger* of Servius Tullius. The purchase of many of these by subscription to the Roman Exploration Fund, now exhausted, was strongly advocated by Mr. Parker. The Italian Government, he said, was doing its utmost.

NEW BRIDGE OVER THE TRENT.

ON Friday last, the foundation-stone of Gunthorpe Bridge was laid by Earl Manvers. The bridge is situate at Gunthorpe and East Bridgeford, about half-way between the Trent Bridge, Nottingham, and the bridge over the Trent at Newark, there being at present no intermediate bridge between those two points in the river. The Act of Parliament was obtained in the year 1870, but in consequence of the greatly increased price of materials, especially iron and labour, the commencement of the works has been retarded. The bridge is being built by a private company, composed of the principal landowners, gentry, and farmers of the neighbourhood. The construction of the bridge is simple and cheap, considering the great width of the river, and its liability to floods on a very large scale. The abutments will be of stone, carried down to the red rocks and marls which underlie the bed of the river, and will rest upon a concrete foundation. The stone used is to a large extent derived from the old Trent Bridge, Nottingham, which has been lately taken down and removed by Mr. Smart, the contractor for the Gunthorpe Bridge. Much of the old stone has been sold for the restoration of churches and other similar work, and has been bought in most opportunely for this new bridge, it being of a character suitable for bridge-building. The approaches to the abutments from the roads on both sides of the river will be earthwork embankments pitched with stone and properly fenced. All the rest of the bridge will be of iron. The total span of the bridge between the abutments is 350ft., and this large opening is crossed in the first place by a pair of iron girders 100ft. span, on the bowstring-girder principle, resting on the north abutment at one end, and on a pair of cast-iron cylinders at the other. These cylinders are each 6ft. in diameter, sunk into the rock in the deepest part of the stream, and filled with Portland cement concrete. After this are five other pairs of iron girders, each of a length or span of 50ft., making, with the first bay, a total length of waterway of 350ft. These latter girders are supported by cast-iron piles or columns; the lower parts of them are 2ft. in diameter, and screwed through the gravel bed of the river into the rock; the upper parts are 14in. in diameter, and are braced together transversely with wrought-iron struts and girders. All the girders are formed of wrought iron and so secured together as to form a continuous girder, bolted down fast to the large 6ft. cylinders, and lying

loosely upon friction rollers fixed to the upper ends of the intermediate pile supports, and upon the stone abutments. The roadway is formed of two layers of bitumenised timber, bolted down to transverse wrought-iron girders which are riveted up at both ends to the horizontal main girders. The bridge will be capable of sustaining the heaviest traffic that is likely ever to arise out of the neighbourhood, including traction engines and agricultural machinery, although the directors have the power to limit the weight of the loads passing over the bridge. The diverted hauling path under the bridge for the Trent navigation will be constructed principally of timber, and will extend above and below the bridge a distance of about sixty yards. The bridge has been designed by Mr. M. O. Tarbotton, M. Inst. C.E., who has been the consulting engineer to the company from the commencement. The resident superintendent of the work is Mr. Phillips, of Carnarvon. Mr. Wm. Smart is the contractor for the masonry.

THE SITE OF TROY.

MR. M.E. GRANT DUFF, M.P., lectured on this subject at the Royal Institution on the 9th inst., giving an account of a fortnight spent in the autumn of 1872 in Asia Minor. The party sailed from Constantinople through the Sea of Marmora, landed at the Dardanelles, re-embarked in a boat and sailed along the coast till they landed on the Troad. They first inspected the tumulus of Ajax, which has afforded no new light to the antiquary. The Scamander they found to be a considerable river. Thence they proceeded on horseback across the plain and over the dry bed of the Simois to Hissarlik, one of the two supposed sites of Troy. At Hanai Tepe is a great tumulus, possibly of the mass of warriors who fell before Troy, reminding us of Lucan's expression "*etiam perire ruinae*" ("even the ruins have perished"). Crossing the brook Thymbrus and fording the Scamander, the party reached, by a long ascent, the hill of Bounabashi, the most usually received site of Troy, but not now recognised as such; and Mr. Grant Duff remarked that it is unfair to treat Homer as if he had written a geographical description of the plain of Troy—a notion which has clouded the understanding of many travellers. The so-called tumulus of Hector was explored, and nothing found of the slightest importance. The party thence proceeded to Hissarlik, the site of *Novum Ilium*, where the enthusiastic Dr. Schliemann is hopefully carrying on extensive excavations. If he has not found Troy, he has certainly found the site of a city of great antiquity. In relation to this, Mr. Grant Duff read a very interesting letter from Dr. Schliemann, dated Troy, April 10, 1873, describing his discovery of an ancient temple of Minerva, and other buildings, with skeletons of warriors, arms, and other objects. After examining the tumulus of Achilles, said to have been visited by Alexander the Great, the party returned to Bounabashi, whence they proceeded to the Alexandria Troas, built by one of Alexander's generals, and visited by S. Paul. The party also visited Ephesus, exploring the ruins of the Temple of Diana, discovered by Mr. Wood, and from which marble columns are now in the British Museum. In Lydia they examined the scanty ruins of the once magnificent Sardis, and the tumuli of the ancient kings described by Herodotus, and called by the Turks "the thousand and one barrows," and of which Sir John Lubbock counted sixty in sight at one time.

SWISS WOOD CONSTRUCTION.—GRANARIES AT LANGNAU.

(With Illustrations.)

WOOD, as used in architecture, is of great importance in the study of the historical development of art. That wood must have preceded stone as a material of construction may be assumed as a fact. The pillar is said to have been a transformation of the trunk of a tree. Triglyphs took their origin in projecting cross-beams. The rafters marked in the rock-hewn Buddhist temples of India must have been suggested by the collar-braces of wooden roofs. All triangular constructions, whether in Greek, Roman, ecclesiastical, or modern temples and churches, have taken their forms from the joining of rafters to a tie-beam. This simple framework served as the pediment in Greek and Roman temples, and contained the most glorious works of their sculptors. The North-western

nations of Europe have always excelled in wood constructions, and have been praised by the writers of the Classical world for their works in this material. Cæsar mentioned the buildings of the Gauls as half-wood, half-stone. Vitruvius extolled the Gauls, Iberians, and Lusitanians for their superiority in wood-framing, and the Kolchians for their solid building of log-houses; and Tacitus mentions the richly decorated polychrome wood architecture of the Teutons. Gregory of Tours observes that the peculiar buildings of the Franks took their origin from wood-constructions. During the Middle Ages the influence of wood-carving on architecture was prominent. The first profane and sacred buildings in the newly converted districts of Northern and Central Germany were erected under the influence of Scotch and Irish missionaries, who had the places of worship constructed in a style reminding us of wood buildings. The Scandinavians, less influenced by foreign ideas, held to the old forms, which they brought with them, when they separated from their brethren on the shores of the Euxine, keeping strictly to the Homeric Megaron, built of wood, here and there in a decidedly Mongol style, which they must have learned on their wanderings through Central and Northern Asia. Their wood carvings were often compared to the finest works of tapestry; whilst stone, as the more lasting material, generally superseded wood in architecture in the north-west. Wood buildings are still found in abundance in the south-eastern parts of Germany, and in Switzerland. The towns during the Middle Ages adopted in general the Gothic style. Churches, town-halls, and even private dwellings, were constructed in those angular and quaint forms so much cherished at a period when mysticism swayed the minds of the European nations. The notion that the South German or Swiss peasant's houses are Gothic, because we find sometimes a carved pinnacle, or a trefoil, or a projecting orbel, is altogether erroneous. The assertion that they are mixtures of the Gothic and Renaissance types is also a mere hypothesis, or the special opinion of some architects who wish to shine in paradoxical assertions. The style is Romanesque in all its general outlines, or rather, to be thoroughly correct, "Greco-Roman." These wooden houses, granaries, churches, and chapels are all in the very oldest Greco-Roman style. The flat projecting gable-roof, its frame-like construction, and the "tabulatum," partly or entirely surrounding the house, reminds us of the "Mesodine" of Hellenic, or the "Pergula" of Roman houses. The panelling and the framing of windows and doors, rarely, if ever, bear traces of the pointed arch, but are generally perfectly square, or sometimes circular. The decorations are generally Greek. Carved dentils, the egg and tongue ornament, and guilloches predominate. The bracketing shafts growing out of the cross-beams remind us of India, the common cradle of Greeks, Romans, and Teutons. M. Riehl is right when he tells us "that the architecture of a people, wherever it has preserved its original character, belongs to the history and the art of a nation, just as its popular songs form part of the history of its music." These wood buildings of the Swiss are records of old forms, just as their popular songs are records of old feelings. The best examples of wood architectural forms are preserved in the cantons of Uri and Switz. The system is that of the log-houses, connecting our times in one continual and uninterrupted line with the period of the pre-historic pile-dwellings in Switzerland, the primitive buildings on Lake Prasias mentioned by Herodotus; the huts of the early Christian fishermen; the dwellings of the Papuans in New Guinea; and those of the New Zealanders, and of the Isos, in Africa. In all these constructions of wood we have strong posts as the fundamental framework, boards for panelling, and carved projecting beams. The subconstruction in more recent times is generally of stone. Above this rises the strong log-construction of square posts; the ends of the principal beams (see our illustration, "Granaries at Langnau," Figs. 4, 5, 6, 7, and 8) strongly project either as ornamental parts or as supports for the wooden galleries (Figs. 2 and 3). The use of consoles is here to be traced in its very origin. The horizontal beams, as well as the vertical framework, strengthen the construction, and form an harmonious combination of the two principal static and dynamic elements of architecture. We have an immense variety of shapes in the superstructures and gal-

leries, either continued or interrupted, forming a series of detached balconies. The ornamentation may be reduced to four elements: *a*, the framing; *b*, the panelling; *c*, the carving of the projecting beams; and *d*, the painting. The first is characteristic in the treatment of the frames of windows and doors; the second in forming the connecting links between beam and beam, either as balustrades or as a kind of wooden drapery; the ornamental patterns of the boards are not less varied than the third element, the carving of the projecting beams. As a peculiarity, we may mention that whilst we find that monsters—especially dragons, birds, and giant-heads—predominate in China, Scandinavia, and New Zealand, the ornamentations in Switzerland are of a conventional—partly geometrical, partly vegetable—kind, without enabling us to recognise the Flora of the country, a principle which is in accordance with that of the Renaissance. The painting is reduced to the use of secondary colours, green or violet; the frieze is white, with black inscriptions. The number of these wood constructions, which form so picturesque an element in the rich Alpine scenery, is decreasing day by day. We might use them for ornamental purposes in parks and on hill-sides instead of cottages. If granaries can be constructed by Swiss peasants in the style which we reproduce (Fig. 1), why should not some of our wealthy lords and merchant-princes have a pavilion or outhouses in this quaint form? A wooden house by the side of a gorgeous palace would produce the same charming effect of contrast as a Swiss house leaning against the mighty rocks of the snow-crowned Alps, surrounded by thick woods and bright meadows.

BELFAST ARCHITECTURAL ASSOCIATION.

AT the last meeting of this Society, Mr. J. Lanyon in the chair, Mr. Wm. Gray read a paper on "The Building-stones of the North of Ireland, geologically considered."

Mr. Gray referred to the connection between geology and architecture, and showed that it was important, if not absolutely necessary, for an architect to know something of geology, so that he might be the better prepared to know where to find and how to use his materials, so as to secure variety and beauty in his designs, and strength and durability in his structures. Mr. Gray then explained how that a limited area in the north-east corner of Ireland affords as good an opportunity for the practical study of the various phenomena connected with geology as the same extent in any other portion of Britain. He then gave a general description of the geology of the north of Ireland and of the various strata exposed, noticing more particularly the formations which are capable of yielding building stone, referring to each bed in descending stratigraphical order. The marked peculiarity of the north of Ireland is the occurrence of extensive beds of trap rock, so well known in connection with the Giant's Causeway. The same rock extends over an area of about 1,200 square miles, not in one solid bed of rock, but in a number of irregular beds, each having been originally poured forth as volcanic lava, mud, ashes, &c., either in the worn surface of the chalk or under water. Mr. Gray explained that the trap rock usually made damp walls, not because the stone admitted wet through its substance, but because of the defective mode of jointing the masonry; properly built, the trap would be impervious to wet. Below the trap there occurred a whole series of stratified rocks, such as the chalk, greensand, lias, and New Red Sandstone. Between the greensand and lias is the proper position for the oolite series, including the Bath and Portland stones; but in the North of Ireland this series is entirely wanting. The New Red Sandstone yields the Scrabo and Dundonald stone, which is also represented at various other points, such as the Gas Works, Belfast; Dunmurry river, Money-more, and Moira. Under the new red comes the Carboniferous series represented by the sandstones of Dunganon, Cookstown, Dungiven, Donegal, and Ballycastle; all of which come from the upper portion of the Carboniferous system, the lower portion yielding the limestones of Armagh, Castle Espin, Tubbermore, Dundalk, &c. The Old Red Sandstone occurs below the Carboniferous, and is possibly represented by the sandstones of Cushendall, and doubtless some beds in Tyrone. The Silurian formation occurs chiefly in County Down, and furnishes the compact stone of Ballygowan quarries, and the slate of Greyabbey. Mr. Gray then de-

scribed the various descriptions of granite, particularly the very excellent examples from Castlewel-lan, Newry, Bessbrook, Gorawood, and Donegal, and demonstrated that we had in our locality a variety of granite which in quality or quantity is equal, if not superior, to the granite of any other place in Great Britain. Mr. Gray fully described the nature and occurrence of the porphyries at Cushendall, Jarden, Newcastle, &c., and closed by dwelling on the fact that the exhibition of drawings on the walls proved the high character of the designs prepared by Belfast architects, while the specimen of rocks on the table proved we had in the immediate locality an extensive assortment and ample supply of valuable building materials capable of being rendered available, to the exclusion of all imported stone.

VISIT OF THE SOCIETY OF ENGINEERS TO THE ALBERT AND WANDSWORTH BRIDGES, AND TO THE THAMES EMBANKMENT AT CHELSEA.

ON Monday afternoon last, a large number of members of the Society of Engineers visited these important works. Meeting at one o'clock at the Middlesex side of the Albert Bridge, which connects Chelsea (at Oakley-street) with Battersea, the visitors were met and shown over the works by Mr. F. W. Bryant, the constructing engineer. The bridge has been designed by Mr. R. M. Ordish on his "rigid suspension" principle, and is fast nearing completion. The bridge is 710ft. 8in. long, divided into a central span of 400ft., and two side spans. Its width is 40ft. 6in. Its construction is similar to the bridge erected over the Moldau, at Prague upon the same principle, with this difference, that in the Albert bridge the catenary chain, consisting of 913 untwisted steel wires 0.186 in diameter in each rope (the whole being about 6in. in diameter, clipped at intervals of about 7ft.), supports a portion of the weight of the platform and the moving load of the structure by suspension-rods placed 20ft. apart, in addition to the entire fixed and moving loads of the central 40ft. in the middle span. The straight inclined chains are fastened to a saddle placed on rockers in the top of the towers, and consist of flat wrought-iron bars with enlarged ends only at each end of the chain. Above this is a saddle-bearing for the wire rope, entirely independent of the saddle for the straight links. One of the chief peculiarities is the novel arrangement adopted for anchorage. A cast-iron cylinder, enlarged at its base, is placed vertically at the same angle as the girder, and embedded in concrete. This cylinder is provided with a man-hole and steps, so that the anchorage can be inspected, cleaned, and painted when necessary. In the enlarged portion of each cylinder are fixed two vertical anchorage chains, connected with an end quadrant casting attached to the end of the main continuous girders, to which casting is also connected the principal back-chain and wire-cable. The strain, which is usually taken in most suspension bridges by the anchorage, is here thus resolved horizontally through the main girders, which are 8ft. lin. deep, including hand-rail, and the vertical lift taken by the concrete 3ft. lin., in which the cylinder is fixed. Since the wire-rope chain cannot alter its form without affecting the action of the inclined links, the weight supported at the apex of the catenary will bear a relative ratio to the amount sustained by it at each of its suspending points, and its form has been arranged to prevent any alteration in this proportion. The chains and rope are now being erected on a light staging of scaffold-poles. The cylinders forming each pier were cast in complete rings. These columns are riveted and stayed by a strong girder passing transversely under the roadway. The discs in the tower were also made in single castings. A point which we believe is quite novel in suspension bridges is that the piers are built on the outer side of the parapet girders, so that the pathway and roadway are of uniform width from end to end. The bridge will be permanently opened for traffic during the summer months, and will form a small portion of one continuous line of road between Clapham and Queen's-gate, Kensington. Mr. Hedworth Williamson is the contractor. The cost of the bridge will be about £60,000. The bridge is likely to attract attention, being the only one of its kind in the United Kingdom. The roadway is paved with the new wood-block pavement, every fourth block being spiked, and the footpaths with Ransome's patent

stone in small squares of two different colours. It is believed that the bridge will be a great success commercially, and the promoters have taken a very large quantity of land on the Battersea side for building purposes. The Middlesex end of the bridge will terminate direct on to the new Thames Embankment at Chelsea, and the distortion which occurs at the Surrey side of Lambeth Bridge will not be repeated. The main girders, which extend high enough to form the parapet, are pierced at intervals with round openings, which look somewhat like ships' portholes, filled in with small wrought-iron grilles. This has been done, we believe, to comply with the letter of the Act of Parliament authorising the formation of the bridge, which provided that there should be a "pierced parapet." It is thought, however, that the effect will be sufficiently light. For many of the particulars here given of this bridge we are indebted to a paper recently read before the Civil and Mechanical Engineers' Society by Mr. Walmisley.

The visitors next proceeded to the works of the new section of the Thames Embankment at Chelsea, which extends up the river (on the Middlesex side, of course) from the Battersea Park Suspension Bridge to Old Battersea Bridge, a distance of 4,300ft., the Albert Bridge being about midway between these bridges. The Embankment works are fast drawing towards completion, nearly all the masonry being set. The masonry of the granite wall next the river is rusticated, and does not present the highly-finished appearance of the work of the Albert and Victoria Embankments; but this was referred to by the visitors on Tuesday to be a great merit, as they considered that such highly-finished work as characterises the Embankment walls lower down the river is unnecessary, and worse than useless, as it detracts from the dignity of an engineering work of magnitude. Several of the visitors went down the shafts and inspected the works going on in the construction of the Low Level Sewer, which will be 35ft. below the level of the Embankment roadway. That portion of the sewer nearest to London is carried through a bed of very fine sand, which holds, of course, a very great quantity of water. The sewer is constructed in 12ft. lengths at a time, the 12ft. headings being got out by mining, and the water removed by one of Murray's powerful chain-pumps. When each length of sewer is completed, it is backed up with a thick layer of Portland cement concrete. Further up the river the sewer runs through the London clay, and is being constructed in an open cutting. There will be 4,500ft. run of this main sewer. Beginning at Battersea Bridge, there will be 750ft. of 5ft. 9in. barrel sewer; then 3,000ft. run of sewer 6ft. in diameter; and, finally, 750ft. run of sewer 6ft. 9in. in diameter. The workmanship of this sewer is exquisite, and the materials are the very best of their kind. The sewer is five rings of brick thick, all the bricks being the best White Gauls, from the Burham Company, and costing 60s. per thousand alongside; they are all of the description known as "Best No. 1's, for facings." Two-thirds of the circumference of the cylinder, the culvert, is lined with blue Staffordshire bricks, costing no less than 102s. 6d. per thousand alongside. All the brickwork is set in Portland cement of the very best quality.

The visitors then proceeded to the new Wandsworth Bridge, which is at present devoid of approaches on either side, although itself nearly completed. It is an unpretending structure, consisting of two lattice girders 12ft. deep, supported on cylindrical iron piers, there being four of these piers to carry each girder, thus giving five spans, besides a short portion on the Middlesex side carried on a brick arch. The three central spans are each 133ft. 4in. across, and the two side spans are each 113ft. 6in. The total cost of the bridge will be about £24,000. Mr. Nicholls is the engineer, and the work has been carried out by Messrs. O. De Bergue & Co., of Craven-street, Strand. We believe that the bridge has been erected by the joint enterprise of the landowners on both sides of the river, and that it is contemplated to build largely at each end. The bridge, like the Albert Bridge, will be a toll-bridge. It is questionable whether, in the present state of public opinion with regard to toll-bridges, the legislature ought to allow tolls to be levied on any new bridges. The visitors having spent between four and five hours in inspecting these important works, afterwards dined together, to the number of about twenty, at Cremorne.

ARCHÆOLOGICAL.

OXFORD ARCHITECTURAL AND HISTORICAL SOCIETY.—The excursions for this term are expected to be as follows:—To-morrow, May 24, the Rollright Stones, Lyneham Camp and the Church of Shipton-under-Wychwood, Chipping-Norton, &c.; leave Oxford by the 12 o'clock train, G.W.R. Saturday, May 31, Wallingford, North Stoke, Newnham Murren, and Crowmarsh Churches; leaving Oxford at 11.35, by G.W.R. Saturday, June 7, Reading and Silchester; leaving Oxford at 11.55, by G.W.R.

YORK.—Some relics of the Roman occupation have recently come to light during the excavations made for the new station of the North-Eastern Railway at York. Among the objects discovered are several stone coffins, which when found, were in good preservation, and contained human remains. One of the most perfect has been secured for the Museum of the Leeds Philosophical and Literary Society, and may now be seen in the entrance hall. It is 6ft. 10in. in length; the breadth diminishes gradually from 27in. at one end, to 24in. at the other; it is 22in. deep outside, and excavated to a depth of 17in. The lid is of corresponding dimensions, and uninjured.

PARLIAMENTARY NOTES.

POLLUTION OF RIVERS.—The second reading in the House of Lords of the Pollution of Rivers Bill was moved by the Duke of Northumberland on Friday last. The Earl of Morley, on behalf of the Government, intimated that much as they regretted the evils which the bill sought to remedy, it would be impossible for the Government to support the measure now before the House. The whole subject was under the consideration of the Government, and it was a question with them whether, in the organisation of the local authorities, which was one of the most important parts of the subject, the jurisdiction as to rivers should be given to the sanitary authorities who had jurisdiction over so small an area, or whether it should not be handed over to the same authorities as had the management of the highways.—The Duke of Cleveland considered that the measure required more consideration than appeared to have been bestowed on some of its provisions, and thought it better to wait until some better-digested measure could be put before their lordships.—Lord Ravensworth thought the object of the bill so good that he should vote for its second reading, in the belief that whatever amendments it required would be made in committee.—The Marquis of Salisbury pointed to one particular clause, which, he said, must of necessity prejudicially affect the property of every landowner, namely, that which imposed heavy penalties on any one allowing polluted liquid matter to run from a ditch into a river; polluted liquid to be water exhibiting by daylight a distinct colour in a stratum of 1in. deep in a white porcelain vessel. He thought the bill should be sent to a select committee.—Lord Portman also opposed the bill; and after some observations from Lord Vivian, the Earl of Lauderdale, and the Marquis of Ripon, the Lord Chamberlain referred to the legal bearings of the question, which the bill did not seem to have fully comprehended or provided for.—After a brief reply from the Duke of Northumberland, the bill was read a second time.

BUILDING SOCIETIES.—In reply to Mr. Cross, Mr. Winterbotham said, in the House of Commons, that the Government Bill relating to building societies would be withdrawn, and an amended one introduced in its place.

ROYAL ARCHITECTURAL MUSEUM.—The Goldsmiths' Company have forwarded to the Council of the Royal Architectural Museum a donation of £50 to help the Institution in its work, in return for which the Council undertake to exhibit the designs for the plate for which the Goldsmiths' Company offer prizes. The Art Workmen's evening modelling and drawing classes have been well attended, as many as sixty entrance fees having been paid. This result is mainly owing to the very valuable and practical instruction imparted by Messrs. Brindley and Redfern, two members of the Museum Council, who have generously undertaken the duties of Honorary instructors while the Council are seeking funds to provide for a permanent paid teacher.

Building Intelligence.

CHURCHES AND CHAPELS.

BURY.—The erection of a new Temperance-hall has been commenced at Bury. The height of the building in front will be 35ft. by 35ft. wide, and it will be 84ft. long. The frontage will be of seconds brick, with stock brick dressings and Burnley stone cornices, eills, &c. On the first floor there will be a large assembly-room, 33ft. wide by 65ft. in length. The building will be erected from plans by Messrs. Maxwell and Take, architects. The entire cost will be £1,600.

ESTON.—The foundation-stone of a new (Roman) Catholic school chapel was laid at Eston, Yorks, on Wednesday week. The building will be 80ft. long by 30ft. wide, and is to be constructed of red pressed bricks with stone dressings. The design is Gothic of the thirteenth century. The roof will be open-timbered. There will be a division in the middle of the building, made of coiling shutters, which will move up to throw the whole structure into one room for the chapel; but for educational uses will divide the building into boys' and girls' schoolrooms. At the east end there will be an apsidal chancel, separated from the main building by a curtain. The church will accommodate about 400 persons. The architects are Messrs. Hunter and Carr, of Middlesbrough.

INCORPORATED SOCIETY FOR PROMOTING THE ENLARGEMENT, BUILDING, AND REPAIRING OF CHURCHES AND CHAPELS.—This Society held its usual monthly meeting on Monday. Grants of money were made in aid of the following objects, viz.:—Building new churches at Colebrook, in the parish of Tarporley, Cheshire; Hedge End, near Southampton; Plymouth, All Saints; Portmadoc, North Wales; and S. Mark, South Shields. Rebuilding the churches at Marton, near Ouseburn, York; and Tryddyn, near Mold, Flint. Enlarging or otherwise increasing the accommodation in the churches at Cheadle Hulme, near Stockport; Farncombe, near Godalming; Hargham, near Attleborough; Hastings, S. Andrew's; Hillsden, near Buckingham; Holt, Wilts; Horsham S. Faith, Norfolk; Llanddaniel Fab, near Bangor; Llanelien, near Amlwch; Llanfair Kilgildin, near Abergavenny; Raunds, near Thrapstone; Shalbourne, near Hungerford; and Eriswell, near Brandon; under urgent circumstances, the grant formerly made towards rebuilding the church at Leysdown, near Sheerness, was increased. Grants were also made from the School-church and Mission-house Fund towards building, &c., school-churches at Churchdown, near Gloucester; Esh, near Durham; and Pencae, in the Parish of Ystradgynlais, Brecon. The Archbishop of Canterbury, president, has appointed Tuesday next, the 27th inst., for the annual general court, to be held at the Society's House, 7, Whitehall, S.W., at three o'clock.

LEAMINGTON.—The foundation-stone of a new church was laid at Leamington on Thursday week. Mr. Cundall, of that town, is the architect, and Mr. Kibler, of Wellesbourne, the builder. The general plan of the church consists of nave and aisles, transepts, chancel, and chancel aisles. There will be galleries in the transepts only. The total length of the church from east to west internally will be 130ft., and the extreme internal width across the transepts 86ft. The height of nave from floor to ridge of roof will be 50ft. The walls throughout are to be of red bricks, with dressings of Bath stone; and the interior, except the clerestory, is to be plastered; the nave and chancel arches, and some other parts being of Bath stone, and the nave piers of polished Aberdeen granite, with caps and bases of Bath stone. A clerestory will give the principal light. The style adopted is Late Thirteenth Century.

LEEK CONGREGATIONAL CHURCH AND SCHOOLS.—**EXTENSION OF BUILDINGS.**—A new range of buildings have just been completed here, comprising on the ground floor a lecture-room, 45ft. x 22ft., with entrance, &c., and above that four commodious classrooms, communicating with the present upper schoolroom. The new building is, like the older buildings, stone-faced, and finished at each end by a gable and substantial buttressed chimney. On the lower story it has two cusped three-light windows to the lecture-room, and a door-case with pointed segmental moulded arch resting upon short columns, with carved caps. In the jambs, the upper story gives a diversified sky-line by three gables, with a cusped two

light and circlet over in each. Mr. W. Sugden, of Leek, is the architect of all the buildings.

OXFORD.—The foundation-stone of a new (Roman) Catholic church, dedicated to S. Aloysius, was laid on Tuesday. Messrs. Hanson & Sons, of Brompton, are the architects. The building will be in the Florid Perpendicular style, and will be groined throughout. It will be 105ft. 6in. long by 35ft. wide, and 70ft. will be the height of the nave. The accommodation at present to be provided will be for 400 persons, with a provision for its extension for seats for 800.

BUILDINGS.

BRISTOL.—A new building is being erected in Bristol for the Deaf and Dumb Institution, from designs by Mr. J. Bevan, architect, of that town, Mr. Gay being the contractor. The new institution is designed to accommodate about 70 children. The style is Domestic Gothic. The building will consist of a basement and three stories. The principal entrance in the middle will be approached by a flight of steps; at the back of the entrance-hall will be the principal staircase, and behind that a large room for meals, with a schoolroom over. A wing on either side of the entrance will provide rooms for the committee and matron, apartments for the teachers, and day-rooms and dormitories for the first class and other pupils—the boys occupying the right and the girls the left wing. A room at the top of the house is set apart for sick inmates. The basement contains the usual domestic offices, and bathing and lavatory accommodation for the children. The building will be of local stone, with freestone dressings.

GLASGOW.—The Town Council of Glasgow are about to erect a new market in place of the building at present known as "Paddy's Market" at the foot of the Saltmarket. The building is to be in the shape of the letter "L," one limb being 178ft., and the other 172ft. in length, with galleries on each side 15ft. high. The frontage to Greendyke-street, which will be in simple but effective Italian style, will be of polished ashlar, with rusticated basements. The front consists of a centre and two wings, and in the centre there will be three large arched openings giving access to the market. The ground-plan of the building shows a nave and aisles. The nave is 40ft. wide, and upwards of 45ft. to the ridge of the roof, the roofs of the aisles being of course considerably lower, so as to leave space for a clerestory above them on either side. The walls are to be finished inside with the finest white glazed brick relieved by occasional bandings of yellow glazed brick. The plans and arrangements have been prepared by Mr. John Carrick, I.A.

PEMBROKE COLLEGE, CAMBRIDGE.—The extensive works at Pembroke College, which have been in hand upwards of two years, are now complete. The master's lodge in Pembroke-street has just been finished. The building abuts westwardly upon Pembroke-street, facing the new museums and lecture-rooms; it is in the Tudor style, and built of red bricks and stone dressings. It has three stories, and is covered in with green Westmoreland slate. Passing into the lodge by the carriage entrance, the hall is reached, which possesses a wainscot oak ceiling, and a floor paved with encaustic tiles from Lugwardine. To the left is the north porch, opening out on to a terrace. Close by is the study, about 20ft. square, which has a decorated panelled ceiling, and a striking mantelpiece, containing tiles on the frieze bearing portraits of Homer, Virgil, Dante, Shakespeare, and Goethe. The dining-room, which adjoins the latter, has likewise a panelled ceiling. The drawing-room has a cove and panelled ceiling, with wainscot cornice, and on the frieze of the chimney-piece there are eight 6in. square panels, containing paintings of British birds in oil on a gilded ground; the outer jambs being of carved oak, and the inner ones of Belgian marble, with encaustic tiles immediately round the grate. The decorations have been effected by Mr. Charter, of London. Mr. A. Waterhouse was the architect; the contractor, Mr. Horsman, of Wolverhampton.

SCHOOLS.

GRAVESEND.—The new college for the education of daughters of Congregational ministers at Milton, near Gravesend, was opened on Friday last. The architect is Mr. E. C. Robins. It has cost £12,354, and is capable of receiving 150

girls. Each will have a separate bed-chamber, partitioned off the great dormitories, which are 200ft. in length, having a central corridor, with cubicles on either side fitted with every convenience. There is a separate window to each cubicle, though the partitions inclosing them are but 6ft. 6in. high. On the ground floor a series of classrooms extend along the main front, and there are music-rooms at the two ends, the two large schoolrooms occupying the wings. An illustration and description of the building appeared in the *BUILDING NEWS* of Sept. 29, 1871.

LLANDEGLEY.—New school-buildings, including a commodious residence for the master, have recently been opened in the parish of Llandegley, Radnorshire. The architect was Mr. E. H. Lingin Barker, and the contractors for the works, Messrs. Ingram & Jones.

MIDDLESBROUGH.—On the 14th ult., the Bishop of Beverley laid the foundation-stone of S. Peter's new Roman Catholic Schools at South Bank, near Middlesbrough. The building will be a neat Gothic structure, and will accommodate 500 children. The east end of the schools will have an apsidal termination; the apse will be finished inside as a vaulted ceiling. There will be an altar erected, so that the schools may be used for divine worship on Sundays and holidays. The walls will be built of red pressed bricks and stone dressings. The heating will be done by Shillito and Shorland's patent grates. The roofs will be open timbered. The seating will be reversible, so as to be used either for seats or desks. The roofs will be covered with ornamental slating in bands. All the interior woodwork will be stained and varnished. The cost of the buildings will be about £2,000. Messrs. Hunter and Carr, of Middlesbrough, are the architects.

NEWCHURCH.—New church-schools were opened at Newchurch, Lancashire, on Saturday. They are in the Gothic style, and have cost £1,400, exclusive of site. There is accommodation for 250 scholars. The schools are built of stone, and the building is open-timbered and Gothic-roofed. The work has been done under the personal superintendence of the architect, Mr. Harry Percival, of Newchurch.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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APPLIANCES.—Your query is an advertisement.

P. H. REVES.—Respectfully declined.

HENRY LOVEGROVE.—It is not within our province to give advice in such matters.

H. PERKINS and SON.—Drawing of schools to hand. Please send description.

J. W. J.—Inadmissible.

ENTWISTLE and SHAD.—Please repeat your communication.

J. L. C.—Do you not see that the article was satirical? Perhaps the cap may fit you.

TRIANGLE IN CIRCLE.—Respectfully declined.

J. P.—It was the absence of any thoroughly technical work on taking out quantities that induced us to ask for these articles, our desire being to give our readers valuable information, and that which they cannot obtain elsewhere.

Correspondence.

THE PALACE OF SCAURUS.

To the Editor of the *BUILDING NEWS*.

SIR,—It has been suggested to me that I ought, before the conclusion of my paper on the "Palace of Scaurus," or at all events before its publication, to have stated that the letters of Mirovir published by Mazois are not, I believe, authentic. I mention this because, as you have published the plan, it might mislead those students who would hope to find in the map of Rome the site of so large a palace: the fact being that this plan is imaginary, and the possible elements of such a palace are authenticated only by numerous quotations made by Mazois throughout his book, from Pliny and other authors, in corroboration of all the features mentioned. My object, I should say, in reading the paper, was not archaeological, but had its origin only in a desire to lay before the members of the Architectural Association a scheme of a Roman mansion on a larger scale than I had been able to do ten years ago, when reading my paper on Pompeii.—I am, Sir, &c.,

R. PHENE SPIERS.

Intercommunication.

QUESTIONS.

[2854].—Mud in Rivers.—Am I liable to an action for turning the mud from a millpond into the stream running through it?—B. T. H.

[2855].—Plugging Walls.—How is this best done, especially when a place cannot be chosen between two bricks?—F. M.

[2856].—Stain for Wooden Floor.—I want to stain a wooden flooring a dark oak or mahogany colour, which will not require varnishing to prevent its washing out when the floor is washed.—P. FAULD.

[2857].—Pitch Pine.—In a building just finished I have to treat a quantity of external and internal pitch-pine fittings. The external fittings are barge-boards and finials. I propose not to stain these, but to give them two coats of oil—query, what sort? Internally the wood is nicely marked, but will have to be well washed to clear off lime spots, &c. Will the soap used interfere with the effect of any of the staining fluids?—CANADIAN SUBSCRIBER.

[2858].—Varnishes Used by House-Painters.—How can I make the pale oak and other varnishes sold at the oil-shops? I have tried various receipts, but without success. Copal and gum animé seem the principal gums used, but these will not unite with linseed oil, though I have got the oil up to boiling heat, and added to it the melted gum, stirring the whole briskly over the fire, but on leaving off can see the melted gum at the bottom of the pot by itself. Are there any other gums used or mixed with copal or animé? I have tried adding common resin with the gums to facilitate solution, but to no purpose; neither will shellac nor sandarac unite with linseed oil or turps. Information would be very acceptable.—PAINTER.

[2859].—French Casement.—Will any reader give sketch of wood-tonguing to French casement windows, to make them perfectly watertight? I do not want to be put to the expense of metal bars or tongues.—POPPLETON.

[2860].—Party-Wall.—The Metropolitan Buildings Act defines "owner" as applying to "every person in possession or receipt of the rents or profits of any land or tenement (other than as a tenant from year to year or for any less term, or as a tenant at will)." A person being desirous of pulling down and rebuilding a party-wall cannot acquire the right to do so until he has given three months' notice to the adjoining "owner." Is it necessary to give notice to, and to treat with the person in receipt of the ground-rent, with him who receives an improved rent, and with a third person who is in actual possession, under lease, at a still further improved rent, and under covenant to repair, or will notice to, and agreement with one of these parties suffice, and if so, with which one?—SIMS.

[2861].—Organ Construction.—Is it quite competent with organ construction to have the keyboard at the end of the organ (not in front and opposite the pipes, as is usual), and 8ft. below the level of the organ floor? A reply from any correspondent will greatly oblige.—ORGAN.

[2862].—Metropolitan Buildings Act.—In the cases contemplated by parts 6, 7, 8, and 9 of section 83, where the expenses of rebuilding a party-wall, &c., are directed to be paid by the building owner, is it usual, and is it not in accordance with the provisions of the Act as to payment of expenses, that the fees of the surveyor of the adjoining owner, who has been appointed in consequence of the notice of the building owner, should be included and paid as part of such expenses by the building owner? It will be remembered that in the cases to which this inquiry refers, the party-wall is supposed to be a good and sufficient one for its present purposes, and that it is to be rebuilt by the building owner to suit a much loftier building, which he desires to erect. If an adjoining owner, wishing to prevent or delay the pulling down of a wall appoints his surveyor, and the surveyor purposely neglects to appoint an umpire, or refuses to agree with the building owner's surveyor as to the umpire to be appointed, what remedy has the building owner, as it is clear that he cannot commence to pull down before an award is obtained?—R. L.

[2863].—Dilapidations.—Mr. B. Fletcher, in his valuable treatise on "Dilapidations," first published in your

eminently practical journal, says in section 18 of chapter 8, in reference to party-walls:—"The general covenant to repair does not affect these walls where the premises are leased at a rack-rent, as the Metropolitan Buildings Acts relieve such lessees, and place the liability on the lessors;" and in a footnote gives as his authority "7 and 8 Vic., cap. 84." Now, taking into consideration that the Act of Parliament quoted was not in force at the time the above was published, and in fact was repealed at the commencement of the year 1856, and replaced by the 18 and 19 Vic., cap. 122, in which the word "rack-rent" does not occur at all, is not the information given inconveniently misleading, more especially, as I take it, Mr. Fletcher's book will be taken as an authoritative textbook by the profession?—R.

[2864].—Plans for Double Villa.—Would any correspondent inform me where I could obtain a sight of a book containing plans of neat-looking houses, or is there any in back indices of the BUILDING NEWS? What I want is to see some pretty double villas, say about 40ft. frontage, two-story, and storm windows, also bow windows in parlour front, to cost, say about £300 per house (£600 per double villa). I am sure you would not only confer a favour on me, but on a great number who, having a little money to invest, would like to put it in houses that would not be a continual eye-sore to them.—DOUBLE VILLA.

REPLIES.

[2843].—Mr. Brooks's Churches.—I was visiting one of Mr. Brooks's churches (St. Columba, Kingsland-road) last summer, and was told by a vergier, when I began sketching some details, that "the architect had issued an order" that no sketching was to be allowed. This incident speaks for itself.—W. CECIL HARDISTY.

[2845].—Measuring Plain Tile Roofs.—In answer to "T. C. H.," the valley tiles are measured separately at per foot run. The allowance of 6in. on each side, mentioned by "T. C. H." is for cutting on the plain tiles, and has, therefore, nothing to do with the valley tiles. It is simply an allowance to pay for the necessary cutting and waste.—B. F.

[2845].—Measuring Plain Tile Roofs.—I have found the general practice of measuring in the country to be an allowance of 12in. for each valley by the length to be added to the general dimensions to meet the cost of labour and waste of material in cutting, the valley tiles being taken into account as a separate lineal dimension.—W. SHAPLAND THOMAS.

[2848].—Hinges for Folding Doors.—"Subscriber" can open a pair of folding doors simultaneously by having a pair of sympathetic hinges. These are not kept in stock, but are made by the principal hinge-spring makers. The action under the floor is by an endless chain thus:—



—W. R. A., Uckfield.

[2849].—Laps in Wall Plates, &c.—I am glad to give "Young Surveyor" the further information he wishes. In measuring from drawings, the allowance should be, for laps in wall plates one lap in every 20ft. length. With respect to the question as to leadwork, the lap should be one in every 10ft. of hips, valleys, and flashings. With regard to gutters, drips should invariably be shown on the drawings, and should in no case exceed 10ft. apart. The measurement, therefore, is very simple. Of course, "Young Surveyor" will remember that these remarks apply to measuring from drawings. In "measuring up" a building, the exact quantity laid must only be taken.—B. F.

[2851].—Re-Using Plaster of Paris.—If dried at a temperature of 300° to 320°, and ground up, it will set with water as when first used.—MATS.

[2852].—Durability of Concrete-Work.—The account referred to of the housefalling was given by its owner, Dr. Larden, in the BUILDING NEWS of October 30, 1868 (p. 743, Vol. XV.). A plan of the building, and a statement of the reasons which caused its fall, by Mr. Tall, the inventor of the apparatus employed in its construction, appeared in the following number (November 6, 1868, p. 764). I saw the ruins at the time, and can endorse the opinions you expressed on p. 725, October 23, 1868, as to the causes of the accident.—KAPPA.

STAINED GLASS.

BIRCHINGTON.—During the past week two coloured-glass windows have been placed in the parish church of Birchington. The centre of the east window is a representation of the Crucifixion, with S. Mary Magdalene, the Virgin Mary, and S. John, and in each of the external lights two evangelists, the draperies being rich, but low-toned, coloured on quarries of white and delicate borders. Over the figures is a series of angels. The west window is a representation of "Faith, Hope, and Charity." Both are from the Art Glass Works, Bloomsbury.

BEVERLEY.—A stained-glass memorial window has just been placed in the church of S. Mary, Beverley. It consists of three lights and tracery, of the Perpendicular or Fifteenth Century style of architecture. The dexter light contains the subject of the Adoration of the Magi. The centre light represents the Departure of the Blessed Virgin, weeping, from the scene of the Crucifixion. The third or sinister light illustrates Our Saviour in the Temple. The work has been carried out by Messrs. Hardman and Co., of Birmingham.

CHAGFORD.—A stained-glass window has just been erected in the parish church of Chagford, Devon, designed and executed by Messrs. E. and S. Beer, of Bartholomew yard, Exeter. The subjects treated are, in the first light, S. Michael the Archangel, and in the second, S. George and the Dragon, both being under richly decorated canopies, whilst in the principal opening is a cross interlaced with the sacred monogram.

WATER SUPPLY AND SANITARY MATTERS.

THE METROPOLITAN BOARD AND THE SEWAGE QUESTION.—On the application of the General Sewage and Manure Company (Limited), the Metropolitan Board of Works have instructed Mr. Keates, the consulting chemist to the Board, to visit Nuneaton, in Warwickshire, in order to investigate and report upon the method of dealing with town sewage carried out there by the above-named company. The process is chemical in its character, and is worked under the patent obtained by Dr. Anderson.

Our Office Table.

S. LUKE'S, CAMBRIDGE.—A new district church is about to be erected for this increasing neighbourhood. The committee invited the following gentlemen to lay sketches before them:—Mr. E. Baw, Mr. C. Bays, Cambridge; Mr. Fawcett, Cambridge; Mr. J. Norton, London; Mr. Smith, Adelphi, R. R. Rowe, Cambridge, and they have selected Mr. Smith to carry out the work.

CATHEDRAL RESTORATION.—Cathedral restoration calls forth from the *Rock* a passionate remonstrance against the absorption of enormous sums in this work. It says:—"Cathedrals really seem to hang like a millstone round the neck of our distracted Church. The sums lavished on what is called their 'restoration' would go a very long way indeed towards securing an adequate provision for a staff of working clergy, which is the crying want of the age. We need more men, but we cannot get them; nor are we likely to get them until we can deal more liberally with those we already have. All that is wanted is money, and although money flows freely enough when the work to be done commends itself to the sensuous and æsthetic elements in our nature; it is far otherwise when we have nothing to show or nothing to promise beyond the conversion of souls to God by the simple unostentatious preaching of His Holy Word. This train of reflection has been forced upon us by a paragraph that appeared in the *Times*, headed 'Restoration of Chester Cathedral,' which is a fair average specimen of the excessive demand made by these fabrics upon the purses of those who dwell within reach of their shadow. It appears that the total subscription-list at the end of last year had already reached £47,000, to which the Ecclesiastical Commissioners have added a grant of £5,000. But even this enormous sum is altogether insufficient to meet the appetite for costly 'restoration,' which—like appetites of a baser kind—seems to grow with what it feeds on; for, the *Times* informs us, in addition to this total amount of £52,000 it is estimated that £18,000 will still be required! 'Save us from our cathedrals! will, we opine, be the cry ere long.'

THE ALEXANDRA PALACE.—On Wednesday the new railway in connection with the whole of the Metropolitan system, and running direct from King's-cross to the central transept of the palace, was virtually opened to the public. Under the direction of Mr. Gilbert R. Redgrave, the manager, the general arrangements are progressing rapidly, but it is extremely doubtful if the whole will be completed for the opening to-morrow. The picture-galleries, which contain works of Turner, Clarkson Stanfield, MacIise, Ward, Prout, David Roberts, Millais, and other masters, are nearly ready, and have been arranged under advice of Mr. Redgrave, R.A., whilst the collection of porcelain and ancient china, to which Her Majesty contributes some specimens on loan, will also be fully prepared for exhibition.

THE MISSING PORTION OF THE DELUGE TABLET.—A despatch from Mr. George Smith to the *Daily Telegraph*, dated Mosul, May 19, says:—"Since my last message I have come upon numerous valuable inscriptions and fragments of all classes, including very curious syllabaries and bilingual records. Among them is a remarkable table of the penalties for neglect or infraction of the law. But my most fortunate discovery is that of a broken tablet containing the very portion of the text which was missing from the Deluge tablet."

THE ROYAL VAULT AT WINDSOR CASTLE.—A new entrance to the Royal Vault at Windsor Castle has just been constructed for the private use of the Queen, or such members of the Royal Family as may wish to visit this place of sepulture. Formerly access to the Royal Vault was only obtained by removing the pavement in front of the Communion Table in S. George's Chapel. Steps leading from the east aisle of S.

George's Chapel into the passage of the vault have now been made, so that it can be visited at any time without trouble.

THE HOLBORN VALLEY IMPROVEMENTS.—Judging by some proceedings at the Clerkenwell Police Court on Wednesday week, the Holborn Valley Improvements would seem to have been carried out with as little regard for the remains of poor humanity laid bare by the up-turning of earth, as the gravediggers in "Hamlet" themselves displayed. Three destitute boys, charged with stealing the supports of a hoarding in Charterhouse-street, were also found to have carried off sacksfull of skulls and bones.

TIMBER IN VAN DIEMEN'S LAND.—A writer a few years ago, remarks: "We have been to-day to see the giants on the bank of the Emu River, below the confluence of the Loud Water and on the Hampshire Hills side. Though we did not find a tree of 70ft. actual girth, there was one of 55ft., at 4ft. from the ground, carrying up its magnitude to a surprising height. Others, within a few yards, measured 48ft., 43ft., 40ft., 38ft., 37ft., 32ft., and 28ft.; all of them fine trees of about 200ft. in height: none of them were much decayed at the bottom, though in general a little broken at the top. On the base of one of them was a tumour or carbuncle, measuring 12ft. across, and 6ft. high. Amongst them was a fallen tree, 22ft. at the base, and 19ft. at 110ft. up. A limb 13ft. springs from it at 90ft. of elevation, and at 120ft. two other large limbs; at 150ft., the general head commenced; its total height, as measured, was 213ft. By its fall it had uprooted another, 168ft. long, which had brought up a ball of earth, 20ft. across. These trees were all stringy barks."

CHIPS.

Lord Braybrooke has undertaken to restore the chancel and two chancel aisles of the parish church at Saffron-Walden.

Mr. Wm. Pinch, architect and surveyor, of Bath, died suddenly of heart-disease, last week, at the age of 67.

A new (Roman) Catholic chapel, dedicated to S. Joseph, was consecrated on Tuesday week, at Stokesley, Yorks. Messrs. Goldie and Child are the architects, and Mr. J. F. Craggs, of Stockton, the builder. The cost has been £1,500.

The parish church of Yarmouth, Isle of Wight, is undergoing restoration, and will shortly be reopened.

A new theatre is shortly to be opened in Camden Town.

The Cross Chapel, Moreton Hampstead, Devon, was reopened, after restoration, on Sunday last.

On Saturday afternoon, the four memorial-stones of a new Wesleyan Chapel were laid in Cross-lane, Gorton, Manchester. The building is to cost upwards of £2,500.

The clock and chimes in the new Town-hall, at Winchester, have been manufactured by Messrs. Gillet and Bland, of Croydon.

On Thursday week, the foundation-stone was laid of the enlargement of the Children's Convalescent Home at Tunbridge Wells. The new portion will be built of stone and brick.

The annual *conversazione* of the President of the Institution of Civil Engineers is to take place on Tuesday next, the 27th instant, in the west galleries of the International Exhibition. The distinguishing feature of last years' reception—the presence of ladies—is to be repeated.

A new Wesleyan chapel and school are about to be erected at Swainby, near Stokesley; the building will be of white press brick and stone dressings. The chapel will accommodate 250 people; the cost will be about £700, exclusive of the site. Messrs. Hunter and Carr, of Middlesbrough, are the architects.

The Wesleyans of Redcar are about to make sundry additions to their chapel: they are adding a new organ and additional space in the orchestra, together with new pulpit of elaborate design. Messrs. Hunter and Carr are the architects.

The Primitive Methodist Chapel at Guisbrough is about to be entirely remodelled from designs by Messrs. Hunter and Carr, architects, of Middlesbrough.

The freehold mansion known as Adair-house, Pall-mall and S. James's-square, lately in the occupation of the Dowager Lady Adair, recently deceased, was on Wednesday sold by auction, upon the premises, by Messrs. Rushworth, Abbott, and Co., of Savile-row, and produced the large sum of £35,500.

The foundation-stone of a new church in East-street, Walworth, dedicated to S. Mark, was laid on the Vigil of the Ascension. The cost will be £5,500.

The Canadian Dominion Parliament has passed the Bill regulating the loading of timber on vessels in a manner insuring their safety.

A deficiency in the water-supply in Brimondsey and the adjoining districts similar to that which occurred last year, seems to be apprehended by the inhabitants.

The Incorporated Church Building Society has made a grant towards the erection of a new church at Portmadoc, to be commenced at once under the supervision of Messrs. Roberts and Morrow, of Portmadoc, from drawings prepared by Messrs. Axmann and Perrotti, of 7, John-street, Adelphi, architects.

Trade News.

WAGES MOVEMENT.

ARBROATH.—The operative joiners, at a meeting held on Wednesday week, resolved to decline an offer by their employers of an advance of 1s. per week. They adhere to their own demand for an increase at the rate of $\frac{1}{2}$ d. per hour, and they have resolved that if this be not conceded they will strike work on Monday next.

BIRKENHEAD.—A meeting of the employers in the building trade, Mr. Henry Fisher in the chair, was held in the Park Hotel, Birkenhead, on Monday evening, to consider the demand of the masons for an advance of 3s. per week, when it was resolved to adhere to the offer made by the master masons' committee of Liverpool and Birkenhead on the 1st May last, viz., $\frac{7}{8}$ d. per hour for 55 hours per week in summer, or £1. 14s. 4 $\frac{1}{2}$ d.; 8d. per hour for 46 hours per week in winter, or £1. 10s. 8d. per week. The secretary to the meeting was requested to communicate this decision to the operatives' association. A counter motion, that no advance be made, but that the wages remain at 3s. per week as at present, was lost by a majority of ten to five. The operatives are on strike.

BRISTOL.—A correspondence having passed between the secretary to the Master Builders' Association and the labourers employed in the building trade, it was arranged that a meeting of representatives should be held on Friday last. The meeting was of a most friendly character, and it was resolved to refer the matter to arbitration, the delegates from the labourers offering to accept any three arbitrators whom the masters might name. It was then decided to ask three gentlemen, whose names were acceptable to both sides, to act as the arbitrators.

LIVERPOOL.—The strike of the operative joiners of Liverpool still continues, and there seems to be no sign of an agreement being come to. The men report that they receive substantial assistance from the different trades organisations throughout the country, and that they were able to pay a handsome dividend on Saturday to about 700 of the turnouts. Daily a number of men are leaving for other towns, where their labour seems to be in demand.

ASHTON & GREEN.

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portmadoc and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

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16 by 10	16 by 8	14 by 10	14 by 8	12 by 8
19s. 6d.	14s.	17s.	11s. 6d.	6s. 6d.

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TENDERS.

BECKENHAM.—For erecting conservatory and stable, for Mr. J. F. Inmay. Mr. Wm. Banks, architect.
Cooper (accepted) £661 10 0

CHESHIRE.—For summer cottage at Tattenhall, for Mr. John Mosford. Messrs. Lewis Hornblower and Son, architects, Liverpool. Quantities by Mr. G. Northcroft.
Hughes £3,350 0 0
Woolam 3,100 0 0
Farrimond 2,660 0 0
Lloyd* 2,580 0 0
(* Accepted, subject to alterations.)

CHESTERFIELD.—For the erection of a villa residence at Gladstone-road, for Mr. John H. Gosling. Mr. S. Rollinson, architect.

Excavator, Mason, Slater, and Plasterer.

Maw £657 11 0

Carpenter, Joiner, Smith, Founder, and Painter.

Glossop £345 0 0

Plumber, Glazier, and Bell-hanger.

Gothard £88 19 0

ESSEX.—For restoring S. Michael's Church, Kirby-la-Soken, Essex. Mr. Henry Stone, architect.

Grimes (accepted) £1,550 0 0

FREYSTROP.—For the restoration of the parish church.

Mr. E. H. Lingen Barker, architect.

T. and J. Lloyd £400 0 0

LONDON.—For pulling down and rebuilding six houses and shops, Bethnal Green-road, for Mr. H. J. Bliss.

Messrs. T. and W. Stone, architects.

Palmer £2,382 0 0

Pettigrew and Moyes 1,873 0 0

Higgs 1,817 0 0

Beale 1,569 0 0

Christoffer Bros. 1,540 0 0

Langmead 1,470 0 0

OXON.—For re-paving, re-seating, and sundry other work to be done in the restoration of the Church of S. Mary Magdalene, Balcott. Mr. Dolby, architect.

T. and S. Orchard £383 0 0

Kimberley 284 2 5

Claridge 248 0 0

POPULAR.—For the erection of the "Commercial Tavern," for Sir Henry Meux and Co. Mr. F. Warburton Stent, architect.

Ebbs and Sons £2,440 0 0

Colls and Sons 3,321 0 0

Turner and Sons (accepted) 3,250 0 0

SHIRLAND, DERBYSHIRE.—For the erection of schools, master's residence, fence walls, and conveniences for the Shirland School Board. Mr. S. Rollinson, architect. Quantities supplied.

Mason, Bricklayer, and Excavator.

Roe £343 15 0

Carpenter, Joiner, and Painter.

Margerrison £715 5 0

Slater.

Harrison and Chadwick £132 0 0

Plasterer.

Harrison and Chadwick £71 0 0

Plumber and Glazier.

Coldron £183 10 0

STOURBRIDGE.—For S. John's Parsonage House. Mr. H. Smith, architect. Quantities by Messrs. H. and J. P. Sharp, Birmingham.

Lovatt £1,977 10 2

Nelson 1,869 0 0

Bennett 1,830 0 0

Chapman 1,830 0 0

Thompson 1,798 0 0

Binnion and Son 1,795 0 0

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[ADVT.] BATH STONE OFFICE: CORSHAM, WILTS

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MEETINGS FOR THE ENSUING WEEK.

TUESDAY.—INSTITUTION OF CIVIL ENGINEERS.—The President's Annual Conversazione at the Exhibition, South Kensington. 9 p.m.

WEDNESDAY.—SOCIETY OF ARTS.—8 p.m.

THURSDAY.—SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—"On Form and Motion." By Mr. H. C. Selous. 8 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—(1) "On the Restoration of the Church of the Holy Innocents, Adisham, Kent." By Mr. William White, F.S.A. (2) "On the Fortified Churches of the Border." By Mr. G. H. Birch. 7.30 p.m.

COMPETITIONS OPEN.

DEVON COUNTY ASYLUM. May 31.—For plans, specifications, and estimates for additional buildings at the Asylum at Exminster. The architect whose plans may be adopted will be employed to superintend the works, on the usual terms of commission, provided it be found that they can be executed within the estimated amount. The sum of £25 will be given for the second best design, namely, £10 for that of the chapel, and £15 for that of the other buildings. T. E. Drake, Clerk to the Committee, Exeter.

NORFOLK AGRICULTURAL ASSOCIATION.—For a design for Norfolk labourer's double cottage. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NORFOLK AGRICULTURAL ASSOCIATION.—For designs for farm buildings for a Norfolk farm of about 300 acres. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 6s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ALCESTER RAILWAY. May 28.—For the construction of the Alcester Railway. Mr. William Clarke, the Company's Engineer, 45, Parliament-street, London, S.W.

ANELEY. May 28.—North Surrey District Schools.—For drainage works. A. G. Hennell, architect, 15, Bedford-row.

BETHERSDEN, NEAR ASHFORD, KENT. May 27.—For the restoration of the parish church. Mr. Walter Blackett, 8, Furnival's Inn, E.C.

BEVELEY. May 31.—For the erection of an 80-quarter malt-kiln and warehouse joining the railway station. Mr. Robert Clump, Architect, 11, Bowditch-lane, Hull.

BRADFORD. May 28.—For constructing and erecting wrought-iron roofs to a warehouse and mill in Segrant's-lane. Messrs. Lockwood and Mawson, architects, Bradford.

BRADFORD. May 29.—For the supply of 5,000 or 10,000 tons of limestone. W. T. McGowan, Town Clerk, Corporation Offices, Bradford.

BUENOS AYRES. June 2.—For the water supply, drainage, sewerage, and paving of the city. Mr. J. F. Bateman, Engineer, 10, Great George-street Westminster, S.W.

CLIFFE, LEWES. May 26.—For the erection of a chapel on the burial grounds. W. E. Baxter, Clerk, 199, High-street, Lewes.

CROSS-Y-CEILOG. May 26.—For the erection of a school to accommodate 129 children, and residence. Mr. E. Lawrence, Bank Chambers, Newport.

CROYDON UNION. May 28.—For the enlargement of the workhouse.—Mr. J. Berney, 61, North End, Croydon.

DAWLISH, DEVON. June 7.—For altering and re-seating the parish church. Mr. St. Aubyn, architect, Lamb-buildings, Temple, London.

FRANKFORD-ON-THE-MAIN SEWERAGE WORKS. May 31.—Contract No. 49.—For the supply of about ten English miles of sewer invert blocks for 10in. and 5in. brick-work, together with 2,400 9in. and 6in. side junction blocks. Contract No. 50.—For the supply of about 8,800 lineal feet of sewer pipes, ranging from 9in. to 15in. diameter, together with 825 junction pipes, bends, and taper pipes, and 1,000 disc plugs. Engineer's office, 16, Paul's Platz, Frankfurt-on-the-Main.

GRAZLEY, SHROPSHIRE. May 30.—For the erection of a new church. Mr. Thomas Roberts, 2, Church-lane, Bridgnorth.

LANCASHIRE AND YORKSHIRE RAILWAY. June 10.—For the construction of the Ripponden Branch Railway. Engineer's Office, Hunt's Bank, Manchester.

LEEDS. May 26.—For the erection of two shops in Market-street. A. H. Thompson, architect, 14, Park-square, Leeds.

LEEDS. May 27.—For the erection of extensive buildings in Bull-street. T. Ambler, architect, 9, Park-place, Leeds.

LEWES. June 7.—For the erection of a race stand. Mr. J. D. Verrall, The Mulberries, Denmark-hill, S.E.

LONDON COMMISSIONERS OF SEWERS. June 3.—For the supply of cast-iron work. Joseph Daw, Principal Clerk, Sewers Office, Guildhall.

NORTH LONDON RAILWAY COMPANY. June 3.—For the purchase of about 23 tons of old material. R. S. Mansel, Secretary, Euston Station.

NORTON SCHOOL BOARD. May 28.—For the erection of new school buildings and teachers' residences. J. Robinson, Clerk to the Board, Norton Grove, Stockton-on-Tees.

OTLEY. May 30.—For the erection of a Wesleyan chapel. Mr. E. Taylor, architect, 7, Stonegate, York.

READING SCHOOL BOARD, BEKES. May 30.—For the erection of two schools to accommodate 678 and 630 children. J. Morris, architect, 9, Friar-street, Reading.

SHAWFORTH, NEAR BACUP. June 9.—For the erection of a new Wesleyan chapel and schools. W. Waddington, architect, Burnley.

SOHAM SCHOOL BOARD. May 27.—For the erection of boys' school in the Ely road, and infants' school in Clay-street. T. Huxwick, Clerk to the Board, Soham.

SULLINGTON, SUSSEX. June 3.—For restoring, re-seating, and adding vestry to the church. Mr. L. W. Ridge, architect, 23, Bedford-row, W.C.

WAR DEPARTMENT CONTRACTS. May 31.—For works and repairs to the Severn defences. T. Rowe, Surveyor, Royal Engineer Office, Devonport.

WELLINGTON, SALOP. May 29.—For the erection of new workhouse buildings in Street-lane. Messrs. Bidlake and Fleming, Architects, Wolverhampton.

WELLINGTON (SALOP) UNION. May 29.—For the erection of new workhouse buildings in Street-lane, Wellington. Messrs. Bidlake and Fleming, Architects, and Surveyors to the Guardians, Wolverhampton.

WELSHPOOL. June 3.—For taking down a portion of the present town-hall and adjoining buildings, and reconstructing the town-hall. Mr. B. Lay, Architect, Bridge House, Welshpool.

BANKRUPTS.

(To Surrender in London.)

Joseph John Phillips, Auckland-hill, Lower Norwood, builder, June 4, at 11.

(To Surrender in the Country.)

Richard Smith, Northampton, builder, June 7, at Northampton.

DIVIDEND MEETING.

J. C. Westley, Dudley, brassfounder, May 30.

DECLARATIONS OF DIVIDENDS.

W. T. Turner, Howard-road, South Hornsey, builder, divs. 2s. 2d. and 14d.—S. M. Peto and E. L. Betts, Great George-street, Westminster, contractors and builders, divs. 1s. 1d. and 3s. 9d.—J. McGill, Great Coram-street, Brunswick-square, and Woburn News, St. Pancras, late of Euston-place, Euston square, builder, div. 6 15-16d.—G. Jones, Osney, Oxon, builder, div. 1s. 6d.

SCOTCH SEQUESTRATIONS.

Robert Alexander Lowe and Colin Fergusson Brown, wrights and builders, May 23, at 2.—James Campbell, Edinburgh, builder, May 22, at 12.

PARTNERSHIPS DISSOLVED.

M. Manus and Mansley, Bacup, builders.—Eckwith and Stanhope, Castleford, joiners.—Close and Murgatroyd-Hallifax, painters.—Barton, Wood, and Co., Manchester, oil merchants.—Hollis and Stockman, Duke-street, Westminster, civil engineers.—Benjamin Willans and Co., Bristol, stonemasons and contractors.—Spicer and Snuggs, New Windsor, plumbers.—J. E. Broom, Cheltenham, builders and undertakers.—Middleton and Goodman, Cheltenham, architects.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 30, 1873.

SCHOOLS.—No. IV.

EDINBURGH.

ALTHOUGH the lower grades of the great scholastic institutions of Edinburgh confer educational advantages far in advance of those inherited by other towns in Great Britain, the construction of their buildings is, in many instances, behind the intelligence of the present day. No doubt the teachers engaged in the Heriot and other Lower Schools have been able to show good results, but their work in such buildings must be, to themselves and their scholars, destructive of health, wearisome, and disgusting. There are rooms in those schools wherein no person with a healthy olfactory sense could penetrate without annoyance, even when the rooms are empty. There are playgrounds, common to boys and girls, wherein an open gutter, within view from the public street, forms the only urinal. In one case there is a principal room containing a mixed class of senior boys and girls under lady teachers, which has a boys' water-closet in immediate connection with the scholars' desks; while there is the general practice of teaching boys and girls together in the same room, augmented in evil by the girls being compelled to sit in their outdoor clothing during school-hours. It appears strangely inconsistent that, while these and other barbarous defects are permitted to exist under the management of local trustees, a deputation from the Town Council of Edinburgh has been sent within the last few weeks to the Secretary for War, complaining of the absence of beauty, the indeecency and discomfort of the arrangements, and the neglect of sanitary provisions, in a new barrack-building for married soldiers, now approaching completion on the secluded side of the Castle-hill, from the designs of the Government Military Engineers. Surely the Town Council of Edinburgh have never applied their canons of taste, health, and morals to the Lower Schools of their own city! When they do expend their valuable energies in that direction they will find that Mr. Cardwell, had he so selected, had ample grounds for answering their objections to the new Government Barracks by a dumbfounding reference to their own Lower Schools! There are few happy architectural examples of schools, either High or Low, in Edinburgh, gorgeous as many of them are externally. The prevailing new ideas of school construction proceed from a spirit of scientific inquiry altogether different from the old associations and local prejudices derived from the "very good schools" of the past. It may not be the special duty of the Town Council of Edinburgh to determine the character of the new school buildings in their City; at the same time, that duty is equally as much within their province as the object of their recent deputation to the War Office.

In the remodelled schools of a higher grade, Edinburgh is especially fortunate, and, probably in its educational institution in Queen-street (where 1,280 young ladies are receiving the highest education), it possesses one of the most leading and broadly conceived schools in the world. That school forms one of a series of five, under the management of a governing body termed the Merchant Company of Edinburgh. This company, established in 1681, with a capital at the present time of upwards of half a million sterling, has obtained Provisional Orders under the Endowed Institutions (Scotland) Act, 1869, for the reconstitution of five of the more considerable hospitals in Edinburgh, so as to afford educational advantages to scholars by payment of fees, ranging

in the various schools from 3s. to £2. 10s. per quarter. Their scheme includes presentations, bursaries, and scholarships, tenable for 3, 4, and 6 years, obtainable by open competition in certain schools, which may assume an aggregate value of £700. Besides these benefits, a number of young ladies receive their education, board, and clothing, free.

The building wherein "the Edinburgh Educational Institution for Young Ladies" is established formed originally the British Hotel and the Hopetoun Assembly Rooms, at the west end of Queen-street. About three years ago, under the direction of Messrs. MacGibbon and Ross, architects, of Edinburgh, an additional story to the main building, forming a drawing-school, was constructed, with other additions, alterations, and reconverting of the principal floors, at a cost of over £6,000. The area of the building is about 100ft. on the Queen-street frontage, by about 150ft. in depth. The height from the pavement is 80ft., divided into five stories, with a basement floor below the street level. There are 30 principal, and 6 elementary, classrooms, with teachers', masters', and other rooms on each floor. There is a dancing and recreation-room, 42ft. by 34ft., and 40ft. high, divided by solid movable partitions from a singing-classroom at one end and a sewing-room at the other. The movable partitions are of great height, and slide upon guides in the floor. When they are withdrawn, the three rooms form a lecture, concert, or general room, 90ft. by 34ft., and 40ft. high. The partitions are not required to exclude sound, the three rooms they form being used for purposes where silence is not needed. There are sixteen music-rooms; twelve of these are small cubicles, arranged side by side in two blocks of six each, with a corridor between them. Each cubicle, heated by a gas-stove, contains a pianoforte, for teaching elementary pupils, one at a time, under a separate lady-teacher. The other four rooms contain eight pupils each, who are provided with separate pianofortes, and taught simultaneously by one master.

The work of the Institution engages 30 masters and 50 governesses, all of whom devote their whole time to the duties, under the head-master, Mr. David Pryde, M.A. Each class has a master for teaching and a governess, always present, for assisting and superintending. The teaching, discipline, organisation, and quietude of the Institution are remarkable. No class works for more than 50 minutes consecutively in any one room. At every hour during school-time, which begins at nine and ends at three o'clock, a lively march is played upon a powerful harmonium in the central hall, and to its inspiring time the several classes file from the rooms wherein they have been engaged to others in different parts of the building. The 1,280 scholars are thus transferred at one time, and located at their work again, in less than ten minutes. They are marshalled in double file, forming, for the time, a dextrously-interwoven continuous train moving from three opposite directions to pass the room of the head-master upon the central landing of the staircase to the first floor. They move as silently as though they were an orderly funeral procession, and yet with a step as happily buoyant as though they were enjoying the opening ceremony of a Scotch ball. This beautiful arrangement is chiefly due to the head-master's talent for organisation, and partly to the plan of the building. There is a hall, with a staircase, in the centre of the school. From the landings of this central staircase on each floor corridors branch off right and left the whole length of the building, giving access to the classrooms on each side; they extend to other staircases placed at each extreme end of the school—making three leading staircases in all, at distances of nearly 50ft. apart. While the classes are moving, the windows

and ventilators of the several rooms are thrown open, so that each class obtains a change of room and a complete change of air at regular intervals. This is a most inestimable advantage, for it is a rule, almost without an exception, that lady teachers will not open windows or ventilators, but prefer to adhere to their duties for hours after symptoms of exhaustion, irritation, and blackened lips have given warnings of the foetid air they continue to inhale. Of course we refer to this fact with commiseration, not censure, and for the purpose of showing, by the example of this Edinburgh Institution, that organisation must supplement the construction of a school in providing ventilation adapted for the more delicate physical susceptibilities of ladies and girls.

Considering that ventilation had to be provided in an old building, Messrs. MacGibbon and Ross have accomplished all, perhaps, that was possible, by adopting only simple and natural means. Their plan in this school appears to answer; in another school, as we shall see by-and-bye, it does not. At each end of the long corridors is an open shaft of considerable dimensions, running up to the roof, and terminating with louvre boards. Every room has sash windows on one side, and on the other towards the corridors, a pivot-hung casement. There are also open fireplaces. These, combined, promote circulation of air. The classrooms in size and form are the ordinary dwelling-rooms of the original hotel, with long desks, generally six rows in depth; in no case accommodating more than forty scholars in the senior department in one room. The drawing and writing-classroom is a new spacious apartment in the mansard roof, with a floor area spanning the whole depth of the main building.

The elementary department of the Institution, on the ground floor, presents no special features. In the basement, by which all the pupils enter from Queen-street, are a large refreshment-room, 25 closets, lavatories, and cloak and boot rooms. The refreshment-room is supplied by a confectioner at a fixed tariff. The cloak-rooms are divided into a series of compartments, resembling the high pews in an old-fashioned church: they are fitted with a row of double pegs for bonnets and cloaks, and a double box for boots and slippers, with a number over each. Only twelve pupils are admitted into one compartment, which a janitress locks, superintends, and reports upon, to prevent little mistakes or exchanges.

The second of the five schools under the management of the Merchant Company of Edinburgh is situate in the open portion of the Old Town, known as The Meadows. It is called "George Watson's College Schools for Boys." The building has been converted from its original uses as "The Merchant Maiden Hospital," which was the nucleus of the Queen-street Institution. (The term "hospital" is applied to schools in Scotland.) It is a Classic structure three stories in height, containing a number of separate classrooms, to which a large hall for general purposes is now in course of erection, from the designs of Messrs. MacGibbon and Ross. This erection is an example that, even in schools of the higher grade, a large room is required when the classrooms, though numerous, are altogether separate.

The fifth of the schools under the Merchant Company is the more elementary of the group; and this, like the others, has been converted to its present use, being originally a hospital—in the English sense of the word—for fifty old men and women. It is now called "James Gillespie's Schools for Boys and Girls," and is situate at Brunsfield Links. The school has three departments—an elementary, for which the fee is 3s. per quarter; a junior, with a fee of 4s.; and a senior, with a fee of 5s. per quarter. There are 1,200 scholars, all of whom assemble upon an open space in front of the school before school-hours, and there.

remain exposed in wet and cold weather until they can pass in single file into the school. This is inevitable, because the Governors have not seen the necessity of constructing a glass pavilion over the open space, or a covered playground; while the subdivision of the building into twenty-four separate classrooms precludes an assemblage in the school itself. The classrooms on each of the three floors vary in size from 37ft. 9in. by 25ft. 3in. to 12ft. 2in. by 11ft. 6in., and in height from 15ft. to 12ft. 3in. 100 scholars are seated in the larger rooms, which are heated by open fireplaces and hot-water pipes combined. The corridor plan, with the arrangements for lighting and ventilation, before described in the "Institution for young ladies," is adopted here. The alterations were made by the same architects in both cases. In this school, like the one before referred to, the ventilation into the corridors is not a success: the school being more elementary, there is more *viva-voce* teaching than in the Queen-street institution, and the pivot-hung ventilating casements invariably require to be closed to exclude the distracting noises from the other rooms. The teachers are principally ladies, consequently the outer windows remain closed. Many of the rooms are long and narrow, containing two groups of long desks, beyond the compass of one teacher, who can control over seven desks in depth in a room of moderate width, far more effectually than three only in depth, if extended in length in a narrow room. Boys and girls sit in the same rooms, but have separate playgrounds. Outdoor clothing is not always taken off by the girls. There are racks for slates, but no desks for books; these, in accordance with Scotch practice, are held by each scholar during school and play hours, and carried home. Scotch schoolmasters argue that, "Books are the scholars' own property, and they must take care of them." The latrines have no covered approach; they are constructed with glazed brown bricks, fitted with Macfarlane's iron troughs and Scotch guards. The flushing of the troughs is done regularly by the janitor of the school.

The discipline, under the head master, Mr. Robert Foulis, is so complete that not a single instance of mischief, nor even a pencil mark, can be found in any part of the building, which has been occupied by 1,300 scholars since September, 1870. Architects who are disposed to regard the element of mischief in boys as a bugbear interfering with their plans, may note that fact, and leave schoolmasters to act, as experience proves that they do, with a conscientious sense of duty equal to their own.

QUANTITIES.—XVII.

SMITH AND FOUNDER.

IT is customary in measuring the Smith and Founder to commence with the articles executed in wrought iron, which, owing to the difference in price and workmanship, must be kept separate from those executed in cast iron. Many of the items will have been taken off with the other trades to which they have reference; and with respect to these, it will be necessary to bring them into the abstract, in order that the whole of the trade may be billed from the one abstract.

Ironwork generally is billed at per weight. The exceptions to this rule will be found in the Table. Ironwork is measured from the drawings in feet and inches, and abstracted according to its thickness, the transfer to weight being carried out on the abstract. The means of effecting this are various. I will give one example hereafter, but will firstly speak of the measurement. Wrought iron in chimney and bearing-bars is measured by the foot super., taking the extreme length, including turnings up and down, by the width, and stating the thickness. Fitches are also

measured by the foot super., making no deductions for the holes for bolts, because, if drilled, there would be no deduction, and if punched, the deduction would only be worth the weight of old iron. Number the holes in fitch for the bolts, stating the thickness of the metal. I give an example, showing the method of measuring a riveted girder 20ft. long, as per Fig. 44.

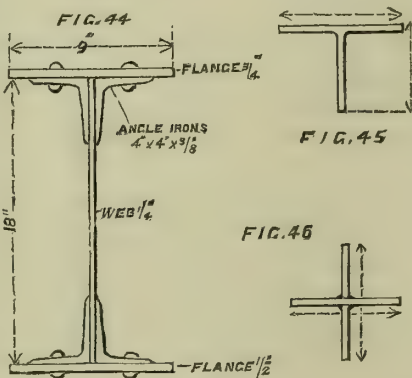
20.0	
1.6	$\frac{1}{4}$ in. web.
22.0	
9	$\frac{1}{2}$ in. bottom flange.
20.0	
9	$\frac{3}{4}$ in. top do.
4 20.0	
8	$\frac{3}{8}$ in. angle-irons.

4	
4	
8	
—	
6)	60 2 $\frac{1}{2}$ in. by $\frac{3}{4}$ in. rivets.

If preferred, the top and bottom flange may be taken in one item, thus:—

20.0	
9	1 $\frac{1}{2}$ in. top and bottom flanges.

adding the thicknesses of metal together. The rivets, as will be observed, are taken as 4in. from centre to centre. The holes should not be numbered in this description of girder, as they are included in the item. The weight of the above girder is 12cwt. 1qr. 25lb., and I leave it to the ingenuity of my readers to work it out for themselves. The weight of iron per foot is given at end of this trade. I have, as will be observed, taken the extreme dimensions of the angle irons each way for the width, this being the customary way of measuring amongst engineers. Tee and cross irons are measured in the same way, taking the outside dimensions in each case, as shown in Figs. 43 and 44. By adopting this course



a small additional amount of iron is taken, which provides against any little discrepancies which may arise in its measurement, it being impossible to find the exact weight of any girder by simply measuring it from the drawings in the ordinary way. Such, at least, is my experience.

In measuring circular columns where solid, it will only be necessary to take the length by the average diameter, making an addition for the cap, base, and caulking. Hollow columns are taken by the foot super.—the length by the average mean circumference—adding for cap, base, and caulking, as before. In the case of solid columns the dimensions would be reduced to the foot cube, and the weight would be easily found.

Bolts are measured by the foot run, stating diameter, the head-nut and washer taken

separately at per foot super., and the whole reduced to weight, as shown in the table. Where the bolts, however, are under one foot in length, it is customary to number them according to their respective lengths and diameters. Straps are taken at per foot superficial, as are also railings, grating-bars, and other work of a similar description, and afterwards reduced to weight.

CAST IRON is measured in the same manner as wrought iron, and my remarks thereon will therefore apply to cast iron. State at the head of the bill for the cast iron, that the cost for patterns for casting from is to be included in the several items, or take and enumerate the patterns separately, in which case they should be billed with the Carpenter. This course is, however, seldom taken, the items including both patterns and fixing. The Table shows the method of measurement, and it is therefore unnecessary for me to repeat here. A little difficulty may present itself in calculating for the weight of ornamental work, but by experience this is soon got over. It is customary to measure it pretty fully, it being much better to take a little more than a little less.

In measuring the various items as gutters, rainwater pipes, cresting, gates, coal-plates, &c., &c., it will be necessary to give the sizes and description.

In conclusion, I would state that in abstracting, take the several items under the several thicknesses, and they may be reduced to 1in. in thickness, or as preferred. Wrought iron weighs 40lb. to the foot super. of 1in. in thickness, and cast iron 37 $\frac{1}{2}$ lb.

From these two items the student will be able to arrive at all his calculations. By multiplying by twelve we obtain the weight per foot cube; and by multiplying by 7854 and dividing by 12 we obtain the weight per foot run of round iron, 1in. in diameter. Some surveyors trust to table-books, but it is much more practical for the student to work it out for himself.

I may observe that it is a common practice amongst some of the profession, in treating of small buildings, to make a "provision" for many of the items, instead of measuring them, that is to provide for a certain weight, and whatever is used under or over this amount must form a deduction or addition to the estimate, as the case may be, and after considerable experience it is possible to fix the weight in such cases pretty closely, although it is a course which I do not recommend.

TABLE XI.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement:—

WROUGHT IRON (including Fixing).

In riveted girders	At per cwt.
" rolled iron do.	"
" chimney and bearing bars	"
" furnace do.	"
" straps and ties	"
" bolts and ties, with screwed ends, with nuts and washers	"
" half-round handrails and square or round balusters	"
" plain window-guards	"
" framed area gratings	"
" bolts under 12in. long and other small items	"
Riveted tanks	At per gallon.
Coppers	"

CAST IRON, (Including Patterns and Fixing):—

In plain girders	At per weight.
" open	"
" solid columns	"
" hollow	"
" heads and shoes to principals	"
Eaves gutter	At per foot run.
Angles	At per number.
Stopped ends	"
Outlets	"
Rainwater pipes	At per foot run.
Heads	At per number.
Shoes	"
Ears	"

Iron cresting	At per foot run.
Finials	At per number.
Shutter bars	"
Air bricks	"
Gratings	"
Brackets	"
Stoves (according to description)	At per inch.
Ranges (do.)	"
Copper doors and Frames	At per number.

GAS-FITTER.

Gas-fitters' work is measured as shown in the accompanying Table. It will be necessary for the surveyor to specify the sizes and quality of the pipe as shown therein, and to number the various fittings to the same as elbows, &c., as extra to beyond the price of the tubing, the lengths of the same having been already taken in that for the pipe. Short pieces of pipe—that is, when under 2ft. in length—are numbered in the same way, also as extra. Of course, it will be unnecessary for me to give the different descriptions of the several articles used in gas-fitting, the object of the present papers being to show how they are measured. The descriptions and prime-cost values of the special items—as gaseliers, sun-burners, &c., should be found in the specification.

Make an item for paying the fees to Gas Company for opening ground and tapping main; and any excavation beyond this, where intended to be executed by the builder, should be taken by the foot run, stating the depth. An item is also made for cutting away for, attending upon, and making good after this Trade.

TABLE XII.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement.

Welded gas-tubing, according to size, stating the diameter of the bore of the pipe.	At per foot run.
Bends, elbows, tees, crosses, sockets, outlets, extra to outlets, stating diameter of bore	At per number.
Stop-cocks and brass spanners, stating size and description.	At per number.
Gas meters, stating number of lights it is to supply, and description.	"
Gas pillars, brackets, pendants, &c., according to description.	"
Star burners, and sun-burners, according to description.	"
Pay Gas Company's fee for opening ground and tapping main.	"
Allow for cutting away for, attending upon, and making good after Gas-fitter in all Trades.	"

BELLHANGER.

The description of the Bellhanging is generally taken directly from the Specification, stating the number and description of the bells, and the various parts of the house from whence they are rung, and their positions; also stating whether the wire is intended to be concealed in secret tubes; if so, whether zinc or copper; and the description and quality of the pulls. This item would include all cranks, wire, &c.; but a separate item must be taken for the attendance of the other trades in cutting away, &c., and making good. Such is the customary mode of dealing with the Bellhanger—the cost of wire being so slight, that a few feet more or less make no perceptible difference in the estimate, and surveyors, as a rule, do not think it necessary to measure it. A general description of the bells should preface the bill, as shown in the accompanying Table:—

TABLE XIII.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement.

The whole of the Bells to be hung in concealed zinc tubes, with best cranks and wire, in the best manner, and all to have pendulums and labels,

Crank pulls in third floor, to ring to bell on ground floor.	At per number.
Lever pulls with white and gold china furniture on first floor, to ring to bell on ground floor.	"
Call-bells and brass slides on ground floor to ring on third floor.	"
Bronzed sunk and dished pulls, 6in. diameter, and fixing at entrance, engraved "Visitors," to ring one bell on ground floor.	"
Bronze draw-out pull, and fixing at entrance.	"
Allow for cutting away, for attending upon, and making good after, Bellhanger.	"

Where the Surveyor prefers to take the several items separately, the following is the method of measurement:—

Copper wire.	At per yard run.
Tubing (zinc or copper).	At per foot dq.
Cranks (with description).	At per number.
Pulls, do.	"
Bells, do.	"
Attendance, &c., as before.	"

Electric bells are generally charged for at per pull, and the indicating bell numbered. Indicator boxes at per indicator, according to description; and batteries are taken at per cell, stating the description of the battery.

B. F.

INDIAN AND EASTERN TIMBER AND FANCY WOODS.

CEDAR is a commercial term given to the woods of several distinct kinds of forest trees, the timbers of which are distinguished as red and white cedar, Barbadoes and Bermuda cedar, cedar of Lebanon, pencil cedar, bastard cedar, and some of those that grow in America, some in Europe, and some in Asia. The lofty Deodara, a native of the Himalaya, with fragrant and almost imperishable wood, and often called the Indian Cedar, is sometimes referred to the genus Pinus, and sometimes to those of Cedrus or Larix, with the specific name of "deodara." But Dr. Hooker is of opinion that the Deodar and the Cedar of Lebanon are identical. The woods of several of the Coniferae are called cedars. But in India the term Bastard Cedar is applied to the *Guazuma tomentosa*, while in New South Wales the term White Cedar is applied to *Melia azerach*, and Red Cedar to that of *Phindesia Australis*, and the name is also given to the woods of the *Cedrela toona* and *Chickrassia tabularis*.

In China, a kind of cedar, probably a cypress, called Nan Mah, or Southern Wood, which resists time and insects, is considered particularly valuable, and is especially reserved for imperial use and buildings, and the cedar wood of Japan, according to Thunberg, is a species of cypress. The cedar of Guiana is the wood of *Icica altissima*. The whitewood or white cedar of Jamaica is *Bignonia leucoxydon*. The word "cedar," in the United States, is applied to various genera of the Pine family. The Virginian red cedar is a juniper; is called red, or pencil cedar; the white cedar of the southern swamps is a cypress. Under the term cedar, Col. Frith describes a reddish coloured wood of Palghat, specific gravity 0.507, as a large tree, wood aromatic, and used for furniture; and under the name of cedar root, a very aromatic wood, used for ornamental furniture in Palghat.

Specimens of the wood of the Indian Cedar, (*Cedrus deodara*) and of the cypress from the Himalayas, were shown by Dr. Royle at the Exhibition of 1851. The former has been introduced into England as a beautiful ornamental tree, and appears to promise well as a useful timber tree, as the wood works well and freely.

The Toona (*Cedrela toona*) is a large and

valuable tree, which grows in varying abundance at the foot of the Himalayas, also in the north-eastern provinces, and to the south in Bengal, and in both peninsulas of India. It is rare in the central provinces. In the Punjab it grows up to 2,500ft. to 4,800ft., with 7ft. to 12ft. in girth. Its growth there is rapid; its darkish wood is not subject to worm or warp, it looks well when properly polished, and is there a favourite for cabinet-work. Mr. R. Thompson says it grows to a large size in the outer, moist valleys of Kumaon and Ghurwal, and hill-men will not sell their trees. In Kumaon, trees with girths of 12ft. to 16ft. yield planks up to 3ft. broad, but 2ft. is the average. In Coimbatore, it is a valuable timber tree of large size, and its reddish coloured wood is used for cabinet-making purposes. It is not a common tree in the Bombay forests, but is found in some of the greenwood jungles about the ghats, and also in the hill range abutting on the Rajpooree Creek to the south. The wood is a choice one for cabinet-makers' purposes, but it is not used for any others, except for house beams, when it is procurable in sufficient quantities. A tree is also found, Dr. Brandis tells us, on the hills and plains of British Burmah, plentiful in some districts, and if not identical with the Toon of Bengal, certainly nearly related to it. A cubic foot of the Burmah wood weighs 28lb. In a full-grown tree, on good soil, the average length of the trunk to the first branch is 40ft., and the average girth, measured at 6ft. from the ground, is 8ft. It sells in Burmah at 8 annas per cubic foot. The lofty Deodara (*Cedrus deodara*) is a native of the Himalayas, and has an almost imperishable wood. Dr. Hooker is of opinion that it is identical with the Cedar of Lebanon, and this view is generally concurred in. It grows at 4,000ft. to 10,000ft. in many parts of the Himalayas, from the Ganges to beyond the Indus at Safed Koh, and the mountains north of Jellalabad. It is a very handsome tree, with a yellow-coloured, easy-worked, straight-grained, and durable wood, and pillars of it, in the great mosque, are said to be of the year 804 Hejira, but those in the Hindoo temples there are said to be 600 or 800 years old. Insects do not attack it. It is strong and elastic, and not too heavy. It is used for knees of boats, and for all building purposes. A tree takes from 80 to 120 years to reach 6ft. of girth, attains a height of 100ft., 120ft., even over 200ft., and girths of from 25ft. to 42ft. It is the best of all the coniferous timbers, and yields a valuable empyreumatic oil.

With reference to the central province forests, Major Pearson gives some very valuable information. At the present time the only forests in which teak of good size is procurable are, 1st, the forests of Boree, at the foot of the Puchmuree or Mahedee hills, and those of Sowleeghur and Jamgurh in Baitool. 2nd—the forests around the Bormeyr River in Mundla. 3rd—the forests of Lahora, Konkeir, and Panabarras, of which the latter is the centre, between Raepore and Chandah; and 4th, the forests of Aheree on the Godavery, between Seroncha and Chandah. The last two named belong to Zemindars, the first two only are Government property. There is also teak found of large size in the Gurjat States, 120 to 150 miles south-east of Raepore; but it is so remote that it can hardly be considered as belonging to the available resources of the country. It is believed, however, not to exist in any extraordinarily large quantity; indeed, Lieutenant Forsyth's report on the Kuvriar forest represents 12,000 trees in all. In Boree, including the Baitool forests (which latter, however, are practically worked out), there may be 10,000 available timber trees. In Mundla there are about half that quantity remaining. In the forests of which Panabarras is the centre, there is still practically, a perpetual supply, if they are only worked with care, as a vast supply of trees are there found in every stage of growth. About Dorwa in Panabarras alone he calculated there were

10,000 trees available for felling, and 30,000 more from 2 to 2½ ft. in girth, all fine, promising young trees. From the distance of the forests, and excessive weight of the timber, Saul does not come into much use. There is, however, a fine forest (a solitary patch) in the Daniwah Valley at the foot of the Puchmarree hills, which is now being worked, and the Executive Engineers at Jubbulpore and Saugor supply themselves with this timber from the Rewah State, 50 or 60 miles east of Jubbulpore, and from the Government forests in Beejoragoghurh. Of all other timbers, good, bad, and indifferent, and many of them bad, the demand for sleepers for both branches of the Great Indian Peninsula Railway, east of Bosawul, has almost cleared the forests within 50 miles of the railway lines of every tree that would yield a sleeper; nor has the supply of them done much good, as a very few years will have to elapse before all have to be replaced. This is being done partly by Saul, in a very small degree by Teak, but chiefly by iron-girt sleepers.

Western Mysore produces valuable timber trees, useful for building and cabinet-making, such as Boghy, for furniture, strong and tough; Soojhal, useful for all purposes, in colour a light brown, long grain, and rather open; Hoonsay, with red and black streaked heartwood, close grained and knotty, which makes excellent naves of wheels, oil-mills, mallets, &c., and is valuable for brick and tile burning; Biti, an open-grained timber, something like rosewood, which makes up into good furniture of all descriptions; Honagul, a building timber, also used for furniture; Wulla Honay, a light-coloured, open-grained timber, a very excellent description of wood suitable for house-building and furniture; Nundee, of which substantial bridges are built; Nellee, of a dark flesh colour, smooth, very close grain, compact and tough, making fine veneers, does not decay under water, and is well adapted for turning; Novoladdi, a greenish-brown, dull, close-grained timber, which polishes well, and is much liked by builders and others; and Handiga, useful for furniture and for the turner, &c.

These are but a few of the forest products of India, but will serve to show the vast and, comparatively speaking, still undeveloped timber resources of that country, which cannot be otherwise than a matter of great interest to all builders in Great Britain.

THE REGULATIONS FOR THE CONSTANT SUPPLY OF WATER TO THE METROPOLIS.

By JOHN P. SEDDON.

GREAT misapprehension appears to prevail on the part of the public as to the liability entailed by the new regulations for a constant supply of water to the metropolis, and I cannot but think that architects generally are hardly aware of the responsibility which attaches to themselves in consequence. Vestries and District Boards of the Metropolis, according to a correspondent of the *Daily News* (who wrote on the 21st of March), are protesting with one accord against these regulations, and the Metropolitan Board of Works has, as he said, expressed its determination to resist, as far as possible, their enforcement. The expense that would be entailed by the new regulations was set down in that statement as from £10 for a cottage to £60 and upwards for superior houses. That the Metropolitan Board of Works should now resist the putting in force of regulations, modified in concession to their own requisition, is manifestly out of the question, but that opposition and misunderstanding exist is certain, and is, as it is my present purpose to show, based upon erroneous premises; yet at the same time, it is essential that architects should know what the extent of the cost is to which their clients may become liable, and they

ought to make provision in new buildings to avoid the probable necessity of alterations and additional expense, which otherwise may at any moment be required.

In order to put the facts clearly, it is necessary to explain, in the first place, the position of the public with regard to the Act, and these regulations connected with it. In 1871 was passed "An Act to amend 'The Metropolitan Water Act, 1852,' and to make further provision for the due supply of water to the Metropolis and certain places in the neighbourhood thereof," but the regulations were left to be fixed at a future period, being left open to avoid coming to hasty decisions on various difficult points. By the Act of 1852, the obligation to provide a constant water supply was laid upon the companies, but as regards the public, unless a majority of four-fifths of the inhabitants of a district or street demanded it, there was no compulsion to incur the requisite expense to provide for it. The Act of 1871, however, made it obligatory on the public, upon the requisition of the Metropolitan Board of Works or the Board of Trade. In July, 1872, a Commission, appointed by the Board of Trade, consisting of Lord Methuen, Mr. Rawlinson, and Capt. Tyler, met to make the regulations referred to.

The inquiry which was held by these Commissioners, and conducted throughout with the utmost patience and intelligence, may be said to have resulted from public opinion as to its necessity, with the action of the Board of Trade and of the Metropolitan Board of Works. There were three parties to this inquiry, all heard by counsel—the Water Companies, represented by Mr. C. Pollock, Q.C.; the Metropolitan Board of Works, by Sir John Karslake, Q.C., and the Corporation of London, by the Hon. A. Thesiger. The evidence of the numerous skilled engineers and others who were called, together with the regulations which were issued after the inquiry, will be found in the Blue Book C 679, called "Minutes of Proceedings, and the Regulations for Constant Supply of Water to the Metropolis, 1873." These regulations are to be put in force in any district included in the Act, whenever the Metropolitan Board of Works, or the Board of Trade, may require it, or the Companies may propose to do so themselves. There is little doubt but that sooner or later notice will be given, and consequently the regulations enforced, the intention of Parliament being that the whole of the Metropolis should be prepared as quickly as possible for a constant supply, and that new buildings should be required to accord to the regulations, and that no fittings be allowed to be fixed except such as are "prescribed fittings" in the meaning of the Act. The neglect of compliance with the regulations, when in force, will render offenders liable to a penalty not exceeding £5 for each offence.

Such is the position of the question at the present moment. The Legislature having decided in favour of a constant supply of water, it would be idle now, perhaps, to discuss its necessity or desirability. It may suffice to say that both it and the present system of an intermittent supply have each certain advantages and disadvantages. The principal advantage of the constant system is the securing water to the poor at all times, purer than if stored in indifferent and dirty cisterns. On the other hand, greater danger to premises in time of frost is to be apprehended, when pipes generally will be always full, and certain inconveniences through the restrictions which it will become necessary to impose, when the supply is constant, to avoid waste, and particularly the liability of premises to be injured by overflow in consequence of the conversion of waste pipes into warning pipes, which is then made imperative.

Although the advantages of the constant supply may preponderate in the case of the houses of the lower classes, they do not appear

to do so in those of a superior class, especially such as have already been fitted up for the intermittent supply; in fact, the principal objects of a constant supply are to afford means of protection from fire, and to secure pure drinking-water for the poor, both which are less necessary in the case of houses fitted with good cisterns kept in order. It was, then, in the supposed interests of the millions that the eight great water companies which have the monopoly of the water-supply of the metropolis were compelled in the first place, in order to maintain their position, and at a later period to prevent the competition of schemes promoted by engineers to bring water into the London basin from the distant lakes of Wales and Westmoreland, to consent to make arrangements for a constant supply; and they do now maintain constant pressure in all their principal lines of mains, and all, therefore, that is needed to supply any district continuously is to leave open the branch service-pipes instead of shutting them off, as is now done, except for two hours or so daily.

Their means for keeping up a general constant supply, however, being obviously inadequate with the present fittings in ordinary use, they were still, by the Act, to be absolved from the necessity of compliance until other fittings, as "prescribed in the regulations," should have been provided in at least four-fifths of the houses in the districts in which they were called upon to make the change. Although the present fittings suffice in a manner for the present intermittent supply, the companies affirm that at least one-third of the water is now wasted by reason of their inefficiency; and that if this waste were continued throughout twenty-four instead of two hours daily, the loss would be ruinous to the companies and consumers, the result having been compared to the operation of pouring water into a sieve. Then, at certain periods in the early part of the day, when water is being drawn in all houses, the pressure in the pipes on the constant supply system would become so greatly reduced, even without this waste, that the service would be liable to at least partial failure and consequent serious inconvenience to the public. It was evident that upon the framing of the regulations the future working of the Act mainly depended; and many points of difference as to them would arise between the parties concerned, although the interest of the companies in the public with regard to the prevention of waste was to a great extent identical.

In many of the provincial towns—as Manchester, Norwich, Bury, &c.—there is a constant supply; and the regulations enforced by Acts of Parliament in those cases are far more stringent than any that were proposed or those that have been adopted in the case of the metropolis.

Each party at the inquiry brought forward a scheme of regulations which they were prepared to propose, the perusal of which, as placed side by side before the Commissioners, would give a clear insight into the history of the struggle, and also as to the nature of the compromise ultimately arrived at, and to the manner, therefore, in which the present regulations are to be interpreted. Unfortunately these have been omitted from the Blue Book, but they ought to be added to it, for the reasons above given.

The chief points which were in dispute between the principal parties may be summarised thus:—The companies sought to have the power given to them to alter all services, pipes, and fittings that did not accord with what they called their "prescribed fittings," and which they collected in a sample-room previous to this inquiry. They wished to restrict, by means of a ferrule, the inlet of water to cisterns to such a stream which, though capable of giving more water than required for use, would not be larger than that doled out to the street drinking-fountains; to compel the use of cisterns for storage, and of waste-preventing taps generally; to do

away with all waste-pipes, and convert them into warning-pipes conveyed outside the premises, so that their servants could perceive when water was passing by them; to forbid the use of iron services and pipes; and to compel the use of sufficiently heavy lead pipes, both within and without houses.

On the part of the public, the counsel for the Metropolitan Board of Works reasonably objected to a hard and fast line being given to the powers of the company, not because it was to be anticipated that they would use them arbitrarily or to the inconvenience of the public, but that stringent regulations might be forced beyond their intention by magistrates to whose jurisdiction their agents might appeal. And again, the very existence of the constant system being made to depend upon the conformance to the regulations of at least four-fifths of the houses in a district, it might become necessary for others than themselves to enforce compliance, in order to be in a position to demand the companies to give the constant supply. It was also objected that a supply, which would be practically a mere "dribble," was not the constant supply demanded by the public. In all the proposed schemes of regulations put forward by these several parties, it was assumed that special fittings would be prescribed, as samples of those which alone would be allowed in connection with the constant system of water supply, and the disputed points were mainly as to the class and cost of the fittings to be so prescribed.

Mr. Charles Stevenson, architect and surveyor, who was called as witness on behalf of the Corporation of London and the Metropolitan Board of Works, gave important evidence, with detailed estimates, showing that the fittings and alterations consequent upon the change of system would entail a cost varying from £14. 3s. 8d. to £63. 10s. 4d. on houses of £24 to £130 respective rentals, and a gross total for the metropolis of nearly nine millions, as per companies' proposed regulations, and of from £1. 13s. 6d. to £11. 8s. 9d. for the same houses, according to the regulations proposed by the Metropolitan Board. It does not appear that in the latter case the removal of existing fittings, which would, to a great extent, be required in both cases, was included, but the difference between the two proportions was obviously exceedingly large, although these estimates were founded on misapprehensions, and should not be taken as any true indication of the comparative effects of the two sets of rules.

This cost, which would have amounted to a serious tax upon the community, and the onerous action of some of the proposed clauses had been unforeseen, and having been brought out by the inquiry, were admitted, and met by the companies in an exceedingly fair manner.

It can be shown that none of the proposed regulations of the companies would have had any *unfair* action. They were not more stringent than those found necessary in Manchester and other constant-supply towns. At the same time, those towns were built with the view of having constant supply, while in London, which was not so, the alterations necessitated by the change were more serious.

Mr. Alfred Tylor, of the firm of Messrs. Tylor & Sons, of Newgate-street, who was summoned to give evidence by the Commissioners, strongly opposed, in the interests of the trade and of the public generally—though, it may be said, somewhat against the interest of his own firm, some of whose articles were among those proposed to be sealed as samples—the prescription of fittings and samples altogether; on the ground—which architects will at once appreciate—that it would be fettering future invention and interfering with the principles of free-trade. Fortunately, this view was that which ultimately prevailed, and to it is due the comparative freedom of the regulations from dogmatic prescription as to the precise methods and materials with which the principles laid down by them are to be carried out.

During the inquiry, which was conducted in the most complete and the fairest manner by all the parties, and after the production of much valuable evidence, certain concessions were made and embodied in the present regulations, the principles of which may be summarised thus:—The Committee decided (clause 33, p. 8) that all existing fittings which are sound and efficient are not required to be removed; and the proposed sample-room, which would practically have given the monopoly into the hands of the few manufacturers whose samples were sealed, was done away with by mutual consent. New inventions which, had that been adopted, would have been excluded from being even tried (see proposed clauses 26 and 31), are now made available; and thus Mr. Stevenson's estimate of nine millions was instantly reduced, by old fittings, sufficient for the purpose, being allowed, and also by the substitution of valves, which can be supplied at 15s. (p. 81), instead of the noisy, expensive, and inconvenient cisterns which had been deposited in the sample-room.*

The objection made by the companies to the use of iron pipes for services within buildings was overruled; and the regulation No. 3 now provides that all pipes in the ground must be lead; but elsewhere they may be lead, copper, or wrought-iron, at the option of the consumer. Architects, however, should not adopt iron pipes for works in the metropolis; for, though cheaper, they are not trustworthy, being apt to corrode within and without; while, as the water supplied to London does not act prejudicially upon lead, that material is, on the whole, far preferable. The weight to be required for lead pipes was materially reduced—in fact, in some cases, to a minimum which it would be undesirable for architects to adhere to too closely. The scale for the weights of lead pipes proposed by the companies is the same as has been found suitable in other towns which have the constant supply, and was more scientific than that adopted, in which it will be found that the weight of pipes of double the diameter of others has simply been doubled, instead of being increased according to the square of the diameter.

The regulations as they now stand seem framed so as to allow of considerable freedom and latitude where a separate supply for drinking purposes is provided from that of the storage for closets, &c.

Old cisterns are now allowed to be used fitted with "waste-not" valves fixed in the place of the old round valves, which can be supplied for 18s. for the valve; and such are being generally introduced to the satisfaction of all parties, as it does not disturb the pipe-work or general arrangements like the proposed sample cistern. This plan may also be adopted in new houses, so that the difference of cost is only as between a valve at 18s. and the old valve at 5s. in estimating the cost to the consumer under the new regulations. Some of the companies also allow waste-not taps, in the place of the ordinary stool-valve to water-closets, when the lead-pipe is in good order; and this change can be effected at a cost of 15s. at the present time, and doubtless a cheaper valve will be produced for use in poor neighbourhoods. This is very different to the estimated £10 per cottage.

The consumer is entitled to an unrestricted supply by a pipe and fittings having half-inch waterway throughout, and only with his own consent may this be diminished.

The water companies were anxious that the new regulations should insure proper attention to purity of drinking-supply, and Mr. Muir in his evidence, p. 28, proposed a complete separation of drinking-water from every other supply, and wished to have a

special waste-preventing tap for drinking, with constant supply pipe to every house on a branch service, as a condition of the company's giving constant supply. The Committee, on the ground of economy, refused to entertain that wise suggestion, and the companies are now endeavouring to get separate cisterns for drinking-water, and all architects should support them on this point, as it is important for sanitary purposes. Inch and a quarter pipes are now specified by the regulations to be used in all service pipes between cisterns and closets, by clause 23. This is a valuable improvement, as it insures a good flush to water-closets, and the extra expense is not a consideration compared with the advantage gained by it.

Preferable, however, as the present regulations may be in certain respects to those that had been proposed, in some points the alterations made were not desirable. Some very proper clauses sought to be introduced by the companies in the interests of the public, as well as themselves, were struck out. In their clause No. 23, the companies had asked that all taps over sinks and drains should be waste-preventing ones. This was omitted, and the public are now at liberty to leave their taps open until the companies find them out, and this license alone will really prevent a constant supply being given to London, as more water will be wasted than used; for though the power to enforce constant supply existed by the former Act of 1871, and is completed by these regulations in July, 1872, the present sources of water supply would only remain thoroughly sufficient for London, under a constant system of supply, if waste be entirely prevented. Some such precaution as that asked for is therefore necessary, and the water companies called Mr. Lee, the architect of the Industrial Dwellings Company (page 77), who proved that 500 sets of rooms were supplied with Messrs. Tylor's waste-not taps, and that there was no waste of water, leakage, or overflowing from them, and that much cost of repairs for fittings had been saved by their introduction.

With regard to bath apparatus, a new condition (clause 26) had been proposed, namely, that all baths should be supplied from the top, to prevent their present liability to allow water to run to waste at the same time that it is being supplied. This appeared to entail much expense and inconvenience, and no article at that time had been put forward by any manufacturer which would meet the difficulties of the case, and therefore the conditions proposed by the companies that every bath should have an arrangement of valves, so that the supply could not be open at the same time as the waste, was not agreed to, and this very proper provision consequently was, after discussion, omitted from clause 26. Since that time, however, a very efficient apparatus to effect this proposed purpose, and one which entails no additional cost, has been invented by Messrs. Tylor and Sons.

With respect to warning pipes, the clauses 14 and 25 related to overflow pipes being also warning pipes. This was intended to have been made an important improvement for the prevention of waste, but in carrying it out in practice, the system of waste-preventing cisterns is liable to derangement, and in some cases the overflow or warning pipes from such cisterns are carried over the water-closet basins so as to insure attention in case of leakage. This provision of course becomes unnecessary if waste-not valves are used.

These waste-not valves, which are under pressure and perfectly sound, do away with all the difficulties, and are much cheaper and more easily fixed, and can be used under any pressure, high or low, which is very important, as the pressure often varies 50 per cent. from the rapid consumption of water at particular periods. If architects practising in London would promptly alter the wording of their specifications to comply with the new regulations, they would materially assist in

* The service cisterns here referred to were those which have been generally prescribed in the regulations of constant-supply towns. But the London companies did not desire to make them compulsory. On the contrary, they originally so framed their regulation on the subject, as to admit of the use of any good waste-preventing apparatus for closets.

the introduction of a constant supply which may soon become general in London, and protect their clients from future cost of alterations. Districts, indeed, have already been selected by the East London and Kent Companies for an early application of the constant supply system; and the New River Company have agreed with a Committee of the Corporation of the City of London, to provide an immediate constant supply to houses of the poor within the city bounds, as soon as the necessary fittings have been put in by the owners.

In some respects, London is considerably in advance of provincial towns. On page 131 of the Blue Book already referred to, it appears, by the statement of counsel, that in London there is a water-closet to every 6.33 persons, whereas in Manchester there is only one to every 53.44 persons, and in Salford there is only one to every 400 persons. If more stringent regulations as to the use of waste-not taps were made, and if architects would aid the water companies by introducing them into their specifications, in a few years London might be the town in which there was the most efficient, as well as the largest, supply in England, with the least waste, and carried out at the least cost. The companies are strongly recommending waste-not taps at the present time, for all purposes of water-supply, and it is a question whether the wording of the Regulation does not require the use of these "waste-not" taps as "the best form of screw-down taps."

The following are the principal points in the adopted regulations which seem to deserve the consideration of architects:—A single communication-pipe only permitted to each premises, which must be approved or will be executed by the Company; and one communication-pipe may serve for a group of houses the rates of which are paid by the owner. The connection may be made by ferrule or stop-cock, but should only be by the former, as the latter may leak under ground. The pipes external and through the walls of a house must be of lead, with wiped joints, sunk at least 2ft. 6in. underground (3ft. in depth, as was proposed by the companies, is preferable, and has been found requisite as a protection against frost in Manchester and elsewhere). Within premises, iron pipes are permitted, but are not desirable. The weight of lead service-pipes must be at least of the several weights per lineal yard specified, viz., 5lb., 6lb., 7½lb., 9lb., 12lb., and 16lb. to every yard for pipes of the respective internal diameters of ½, ¾, 1, 1½, and 2in.; but should rather be 5lb., 7lb., 9lb., 11lb., 16lb., and 22½lb. to every yard instead. Warning-pipes, however, which have open ends may be 3lb., 5lb., and 7lb. to every yard for internal diameters of ½in., ¾in., and 1in. respectively; but closet service-pipes are to be 1½in. diameter and 9lb. lead to every yard. Every communication-pipe is to have, near the point of entrance to premises, within or without, at the option of the consumer, a stop-valve of the screw-down kind, so as to enable the water to be turned off in case of repairs or in time of frost.

Cisterns, which are by no means to be superseded, are to have efficient ball-taps, but no overflow other than a warning-pipe, which must either be carried outside and exposed, or subject the consumer to inconvenience inside. This is, to my mind, the moot point in connection with the whole matter, and will entail much thought and contrivance on the part of architects. Draw-taps are in all cases to be "sound, suitable, and of the screw-down kind," and should be of the waste-not description; or, as pointed out, the constant supply cannot be given, or would prove a failure. It is compulsory that waste-not valves be fitted to all cisterns which supply either water-closets or urinals; and water-closets, urinals, &c., being in connection with foul drains, are only to be served with water through the intervention of a cistern (a very useful provision); and so long as this rule is obeyed,

waste-not taps may be fixed to any service-pipe from cisterns. Lastly, the companies will be bound to give constant supply through ½in. diameter pipes; and all existing fittings which are sound and efficient, and not required to be altered under these regulations, shall be deemed to be prescribed fittings, and permitted accordingly.

It cannot be denied that the benefits to be conferred by the proposed constant supply are by no means wholly of an unmixed nature. Trouble cannot but be apprehended in periods of hard frost. The necessity for saving water consequent upon it entails serious risk (through the abolition of waste-pipes other than drain-pipes) of premises being flooded. It is true, however, that the severance of such means of communication with foul drains has a compensating advantage. The constant liability to noise by night and day, instead of such being limited to a short period, as in the intermittent system, would be an evil which, in case of illness, might be troublesome, though this could be controlled by means of the stop-cock.

Still, as the Legislature has decided that the advantages of a constant and pure supply of water for the poor, and for the purpose of protection against fire, counterbalance the above-named disadvantages, and it is quite uncertain how soon the whole or a portion of the population must conform to the regulations laid down with respect to it, it is manifestly incumbent upon the profession to make suitable provisions for the protection of their clients from damage and expense in having to make alterations in order to conform thereto, which might otherwise be needless.

JOHN STUART MILL AND ART.

IN MEMORIAM.

IF it were asked on what special influence the future of the world and humanity is to rest, looking at things as they are now going on, it might be said, and indeed must be said, that it must needs be on the convictions and teachings of the political economist. Mystics, poets, philosophers, theologians, are doubtless all very well in their several ways; but the great practical and working fact remains—that the things of business—hard business—must and will be in the future regulated and guided by the thinkings and teachings of the political economists—of the Adam Smiths, the Ricardos, and the Mills of the past, present, and future, as each can successively add to the comprehensiveness and certainty of the most rigid of sciences. Nothing can be harder than it is. All is as fixed and immovable as the mathematics themselves. Accept an axiom, and you must needs go on and accept another, and you must take all that follows from them. Nothing is apparently missed, and the whole fabric holds together like a well-built house—a real, useful, practical object. But—and there is always, happily, a *but* in almost everything—is *mere usefulness* in an object all that is to be desired in it? It is a subject of the last degree of importance in this practical age, and one that just now presses on one with some force from the fact of the national loss—for a nation's loss it is—of one of the greatest expounders of politico-economical science, John Stuart Mill. We would say a few words, if only in memory of this good and clear-headed man, and on his relation to fine art, as it influences—whether they will or no—human beings generally all the world over. Mr. Mill was not simply a hard political economist; he had no small share of that in him which we may call here the "imaginative faculty," infinitely more so, indeed, than many of those who profess to be guided by it, and who contrive, somehow or other, to live on it. Mr. Mill's relation, therefore, to fine art, while thinking as a political economist, is worth a passing thought.

Let us define one or two elementary propo-

sitions. There can be no doubt as to the value of bare *utility*—the simply useful—and that man, when he began to build, must have bethought himself mainly, if not solely, of the simply useful. Ornament, or the effort to add beauty, must have sprung up afterwards. It is a somewhat curious thing to think of; all the savage tribes of men with whom we have come into contact must needs have started with the production of the simply useful, adding ornament, or the beautiful, afterwards. It remained for what has been called "Barbaric" times to work the useful and the beautiful at the same time—all the objects produced by men in such a phase of existence evidencing the action of both the useful and "ornament"-producing faculties. In these civilised days, wherein the mechanical powers are made to do so much work, it would almost seem as if men were not a little inclined to go back to that system which produced the simply *useful*, for in all purely engineering works, except by accident, and after additions, the purely useful alone is sought after or thought about. It is the same in matters of political economy, and with all which the political economist has to do. It is the production of the useful that he, in the main, thinks about; appearing to regard the production of the beautiful almost as though it were a waste of the productive powers of man. "Why," some of them have said—to put an extreme case—"Why occupy ground as a flower-garden, producing, as it can do, nought but *pretty* things, but useless, while the same ground might be so *usefully* occupied with food-producing grain, or potatoes—things necessary and useful? Why sacrifice the useful to the beautiful?" The late Archbishop of Dublin, Whately, sometimes put this proposition in very striking ways. Generally, he thought that of all the waste of time and materials which could well be, the very greatest was that in which so much of labour and time and materials were spent in the production of objects which were to pass away almost momentarily, as fireworks—so much profitless labour. An ornamented cake was another of his aversions, only to be eaten, and the *ornament* thrown away. Whately was a rigid political economist, and came down sometimes very hard indeed on the Ricardos and Mills of the economical world. Generally we may say that the political economist is averse to expending energy on the production of the merely eye-gratifying sense of beauty *per se*. But Mr. J. S. Mill was certainly an exception to this hard rule. Mr. Mill must have had a very keen, though perhaps humble, sense of the beautiful. He was a botanist, and his great delight at Avignon was in the collecting and arranging of humble *wild* plants—not cultivated flowers, but modest wild plants. This is worth noting. A person must be dull indeed who does not perceive the beauty of the full-blown rose; but to see into the beauty of wild flowers and weeds demands a deeper faculty, and a longer time to exercise it in; for such modest beauty demands time and a high faculty sometimes to see it at all. It has always seemed to us that this love of humble botany, side by side with his high philosophical and economical studies and speculations, formed a singularly touching trait in the amiable character of the great economist who has just passed away. It should be interesting to the artist in these days of "precedent," for the time may come when even the wild flowers of the earth may find a place in high art—perhaps in architecture! Mr. Herbert Spencer says that in Mr. Mill's mind, emotionally considered, the higher sentiments were unusually predominant, and it must have been so; for to see into, however dimly, the more hidden beauties of an infinite nature, most surely demands them in all their power. He arranged and collected these almost-hidden, but if closely looked at, rarely beautiful objects, with a real and earnest love for them, and with a keen appreciation of

their beauty and never-ending variety. It was really the communing of a great mind with Nature herself when and while at her own work, uninfluenced and unalloyed by the artifices of cultivation and the too often spoiling hand of man!

But now of Mr. Mill's great book—artistic book—"On Liberty." In this admirable book Mr. Mill has had mainly in view to point out the all-comprehensive value of "*individuality*," and the danger there is in these days of combination and united effort, of the loss of the individual in the mass. He has named this book "*On Liberty*," a phrase a little ambiguous perhaps, but liberty it means, in the widest and most gloriously useful sense of that word. Mr. Mill inculcates in this book the all-comprehensive doctrine of individual liberty; we must repeat the word, *individual* liberty of thought, and word, and action; and he shows that to develop human character it is necessary that the individual should work out his own destiny in his own way, and not as a mere copy of the "*society*" about him. It would be impossible to conceive a subject more important to the future of humanity than this, and we would willingly dwell on it, but it must be in its *artistic* bearings that it is here of interest and importance. We do not think that the phrase "*fine art*" occurs once through the whole of this famous essay, nor has Mr. Mill indicated in any way its bearings on art and art action; but the truth is that it is here that the great principle he inculcates finds its highest—certainly one of its most useful—applications. It will one day, perhaps, make this essay the text-book of the artist. For art, in its true sense (to exist at all, as we have always contended) must be the product of individualism, and the artist must be at *liberty* to work out his own thoughts in his own way; for it is not until you see the artist's individual work, whatever it may be, that you can get at the artistic power that is in him. It is not, as is now thought, in these art-manufacturing days, that a great picture can be produced by the combined efforts of many under one direction, thus destroying the individualism of each subordinate artist; it is by giving to each man his own proper work to do, and by leaving him at liberty to think and work it out in his own way, that real and *bonâ-fide* art is to be produced. There is no other way. And Mr. Mill has shown in this book, that to get at individual character you must give the individual *liberty* to develop it—*i.e.*, in his own way, and not as the mere follower and imitator of the little group of people who may happen to surround him. Nothing can possibly surpass the importance of this principle, and Mr. Mill has developed and worked it out in this book in a truly masterly way. It is not too much to say that, as a rule of conduct in life, it is the most important book that has been given to the world in this our generation; and that to go by it, whether as artist or no, is to unfold one's own character naturally, and usefully, and strongly. To the true artist, it must be all in all, in exact proportion as he makes it his own, and is guided by it, and wills to work according to it.

Much more, indeed, might be said on this fruitful theme; but there is one thought of our philosophic thinker which has not a little to do with art and artists. It occurs, we think, in the Political Economy—a little out of place, one would have imagined, but not the less valuable and poetically true on that account. It is a real and true artistic idea. It is this: that it has been so ordered in the nature of things, and of creation itself, that the whole of the earth's surface, every nook and cranny of it, *cannot*, happily, be cultivated, and brought under the dominion of utility. It is good, says this philosophic thinker, that there are solitudes on the face of the earth, places that cannot be cultivated or built upon, or "*utilised*" in any way. It is indeed so. Nature will not, cannot, altogether abandon the world to the artificial. Mountain-tops buried in

clouds, and clothed in eternal ice, remain so everlastingly. Whole tracts, as he says, of hot and barren sand cannot be brought into subjection, and laid out in potato-fields. The Polar ice defies and shuns even the eyesight of man, and will not reveal the secrets of its solitary and silent existence, and it is in scenes like these alone that the highest artistic power finds its truest and its greatest work, and its sublimest inspiration. This was indeed a fine thought of this gentle and good man, and shows that the "*hard and dry*" of political economy could not quench the poetic fervour of his nature. C. B. A.

A SCIENTIFIC COLLEGE.

SIR JOSIAH MASON, who has already built and endowed an orphanage at Erdington, near Birmingham, at a cost of more than a quarter of a million, has now arranged to erect and endow a Scientific College in Birmingham, on which will probably be expended at least an equal amount. All the arrangements for this munificent gift have been completed. The site has been secured, and the deed of foundation duly enrolled in the Court of Chancery, from which, and other sources, we gather the following account of the objects and intentions of the founder. The first clause in the deed furnishes us with a brief sketch of the founder's life. From this we learn that he was born at Kidderminster (February 23rd, 1795), and from his earliest youth was engaged in earning his livelihood. He was first a shoemaker, then a baker, and then a carpet weaver at Kidderminster. At the age of 20 he went to Birmingham, where, until he was 40, he was a jeweller and gilt-toy maker. He was then introduced into his present business of steel split ring and key ring making "by his good friend Samuel Harrison, the first inventor of steel split rings." Mr. Mason states that this "introduction was the foundation of all his subsequent worldly prosperity." Having succeeded to this business, he added to it the manufacture of steel pens, "both of which businesses he hath ever since continued." In 1842 he entered into partnership with Mr. G. R. Elkington, as electro-platers and gilders, under the firm of "Elkington and Mason," and then in the business of copper smelting, under the firm of "Mason and Elkington." This partnership was dissolved on the 11th of January, 1858. During his long experience as a manufacturer, Mr. Mason became deeply convinced of the want of, and necessity for, "thorough systematic scientific instruction, specially adapted to the practical, mechanical, and artistic requirements" of the Midland district, and this want he has determined to devote a portion of his remaining property to supply. With a feeling which is alike honourable and natural, he has provided that its benefits shall be bestowed upon certain pupils of his orphanage, and on persons born in Kidderminster, the place of his birth, and in Birmingham, the town in which he acquired his wealth, his object being to connect the college with the orphanage, and to commemorate his own connection with the two places named. The institution is to be called "Josiah Mason's College," or "Josiah Mason's College for the Study of Practical Science." A preparatory school may be added to the college, and the instruction to be given is strictly confined to subjects specially adapted to the "practical, mechanical, and artistic requirements" of the Midland district, more particularly the boroughs of Kidderminster and Birmingham. Regular systematic instruction is to be given in mathematics, abstract and applied; physics, both mathematical and experimental; chemistry, theoretical, practical, and applied; the natural sciences, especially geology and mineralogy, with their application to mines and metallurgy; botany and zoology, with special application to manufactures; and physiology, with special reference to the laws of health. This last provision will make the Rev. Canon Kingsley's heart beat with joy. The English, French, and German languages will also be taught, and we trust that Spanish will be added. The trustees have power to include mechanics and architecture and all other subjects necessary to carry out the objects of the founder. Mere literary education and instruction are excluded, as well as all teaching of theology and subjects purely theological. These limitations are declared to be "fundamental" and absolute. And no principal, professor, teacher, or other officer of

the college is ever to be called upon to make any "declaration as to or submit to any test whatever of their religious or theological opinions," nor are these in any wise to be considered either as qualifications or disqualifications for holding any office, fitness to give the instruction required being the sole and only test. Provision is also made for giving lectures and opening classes for popular or unsystematic instruction, at which the attendance shall be open to all persons, "without distinction of age, class, creed, race, or sex." The admission of regular students, when properly qualified, is provided for in the following manner:—Preference to be given to candidates, "otherwise eligible," who have been, or are at the time, inmates of Josiah Mason's Orphanage. These students will be classified as the "Orphanage Students." If at any time these form one-fifth of the number of regular students, then preference shall be given to candidates born in Birmingham and Kidderminster, in the proportion of two to the former place and one to the latter. Although no students are to be selected who are not wholly or principally dependent on their own skill and labour for a livelihood, or upon the support of parents or other persons, the founder is particular in dispelling the supposition that the poorer classes are to be considered as having any exclusive right to the benefit of the institution. His object being to promote the prosperity of the manufactures and industry of the country, especially of the two towns so frequently named, the college will be open to qualified persons of all classes who have to rely on science, art, or manufacture for a livelihood, "especially the more intelligent youth of the middle class." Provision is also made, when the funds permit it, to provide instruction for females as well as males. The other clauses of the deed, which altogether number 83, relate to the practical management of the college, specify the nature of the property forming the endowment, and regulate the appointment of trustees and officers. In the last clause power is taken to apply for a Royal Charter or a special Act of Parliament for the incorporation of the trust. The site selected for the college is in Edmund-street. It is in the centre of the town, and close to the town-hall, the Centre Free Libraries, the Midland Institute, the new Post Office, and the proposed Corporation buildings. The land is therefore of the greatest value, and the generous founder has already laid out upwards of £20,000 on the site. He has also conveyed landed property producing about £600 a year, and there is a clause in the deed in which he states it to be his intention to devote by his will more additional funds for the use of the college. The total amount of this noble endowment cannot, therefore, be positively stated, as it will, of course, depend upon circumstances. Enough, however, has already been done to render the "Josiah Mason College" one of the most princely gifts yet made to posterity in England by any of her wealthy sons.

METROPOLITAN IMPROVEMENTS.—The Vestry of S. Marylebone are about to consummate a long-projected improvement at the east end of the parish by the continuation of High-street and Thayer-street through James-street to Wigmore-street, and so on, to Oxford-street, thus clearing away a *cul de sac* in James-street, long a squalid, dirty locality, and a source of great nuisance to the neighbourhood, and opening out a line of thoroughfare from the Regent's Park and Marylebone-road to Oxford-street. It is proposed to construct the street 60ft. in width, and lay out the surplus land suitably for private residences of first-class character, embracing all the modern requirements, being erected upon it. The works will be commenced immediately, under the direction of Mr. Eales, the architect, and an early completion of this important improvement may now be looked forward to. The Vestry have also under consideration a plan by Mr. Eales for another very great improvement at the west end of the parish, long needed, by the levelling-up, widening, and opening out Little James-street—or "*Little Hell*," as it is more familiarly known in its locality—also Charles-street, Lisson-grove, into Devonshire-street and Salisbury-street, making a continuous thoroughfare from the Marylebone-road to New Church-street, and opening out the east end of Manning and Suffolk-places. This, with the new schools about to be erected by the London School Board in Bell-street, will be one of the best improvements, morally, socially, and sanitary, that has lately been projected in the Metropolis.

OUR LITHOGRAPHIC ILLUSTRATIONS.

PROPOSED CHURCH OF S. MARK, SOUTH SHIELDS.

Among our lithographic illustrations will be found a perspective view and plan of a competitive design for this building recently submitted by Messrs. Sulman and Rhodes, of Basinghall-street, City. Although there is nothing particularly original architecturally in the design, we think it a good attempt at church-planning for congregations. On the plan may be seen the arrangement of seats usual in churches; everyone has a clear view of the pulpit, and also, all but a few near the vestry and organ, of the altar. Ample and clear means of entrance and exit have been especially provided, an arcaded narthex being arranged for this purpose. Seating is shown for 530 people, exclusive of choir stalls; 20in. is the ample allowance given to each person, the seats being 3ft. from back to back. The walls are of random-coursed stone, with freestone dressings, and the roofs covered with Westmoreland slates.

PRIMROSE-HILL SCHOOLS, FOR THE LEEDS SCHOOL BOARD.

These schools will be completed in August, and are the second schools erected by the Leeds School Board on the broad system, and the only schools two stories in height built by the Board. The length of each school-room is 41.6ft., and the width 30ft. There are three classrooms to each department, which accommodate half the full number of children, and the average is 10ft per child in school and classrooms. The accommodation is for 700 children. There are covered playgrounds under the classrooms on the upper floor, and the usual conveniences in the yards. The materials are red brick, with stone dressings. The cost of the buildings will be about £6000. The architects are Messrs. William Perkin and Sons, of 20, Park-square, Leeds.

S. MICHAEL'S CHURCH, BOURNEMOUTH.

In reference to this church, an illustration and plan of which appeared in our last impression, Mr. Norman Shaw writes:—

"I really have nothing to say about the Bournemouth Church. It is to be a very simple, commonplace thing—trusting to its size and proportion for any dignity it may have—which won't be much. I am just off for a very small holiday.

"The church is about to be erected on a site on the West Cliff. The materials will be mainly concrete and Bath stone; the concrete arranged with thin courses of stone at intervals. From the exposed nature of the situation, it has been considered desirable to keep the general character of the work very plain and simple.

"R. NORMAN SHAW."

CHURCH OF S. WILFRID, YORK—DETAILS OF STALLS.

We give this week the concluding sheet of our series of illustrations of this church. The sheet this week consists of details, which are carved in oak. The angel finials are represented with musical instruments, and the terminations of the bench-ends symbolise Evangelists. They were executed by Mr. Hayball, of Sheffield, from drawings by the architect, Mr. Geo. Goldie, of Kensington-square, London.

DOMESTIC PLATE.

We illustrate this week a number of designs drawn by Mr. J. Moyr Smith for Messrs. Cox and Sons, for domestic plate, with a Gothic feeling to rival, as prizes for races and as ornaments of the table, the debased Classic plate so generally used. Enamels, opaque or transparent, are intended to be introduced, by the *champlevé* process.

S. GREGORY'S CHURCH AND MONASTERY, DOWNSIDE, NEAR BATH.

We give a double-page N.E. view of these buildings. The Downside Monastery is a large establishment for the English Benedictines attached to their college; the monastery proper has been till now a temporary one in the "old house."

The floor of monastery is on a level with the first floor of the college, and the cloisters continue all round on that level. The west-wing contains the calefactory and lecture-rooms on ground floor, and cells on the upper floor. The church occupies the north-side of quadrangle, and the east wing contains sacristies, chapter-house,

prior's rooms, guest-rooms, entrance, and the monks' refectory. The large gable running east and west at this point is the boys' refectory, and the buttery is placed so as to serve both. There are cellars and offices under the boys' refectory, and a dormitory above. The kitchen and servants' offices run west from here. The remaining portion of the new building is an enlargement of the college, with a dormitory the entire length of the top story. The library is a separate building, and only connected by a low cloister. The church consists of nave, choir, and sanctuary, 180ft. by 28ft. in the clear, with a continuous arcade, and groined in stone. The aisles run round the apse, from which open eight chapels besides the Lady chapel, which will be very beautifully carried out, and a chantry in north transept to the late Right Rev. D. Morris, O.S.B., Bishop of Trebizonde, who is buried at Downside, and will be translated to a tomb in the north wall. The south transept contains the organ, which will be played from the choir. The tower and spire are at the end of this transept and stand out clear into the quadrangle. Every preparation is being made to groin the cloisters, though the groins will not be put in at present.

The plan of this monastery is an attempt to revive something of the arrangements carried out in Mediæval buildings, and the church especially is treated so as to keep up a severe monastic character, and to gain that solemn effect found at Tynemouth Priory and other north-country work. The exterior of the buildings is being carried out with sawn range work, of Doulting stone, in moderately thin courses, laid with a thick mortar joint. Messrs. Barnsley and Sons, of Birmingham, are the contractors, and Messrs. Dunn and Hansom, of Eldon-square, Newcastle-upon-Tyne, the architects.

THE ARCHÆOLOGY OF ROME.

THE WALL OF AURELIAN.

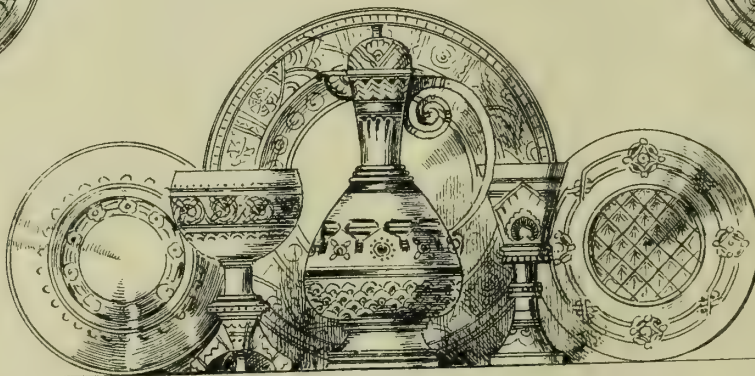
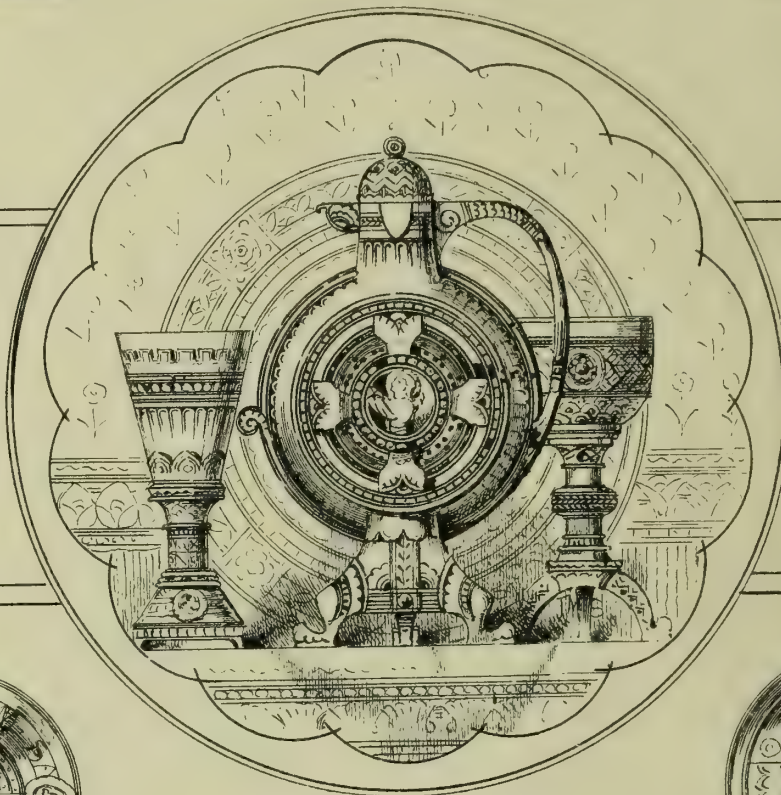
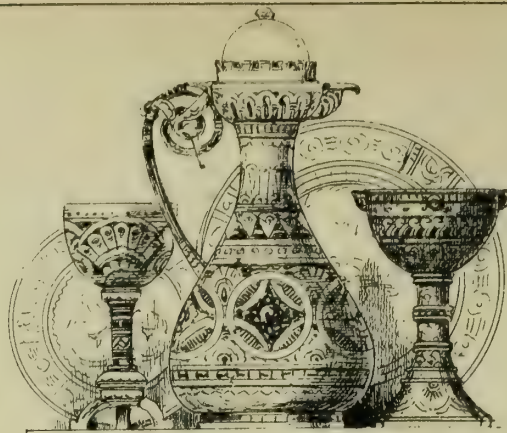
MR. J. H. PARKER, C.B., in his second lecture on the Archæology of Rome, delivered at the Royal Institution on Tuesday week, resumed his account of the third wall—that of Servius Tullius, which was seven miles round, and inclosed the seven fortified villages in one city. The remains of this are disappearing day by day, through the progress of building, but one important part remains tolerably perfect—the horn-work at the east corner of the city, on which the house of Sallust was built, which was the weakest point in the defence of the city, and where it was frequently taken. After the successful rebellion of Brutus, the people refused to continue the enormous labour requisite to carry out the wise plans of the kings, which would have made Rome virtually impregnable for a thousand years. Careful examination of the foundations shows that this wall was built upon older earthworks. Mr. Parker then proceeded to describe the fourth wall of Rome, usually called the wall of Aurelian, thirteen miles long, and 50ft. high, built upon the old earthworks, or *mania* of the third wall, in the third century of the Christian era. This wall contained corridors for the sentinels, and towers at equal intervals. It crossed the river, and included two forts, the Janiculum and the Hadrianum, now the Castle of S. Angelo, which appears to have been connected with it by a covered way. At the time the wall of Aurelian was built, Mr. Parker said there was as much difference between the "City" of Rome and Rome as between the "City" of London and London; but the time may come when the boundaries of the City of Rome will be enlarged, as those of Paris, to the outside boundary of the houses. Several of the existing gates appear to be older than the wall, and inscriptions term them "restorations," probably made in the time of Sylla, who enlarged the *Pomœrium*, the space between the inner and outer wall, chiefly occupied by public gardens and baths. The inner wall was the municipal boundary, also enlarged by different emperors. In Pliny's time there were thirty-seven gates (eighteen in the outer wall, twelve in the inner one, and seven which, he says, "have ceased to be"). Gateway fortresses, added by Stilicho in the time of Honorius (A.D. 400), were rebuilt by King Theodoric, a great benefactor to Rome. The portions of this wall, afterwards destroyed by the Goths, were restored by successive Popes, especially by Leo IV., who added the "Leonine city" to protect the Vatican and connect it more closely with the fortifications. For the later Popes, we have the numerous inscriptions on the parts of the

wall which each erected. The lecture (which was amply illustrated by plans and photographs) was concluded with interesting details of some of Mr. Parker's discoveries of remains of the ancient streets, market-places, and other buildings.

TASTE AND ARTISTIC JUDGMENT.

PROFESSOR SIDNEY COLVIN, M.A. (Slade Professor of Fine Art at Cambridge), recently lectured at the Royal Institution, "On the Limits of Certainty in Taste or in Artistic Judgment." He began by alluding to the difficulties which beset persons who desire to agree in their opinions on art, and the little help afforded by the ordinary definitions and canons. Taste, he said, is the sensibility or sum of sensibilities within us which receives pleasure from the visible work of man's hands, and these differ. Scientific men, who are so familiar with exactness, undervalue art and its rules for their uncertainty, but the nature of the studies is essentially different. Art deals with feelings, not with facts. Visible objects are studied, and it is required that our powers of seeing and observing should be just and vivid; but there are two modes of doing this, and each sensation of sight has the property of awakening feeling within the mind and that of setting the mind to compare and judge. The artist cannot see without beginning to enjoy; the physicist cannot see without beginning to reason. Thus the judgments of artists are merely the expression of their pleasures, and therefore differ. A picture is admired by different spectators for very different reasons, and the more complicated it is the more multifarious are the sensibilities excited. Poetry is more immediately and unanimously appreciated than fine art, and yet it deals with things at a remoter distance from sight and touch; so that we agree about the description of pleasures, yet differ about the enjoyment. Reynolds divided the legitimate kinds of beauty into two—one which is permanent, which he identified with nature; the other transitory and changing, which he identified with fashion or custom. To the permanent and standard nature, which the consenting common-sense of mankind has established, he says, you must look for your standard, and not to individual examples in actual nature. This, Professor Colvin said, is an ideal conception, whereas the conception of nature, as a thing to be studied, imitated, and adhered to scrupulously, is an essentially real conception. The artistic sense of man, in various races and ages, has preferred and pursued very different classes of observations; and it is to the active and ingenious powers in the race and age being set on to produce according to the preference of the sensitive and enjoying ones, that we owe those arts in which the modes of interpreting nature and feeling beauty vary widely. From the study of these a formula of experience, including all kinds of beauty, may be obtained; but it will not help us in the actual exercise of artistic judgment, and the strict analysis of a work of art by the rules of the sciences involved in it, however curious, would afford us no help for the action of taste. Taste works by direct and intuitive decision upon the merits of each case. The whole sum of powers which coalesce within us to form a taste or aptitude for artistic judgment takes cognisance of the result of the activities which have gone together to produce the work of art submitted to judgment. There are two constituent groups of powers in us—the one constitutes the sense or feeling of what the work is like, and the other the knowledge of what it means and tells. The only exactness or certainty of which artistic judgment is capable comes from the conjoint operation of these two groups of powers acting together in equal perfection—the sense which apprehends the least subtleties of beauty, to be trained by attention; and the knowledge which informs us upon the vital force and shades of meaning behind the beauty, to be trained by culture of all kinds. From these is derived true artistic judgment, the appreciation of good work and intolerance of bad; and from these will arise forbearance with differences in taste in what is really good art.

The rector and churchwardens of Guisborough Parish Church, having in contemplation considerable alterations in the church, have called in the services of Mr. C. Noel Armfield, of Whitby (diocesan architect), whose report and designs are now under consideration.



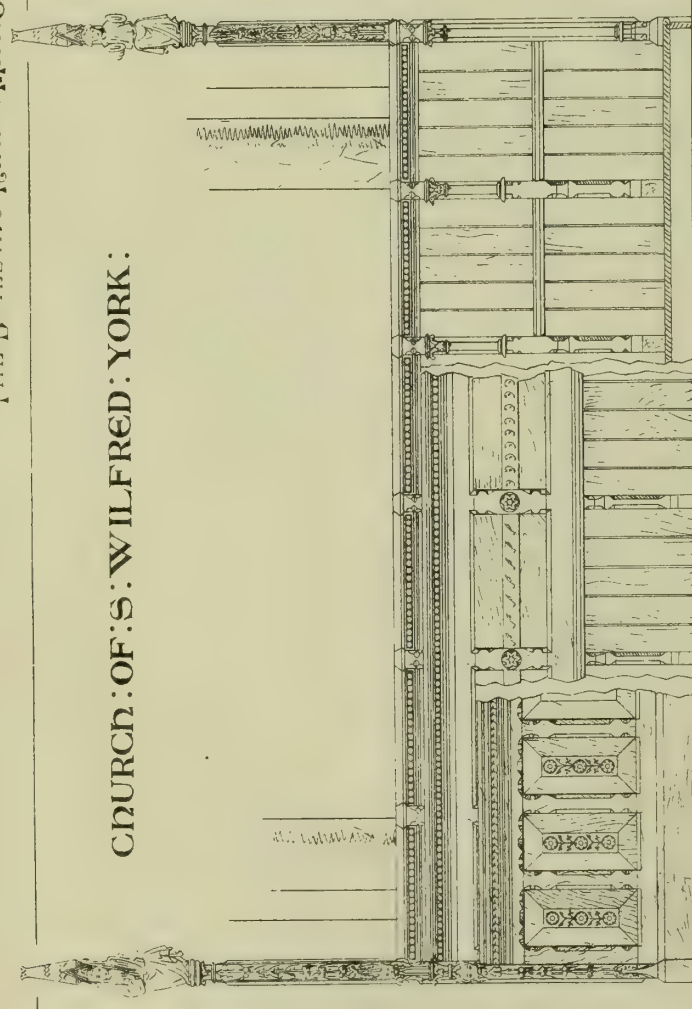
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DOMESTIC PLATE

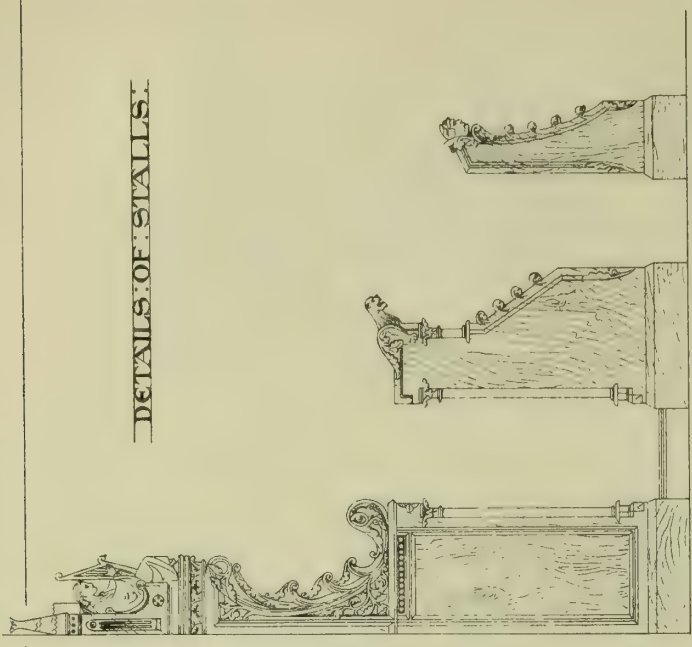
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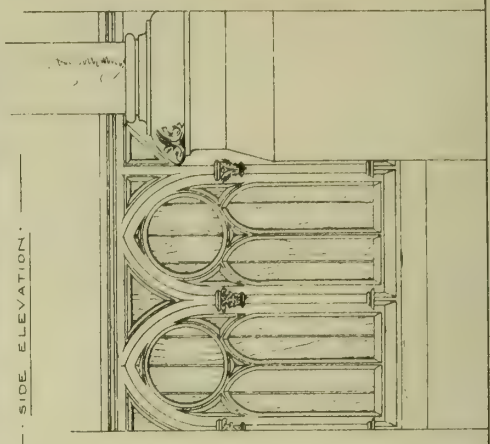
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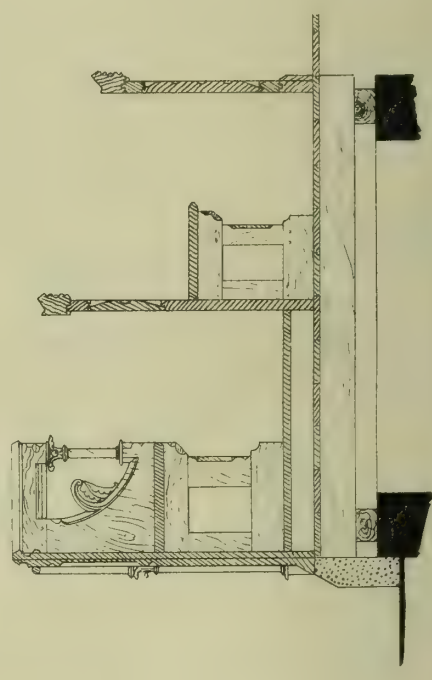
DETAILS OF STALLS.



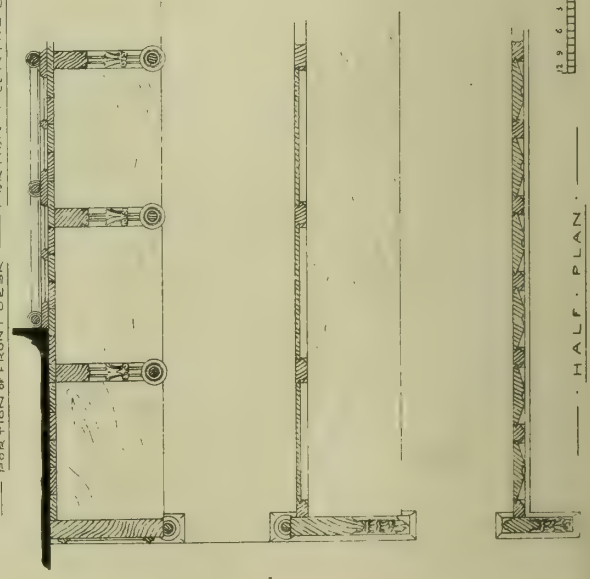
SIDE ELEVATION.



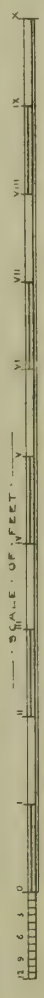
HALF BACK ELEVATION.



SECTION.



SCALE OF FEET.



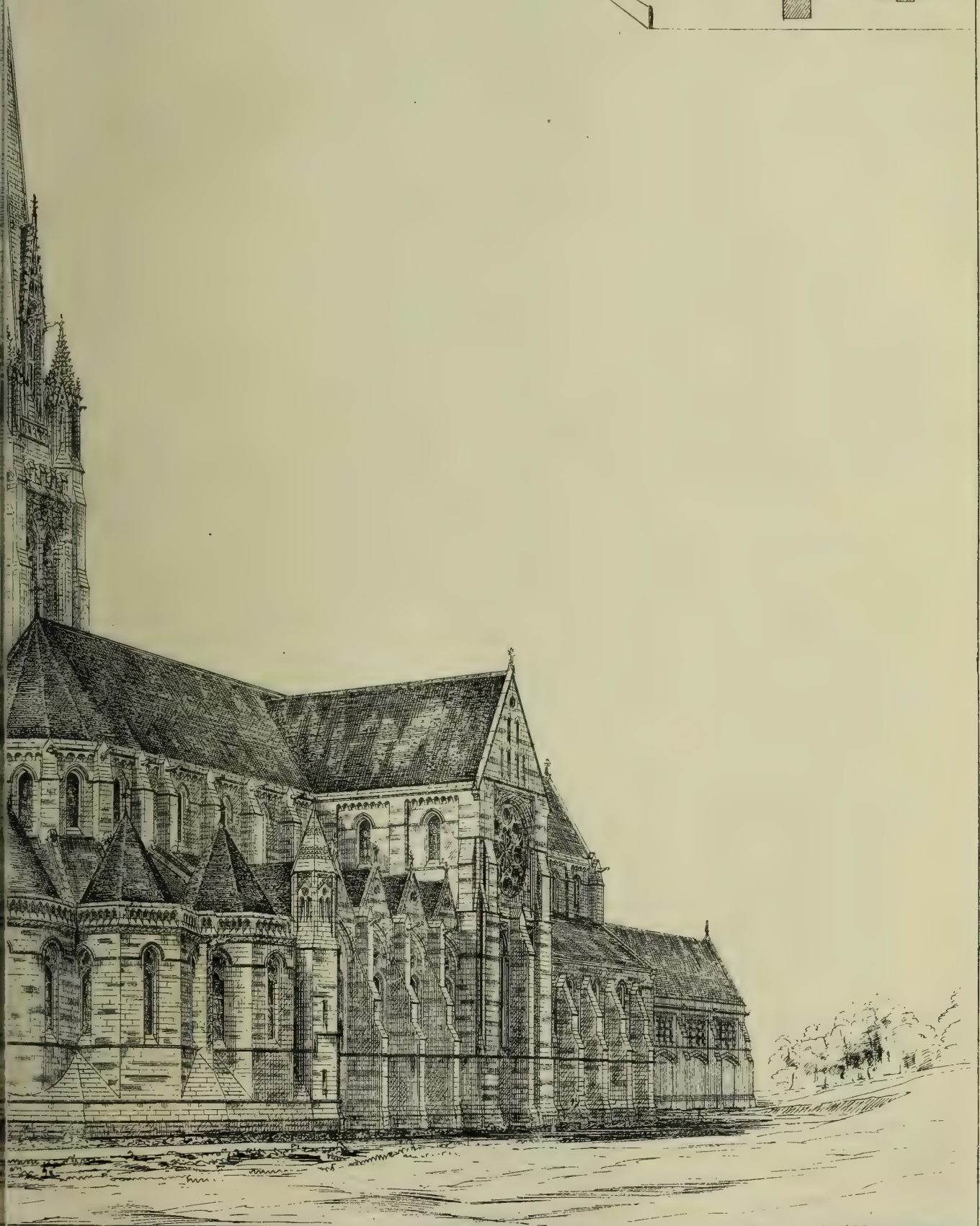
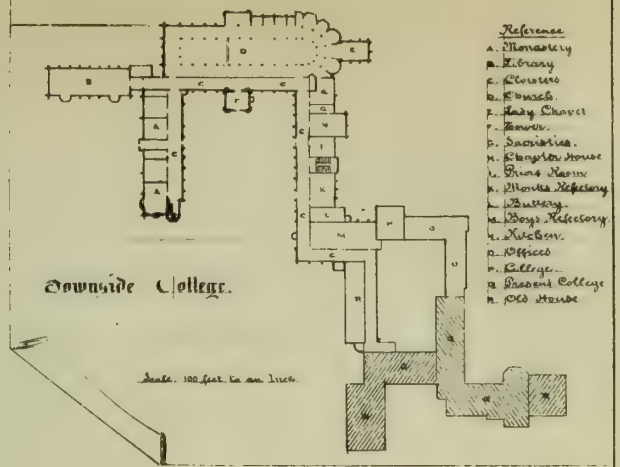
HALF PLAN.

GEORGE GOLDIE ARCHITECT.



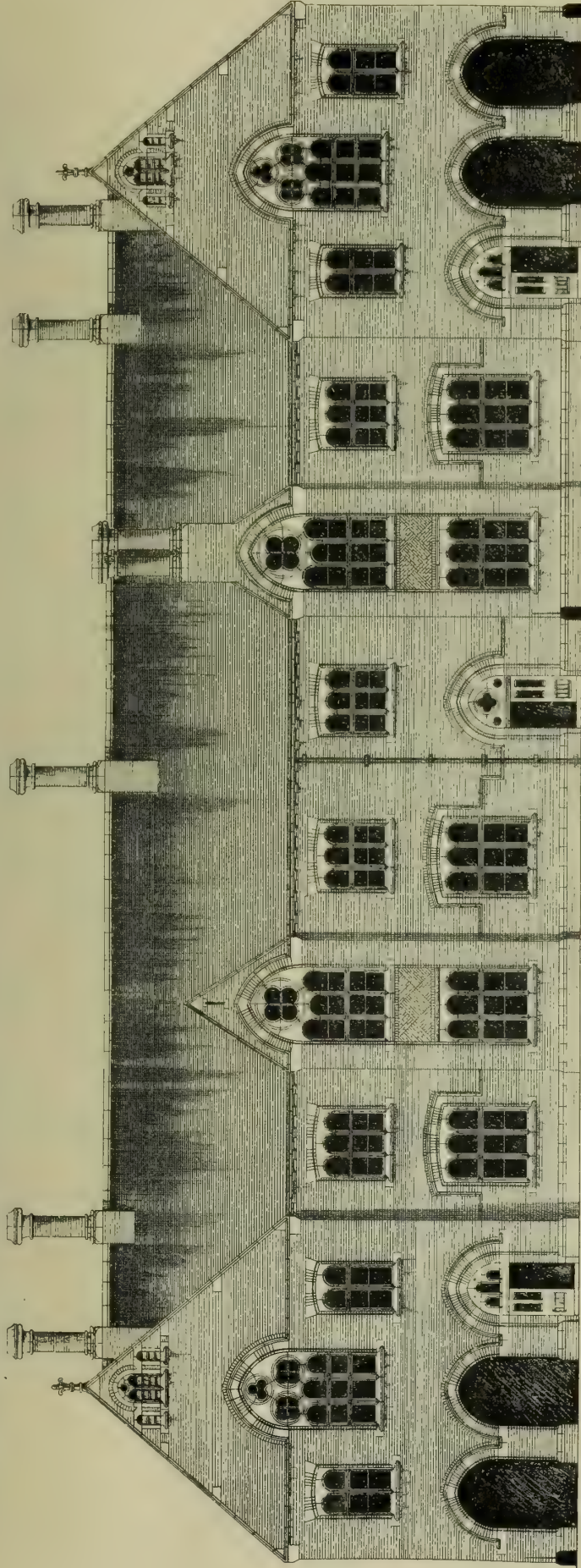
☞ Sancte ☞ Pater ☞ Benedicite ☞ Ora ☞ pro ☞ nobis ☞ || S^r GREGORYS CHURCH and MO

Whitemar & Piss. From a drawing by the Queen, 23rd Helborn, London.



THE BUILDING NEWS, MAY. 30. 1873.

Leeds School Board. Princess Anne School.



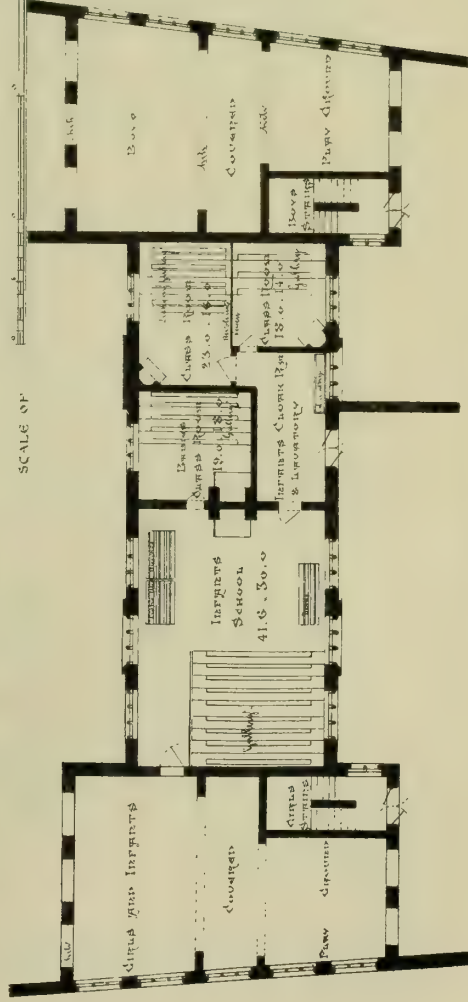
Girls

Boys

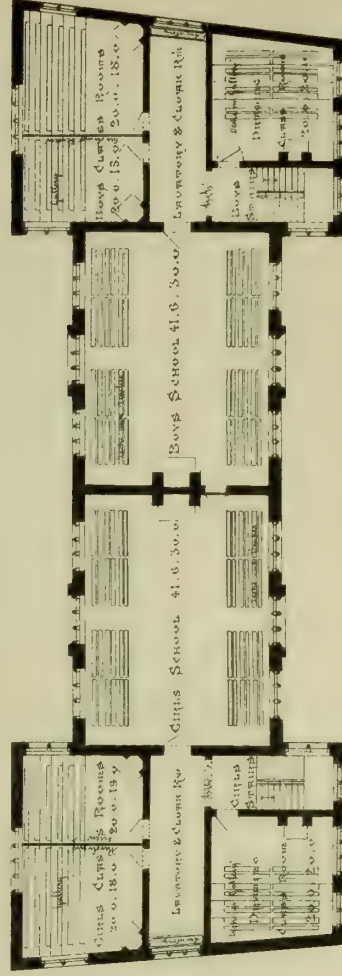
Boys

SCALE OF

FEET TO ELEVATION



Lower Floor Plan



Upper Floor Plan

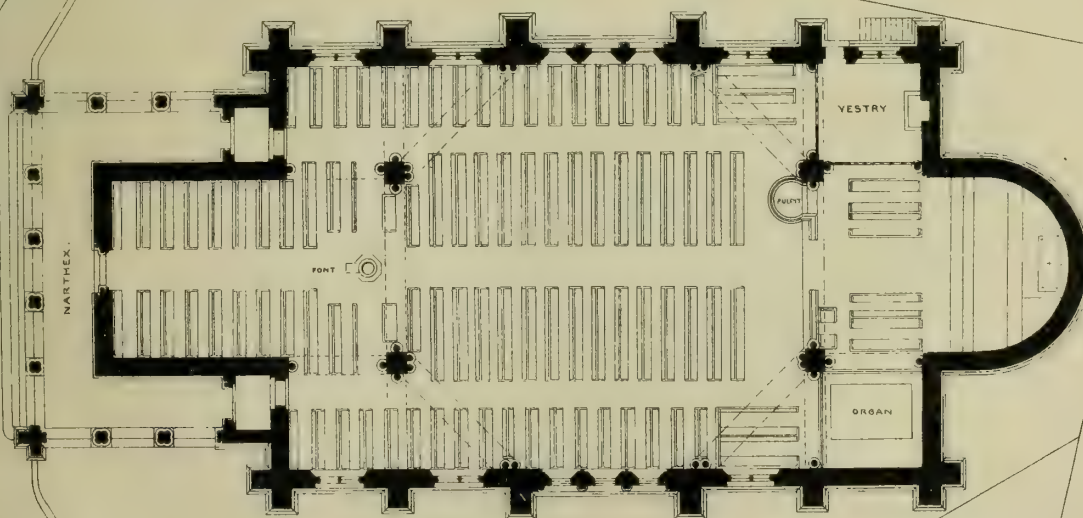
Wm. Parkin & Sons. Architects.
20 Park Square. Leeds: 1873.

PHOTOGRAPHED & PRINTED BY JAMES ARNOLD, 51 GRAFTON ROAD, W.C.

COMPETITIVE DESIGN FOR PROPOSED
CHURCH OF S. MARK SOUTH-SHIELDS



Perspective View



Ground Plan

Sulman and Rhodes
Architects LONDON

SCALE OF FEET
0 10 20 30 40 50 60 70 80

VISIT OF THE ARCHITECTURAL ASSOCIATION TO S. PAUL'S CATHEDRAL.

ON Saturday afternoon last, at 3 o'clock, a very large number of the members of this Association met at the north door of S. Paul's Cathedral, it having been announced that Mr. Penrose, the respected "Surveyor to the Fabrick," had promised to conduct them over the most interesting portion of the building. Proceeding first of all to the choir, Mr. Penrose explained the alterations which were effected ten or twelve years ago, in order to bring the Communion-table further westward. Before these alterations the Communion-table was placed in the apse. The removal of the Communion-table had necessitated the removal of the stalls two bays further westward. The next step was to divide the organ, which was originally carried on a screen across the entrance to the choir, and to place it half on one side and half on the other, so as to allow of an uninterrupted view being obtained from end to end of the building. Some of the carving in the stalls, especially that in the long frieze in the centre, was pointed out as some of the most celebrated of Grinling Gibbons's work. Some new work at the west end, in order to complete the stalls up to the organ, was next pointed out; this new work is of course in harmony with the older portions of the stalls, and is very well executed. Bishop Blomfield's tomb, on the south side of the choir, was hurriedly glanced at, and the visitors next proceeded to the nave. Mr. Penrose remarked that Sir Christopher Wren's first design for this portion of the cathedral provided for five arches in the nave, neither of the present side chapels forming part of his plan; but these chapels being specially required by the Duke of York (afterwards James II.), Wren altered his plan to three main arches and two larger compartments, one giving access on the north to the "morning-prayer" chapel, and that on the south leading into a chapel which was used as the Consistory Court, but in which is now being erected the apparently (at last!) soon-to-be-finished monument to the Duke of Wellington. The north recess has been devoted to the purposes of a "morning-prayer chapel" ever since the completion of the cathedral, and is still used for that purpose. Some attempt at decoration is being made on the east wall of this chapel, the whole of the space being divided into panels by gilding, it being intended to fill up the panels with paintings—these arrangements being made, as we understand, quite irrespective of the proposals now wholly or partially before the public for the decoration of the whole of the interior. The fine brass candelabra suspended from the roof of this chapel, came from the lately-demolished church of S. Mildred in the Poultry, and was the gift of Mr. Banting. The Consistory Court having ceased to require the use of the south chapel, or recess, in consequence of great alterations in the law business connected with Doctors' Commons, it was determined to utilise this recess by erecting in it the Wellington monument, which is now very nearly completed. This monument (originally designed for a position under one of the great arches of the dome), is entirely of white marble and bronze. The marble framework of the monument is all fixed, and a great deal of the bronze work also. The monument will be a very fine work in the Cinque Cento style, the sarcophagus being supported on pedestals between columns of white marble sustaining an entablature surmounted by a group of sculptured figures. At either end of the monument will be allegorical groups of three figures each. The monument is being erected from a design submitted in competition by Mr. Alfred Stevens; but the work having proceeded very slowly for some years past, in consequence, among other things, of the sculptor having sustained a paralytic stroke, the Government last year took the work out of Mr. Stevens's hands, and entered into a contract with Messrs. Collmann & Co., of George-street, Portman-square, for the completion of the work. It is satisfactory to know, however, that the work will not suffer by this arrangement, for although Messrs. Collmann are responsible for the completion of the work, they are employing Mr. Stevens to finish his own work. Proceeding to the crypt, the visitors looked with interest, not to say reverence, on the tomb of Wren, the great architectural genius to whom the design and construction of the Cathedral were due. Close adjoining, the tombs of the accomplished Professor Cockerell (the predecessor and nominator of Mr. Penrose as "Surveyor to the Fabrick"), Sir Joshua Reynolds, and J. M. W.

Turner were pointed out. The Duke of Wellington's tomb was then visited, Mr. Penrose remarking that the large sarcophagus of red (Cornish) porphyry in which the mortal remains of the "Iron Duke" are contained was cut out of one single block. Nelson's tomb, which occupies a position in the crypt immediately beneath the centre of the dome, was next visited, Mr. Penrose remarking that the surmounting sarcophagus was brought to England by Cardinal Wolsey, who intended it for his own tomb. This sarcophagus does not contain the body of Nelson, which lies below. The visitors next inspected the Duke of Wellington's funeral-car—a gigantic, lumbering, six-wheeled vehicle, weighing some fifteen tons, and made chiefly of bronze, from designs by Mr. Semper. This stately vehicle, with the rich pall and other gorgeous paraphernalia of State undertakers, is kept in a sort of "lying-in-state" museum formed by one of the compartments of the crypt, the walls of which are hung with funeral trappings. The visitors next proceeded upstairs to the south transept, and thence proceeded up the wide spiral staircase leading to the "Whispering Gallery" of the dome, stopping on their way to inspect the fine geometrical staircase (now under repair) in the south-west tower. This staircase was reached by passing along the space between the vaulting and the timbers of the south aisle roof, answering to the triforium in a mediæval cathedral, except that there are no openings into the nave. Retracing their steps, the visitors proceeded higher up to the external gallery round the colonnade supporting the dome, and thence went upwards to the apex of the great cone of brickwork which supports the lantern. This gallery is reached by light spiral staircases of iron running up in the space (which is almost in total darkness) between the cone of brickwork and the timbers of the external dome. Here and there, where a few rays of light penetrated, it was possible to see something of the construction of the cone of brickwork, and the workmanship and the materials seem, as they need to be, of the best description. The visitors did not proceed any higher up, as the upper part of the lantern and the ball and cross are at present under repair. The members having explored the nave-roof, Mr. Penrose proceeded to speak of the proposed decorations of the cathedral, remarking that the gilding and other ornamentation which has been put on so far is merely tentative. In reply to a question on the subject, he said that in his opinion the effect of the gilding, as carried out so far, was not to detract from, but rather to add to, the scale of the building, by its brilliancy bringing out into relief details which were hardly discernible before gilding was applied. Mr. Penrose then conducted the visitors to the Chapter House in S. Paul's Churchyard, and explained to them the models and designs which he has prepared for the internal embellishment of S. Paul's. We have already briefly described and commented upon Mr. Penrose's design,* but as the subject is one of great interest, we give the entire text of Mr. Penrose's report on the subject to the Committee for the Completion of the Interior of the Cathedral, merely premising that nothing is yet decided upon. Mr. Penrose, an accomplished Classical architect, has no small right to be consulted as to a scheme of decoration for our metropolitan cathedral. On the other hand, Mr. Burges (who is at present in Italy, we believe, engaged in making studies for the scheme he is to submit to the Committee) is doubtless well versed in the subject of Christian iconography, and if the work is ultimately to be carried out from his designs, we have no doubt he will prove himself artist enough to thoroughly subordinate party feeling and predilections of style to what has been called "the beauty of fitness."

Mr. Penrose, in his report to the Committee, says:—"Quite irrespective of the question of cost, there seem to be only two ways of ornamenting such a building as S. Paul's: one, that of profusely covering every available space, from vault to pavement, with subjects combined with enriched material or ornament; the other, that of concentrating the chief attention on certain points and leaving much of the framework of the building unaltered, proper care being taken to connect the ornamented portions by adequate but subordinate embellishment. In designing the scheme, of which a considerable part is now submitted, conformity with the last-named principle has been arrived at.

There are four main points on which the ornament is concentrated: (1) the choir, including the apse and baldachino; (2) the dome; (3) the painted windows at the ends of the four arms of the cross; (4) the smaller dome at the west end of the nave. With the exception to some extent of the last mentioned, much less display of coloured decoration is proposed for the nave and transepts than for the choir and dome. The connection between the parts more elaborately treated is looked for from the vaulting, which is to be richly worked in mosaic throughout (although colour is to be used predominantly in the choir and the dome), and from the pavement and the attic panels, in which a good deal of marble inlay is contemplated. Ceramic ornament might, however, be partly substituted for marble inlay in the attic panels. In the apse real marbles are proposed to supersede the painted work introduced as a temporary expedient by Sir Christopher Wren. This would necessitate the carrying on the marble work to some extent along the choir, but not to the transepts or nave; and the principal cornice and the pier arches and their supports are intended to remain Portland stone, as at present. Some marbling to the panels and plinth, and gilding to the soffits of the arches, would, however, probably be requisite. The object aimed at, however, is to connect the rich work in the vault and clerestory with the pavement, with no great alteration of the existing framework—a treatment which not only appears peculiarly proper for S. Paul's, but has the advantage of having several very important and successful analogies in Italy. As respects the windows: there are at the east end eight windows—five already occupied and at the ends of the two transepts, six windows, all unoccupied, which admit of being treated pictorially; but the glazing of nearly all requires to be altered to suitable patterns, only seven of these windows having as yet been done. The designs at present prepared for the Committee are shown on three perspective drawings, and a section of the Cathedral from east to west to serve as an explanatory diagram, and two models. The choir, roof, and tribune are shown by one of the perspective drawings and a model to the scale of lin. to the foot. As respects colour, however, the vault in the model more nearly represents what is now intended for the nave and transepts, and the perspective drawing that proposed for the choir. The principal feature in the tribune, after the precedent of several of the early Christian churches, is the colossal figure of Our Lord, with the signs of the Apocalypse. The subjects in the apse windows are those combined in the verse of the Litany, 'By thine agony and bloody sweat, by thy cross and passion, by thy precious death and burial, by thy glorious resurrection and ascension, and by the coming of the Holy Ghost, good Lord deliver us!' In connection with these subjects are the figures of angels in the spandrels of the clerestory windows of the choir, bearing the 'Elements of the Passion,' such as the cross and scourge, the crown of thorns, &c. The pavement in the apse is of choice marbles, forming part of the original construction, but the pilasters and parts of the walls were painted, as mentioned in the 'Parentalia,' 'to serve the present occasion.' It is now proposed to substitute real for the painted marbling. The group proposed for marble intarsia under the apse windows is from a design by the Baron de Triqueti. The baldachino, of which there is both an uncoloured model and a coloured perspective drawing, is composed, so far as it can be recovered, from an imperfect model and a short description, in the 'Parentalia.' The columns and entablature are intended to be of marble, and the superstructure of bronze. The dome is exhibited by a model to a scale of half an inch to the foot, as yet finished only as respects the cupola, and by a perspective drawing. The figures in the spandrels are intended to be the four major prophets, and the four Evangelists. One, that of S. Matthew, is taken from Mr. Watts's design, already executed in mosaic, and three of the major prophets from Mr. Stevens's designs. The others are mere sketches. The figures in the cupola are by Mr. Woodington, by whom are also those in the upper part of the model of the east end. The subject of the cupola is the Te Deum. There are two main horizontal lines of pictures, with eight compartments in each, the Apostles being seated at the twelve gates of the heavenly Jerusalem in groups of three. These occupy the north-west, north-east, south-west, and south-east compartments of the lower range, those towards the cardinal points being devoted

* BUILDING NEWS, August 9, 1872, Vol. XXIII., p. 107.

to the prophets and martyrs. Above these are the angels, Cherubim and Seraphim, and the Powers of the heavens, represented by angels bearing the signs of the sun, planets, and stars. These, with the worship of the Cross and of the Lamb, occupy the eight upper compartments, the last-named subject having been already suggested by the inscription running round the frieze of the drum, 'Worthy is the Lamb that was slain to receive honour and glory.' The whole is surmounted by a continuous ring of angels and blessed spirits playing on various instruments of music or singing "Holy, holy, holy, Lord God of Sabaoth." The interior of the cone above the cupola is intended to have gold stars on a blue ground. This treatment of the interior, whilst preserving the general framework of the architecture with very little alteration, offers very considerable and probably sufficient spaces for iconography, i.e., arrangements of subjects; for, in addition to the figures proposed for the apse and choir, the great west door, if covered, as has been proposed, with bronze, admits of a great series of Biblical subjects. The exterior might well be devoted to the history of S. Paul, and the interior to the acts of the other Apostles. The western dome offers a fine scope for the Creation. This subject was first proposed for it by Archdeacon Hale, and has met with very general acceptance, including that of Mr. Burgess, in his scheme for the iconography of the cathedral. The north and south chapels might receive on their panels subjects derived from more recent ecclesiastical history. The panels on each side of the windows of the aisles offer places suitable for historical subjects in bas-relief. There are twelve such panels in the nave, eight in the transepts, and twelve more in the choir. There would still be spaces below for monumental subjects in continuation of those which have already been commenced. There are twenty-two windows, including one in the north chapel, and two north and south of the western dome, which either have received, or admit of receiving, scriptural subjects. Lastly, there is the great dome, with its eight spandrels and its cupola, which, according to the design submitted, would have about 200 figures, many of which, especially the apostles, prophets, and martyrs of the lower range, would admit of individuality of treatment."

COMPETITIONS.

LEICESTER.—The committee of management of the Leicester Savings Bank have selected, from the designs sent in for competition, that of Mr. Edw. Burgess, of Regent-street, London.

LIVERPOOL.—A competition for School Board schools has just been decided here, Mr. E. R. Robson being the referee. Messrs. H. and A. P. Fry, 40, Castle-street, Liverpool, obtained one; Mr. E. C. Grayson, of Alexandra-buildings, Liverpool, another; the third was a tie between Messrs. Aldridge and Deacon, of Sweeting-street, and Mr. Cook, of Lord-street, who are again competing.

SCHOOL BOARD, WELLINGTON, SALOP.—In a limited competition for the proposed new schools to be erected at Hadley by the Wellington School Board, the plans of Messrs. Bidlake, architects, of Wolverhampton, have been selected. The plans and specification have been approved by the Education Department, and the architects have been instructed to obtain tenders.

SCHOOLS AT YEovil, SOMERSETSHIRE.—Messrs. Reade and Goodison, architects, of Yeovil, have been appointed to carry out the new schools about to be erected in Reckleford-street, Yeovil. There were eighteen sets of plans sent in by various architects; these were at first reduced to five and then to two. Eventually the board decided to adopt the plans marked "Practical," which proved to be by Messrs. Reade and Goodison. The work is, we believe, to be at once carried out.

A STRONG CEMENT FOR GLASS AND PORCELAIN.—Two parts of isinglass are soaked in water until well swollen; the water is then poured off, and isinglass is dissolved in alcohol by the aid of heat. One part of mastic is then dissolved in three parts of alcohol and added to the above solution; then one part of gum ammoniacum. The solution is well shaken, and evaporated to the consistency of strong glue, when it solidifies on cooling. For use, the cement and the articles themselves must be warmed.

Civil Engineering.

A RAILWAY FROM EUROPE TO INDIA.—The Constantinople correspondent of the *Daily News* announces that the project of M. de Lesseps will in a few days be formally submitted to the European public for establishing railway communication between Europe and India. The total length requiring construction is 2,350 miles, linking together Peshawar and Calcutta, Lahore, Delhi, Kurrachee, and Bombay. He estimates the preliminary expenses at 3,000,000 francs, and calculates that two years must be devoted to survey. It is stated that the scheme will be introduced to the world by the Credit Mobilier of Paris.

FRACTURE OF CAST-IRON PIER CYLINDERS.—"It is not, perhaps, generally known," writes Mr. John C. Trautwine, C.E., in the *Journal of the Franklin Institute*, "that cast-iron cylinders, composed of sections bolted together through inside horizontal flanges and filled with concrete, as is usual when employing them for bridge piers, &c., have, in several instances, in the United States, cracked or split asunder, entirely around their circumference, under the influence of severe cold weather. The reason of this, I presume, is that the outer and more exposed cylinder tends to contract to a greater degree than the inside and more sheltered concrete, and that the hold which the inside flanges have upon the solidified concrete in which they are imbedded prevents the contraction from taking place without rupture of cylinder. Unless suitable means be applied to prevent this, the efficiency of such cylinders may be much impaired. It has been suggested that an inside lining of vertical wooden staves, projecting inwards as far the flanges do, will be an effective remedy. Other methods will no doubt present themselves. My object is merely to give greater publicity to an important fact."

THE WATER SUPPLY OF BLACKWELL'S ISLAND (U.S.).—A DIFFICULTY OVERCOME.—The engineers of the American Department of Public Works have recently succeeded in solving a problem which has baffled them for years—the permanent establishment of a supply of water for Blackwell's Island. As long ago as 1850, mains were laid conveying water from the Croton aqueduct to the island, but their small diameter (6in.) subjected them to the action of frost, and also rendered them liable to be detached and carried away by the anchors of vessels. In this way the sections were repeatedly detached and had to be renewed sometimes once or twice in a single season. During the winter, the temperature of the water in the river very often sank to thirty degrees Fahrenheit, and the motion of the current also abstracted the heat from the pipe, which was of iron, to such an extent that if the water inside was not kept running it almost immediately froze, which it repeatedly did. To obviate this, at one time gutta-percha pipes were substituted, but these, in addition to being more easily broken by the anchors of vessels, were continually being worn through by the current rubbing them against the rock-bottom of the river. The main recently laid consisted of an iron pipe, 6in. in diameter, encased in a box, formed of heavy timber, 22in. square. The planks were firmly welded and riveted together, the intervening space being filled in with closely packed cement, and the whole forming a single "continuous mass nearly 1,300ft. in length. The total weight was about 200 tons. The river at this point is 1,140ft. wide and nearly 100ft. deep, while the current moves at least six miles an hour, so that the safe landing of this enormous mass was a task of some difficulty. The means used were a dredge-boat of 100 horse-power, worked along a wire cable 1½in. in diameter, and two powerful tug-boats. Under the main, at intervals of every 75ft., were launching ways, and men were distributed all along the line. In case of the breaking of the cable, ropes were ready at hand to be used with tugs alone. A successful start was made, and by ten o'clock nearly 100 yards of the mass was projected into the river. Then the strain on the cable proved so great, that a pause was made for slack-tide, which was about four o'clock. From that time forward the work was rapidly pushed, and did not cease till the end of the main was securely rested on a stone abutment waiting to receive it on the island. Water was let in soon afterwards, but turned off as soon as it was perceived that the experiment was a success.

PARLIAMENTARY NOTES.

THE NEW COURTS OF JUSTICE.—On Friday last Mr. GREGORY called attention to the delay in the building of the New Courts of Justice, asking Mr. Ayrton to explain the causes of it, and dwelt on the inconveniences and impediments to the administration of justice from the want of concentration of the Courts. Especially he pointed out that Lord Selborne's Judicature Bill could not be carried out while the Courts were dotted all about London.—Mr. O. Morgan pointed out that by the delay we had lost about a quarter of a million in interest; and that, owing to the rise in prices, the building would cost at least 15 per cent. more than if it had been taken in hand at once.—Mr. Goldney commented on the cost to the suitors of the long delay, while Mr. H. Palmer, thought admitting the delay, pointed out that there was some compensation in the cutting down of the originally extravagant design of the Commission.—Mr. Ayrton acknowledged himself alive to the fact that there had been considerable delay in carrying out the idea of concentrating the Courts of Justice, but repudiated the responsibility for himself, the Government, and Parliament. He laid it on the Royal Commission, which—acting without any sense of responsibility—had run up the estimates from one million and a half to three millions and a quarter, and on Mr. Street, who had presented a design of unnecessary magnitude. The steps necessary to bring the estimate and designs down to something like their statutory limits—which Mr. Ayrton explained in detail—occupied till March of this year, and it was only in February this year that he was able to invite tenders. Those tenders were now under consideration, but the public interest forbade his going further into this part of the question. Since he had taken the matter in hand there had been no delay, but it was better that there should be a slight delay than that we should rush into an unknown expenditure. Mr. Street thoroughly understood that he was to do what he was told in accommodating his designs to the real necessities of the case, and to induce the House to place confidence in his management, Mr. Ayrton related how successfully he had dealt with other public buildings in the same spirit. Before the vote was taken, he promised to explain his latest plans.—Mr. B. Hope inveighed against cutting down the design merely to meet the rise in prices, and Mr. Goldsmid also spoke in the same sense, and defended Mr. Street.—Mr. W. H. Smith, alluding to the rumour that the Central Hall is to be taken out of the design, and that the accommodation is to be curtailed, urged that the fullest information of the alterations should be laid before Parliament previous to the tenders being settled.—Mr. F. Powell and Alderman Lawrence strongly condemned the paltry economy contemplated by Mr. Ayrton, while Mr. E. Smith was inclined to think he had exercised a wise discretion in not commencing building operations at this unfavourable time.

THE THAMES EMBANKMENT.—Mr. J. G. Talbot on Tuesday asked the Chairman of the Metropolitan Board of Works whether it was true that the Board proposed to dispose of the vacant land in Cannon-row, abutting on the Thames Embankment, for building purposes, thereby preventing the construction of an approach road from Parliament-street to the Embankment by the Whitehall Club, in continuation of Derby-street?—Colonel Hogg replied that it is the intention of the Metropolitan Board to dispose of the vacant land referred to for building purposes, and as that land is immediately between the Embankment and Derby-street, the construction of an approach to the Embankment from that street will certainly be prevented. The question of approach referred to has been frequently before the Board, but it has not been thought desirable to undertake the work, for it would greatly diminish the value of their land. The gradients of the existing street are bad; while to make a suitable thoroughfare would necessitate the removal of the whole north side of the street, involving an expenditure, in the Board's opinion, more than the value of the suggested approach would justify.

Holly Walk Congregational Chapel, Leamington, was re-opened on Sunday week, after undergoing repairs and alterations under the superintendence of Mr. George Ingall, architect, of Birmingham.

A new company are about to carry out the pier at Herne Bay to a length of 320ft., at a cost of £2,000

Building Intelligence.

CHURCHES AND CHAPELS.

DUNBARTON.—On the 18th of May a new church at Dabreech, Dunbarton, was opened for public worship. The style is Early English Gothic. The plan is oblong, with an aisle at the north-west and a spire at the south-east, under which is the principal entrance. Across the east end there is a gallery. The roof is open, with its timber stained, as is also woodwork of pews, platform, &c. A three-light window behind platform is filled with stained glass, by Keir, of Glasgow. The church is seated for 620—500 in area, and 120 in gallery, and costs a little over £2,000. Architect, Mr. John MacLeod, Glasgow.

ELLEL GRANGE.—The new church of S. Mary, Ellel Grange, near Lancaster, was consecrated on the Feast of the Ascension. The style is Early Thirteenth Century French, and the church is built of local stone, and internally finished throughout with Bath stone, relieved in the arches and other details with blue Burnley and red stone. All the columns, both externally and internally, are of polished granite and red and green marbles. The building consists of a nave with apsidal chancel, and organ-chamber projected southwards. Entrance to the nave is obtained through the tower porch and richly arched vestibule. The window at the west-end is filled with stained glass, representing scenes from the life of the Virgin Mary; and the side windows of the nave are of stained glass, on which are depicted the Miracles and Parables of our Lord. The ceiling of the nave is of a pointed waggon form, richly decorated in colours and gold. On the sixteen divisions between the main ribs are painted half-length figures of the Evangelists and Apostles, bearing their emblems. By a low marble wall and wrought iron and brass screen and gates, the chancel is divided from the nave, the chancel terminating eastward in a semi-circular apse, pierced with seven lancet windows filled with brilliant stained glass, the medallions containing a complete series of subjects from the life of our Saviour. The floor is of marble and encaustic tiles, and the whole furniture is of richly worked oak, the lectern and communion-rails being of polished brass. The ceiling is elaborately decorated, having a centre figure of our Lord in glory on the apse roof, and angels bearing emblems of the Passion on the choir ceiling. Seat accommodation is provided for about 100 persons. Adjoining the church, towards the south-west, is the mausoleum in the same style of architecture as the church. Over the entrance is a sculptured subject, representing our Lord's Resurrection. The designs are by Messrs. W. and G. Audsley, architects, of Liverpool.

EXETER CATHEDRAL.—The London fund towards the restoration of Exeter Cathedral now amounts to about £1,200, and it is proposed to close that, as also the Oxford fund. The amount originally required for the restoration was £35,000—viz., 25,000 for the choir and that part of the edifice east of the organ, and £10,000 for the nave. The amount promised through the Chapter amounted to £21,100, which, with the city fund, would make a total of nearly £31,000. Over £4,000 is still required. To the contractor has been already paid for work done £14,779. It is proposed to do a deal more work than was at first contemplated. The Bishop's throne will cost £500 and the organ £800—double the outlay originally intended. In addition to this, there are special funds for the restoration of the Lady Chapel at the sole cost of Lady Rolle, of Bicton, the four memorial windows to the late Bishop Phillpotts for the Lady Chapel; the memorial window for the east end, and two pulpits—the cost of which will be £1,000—as a memorial to the late Bishop Patteson. The entire restoration, when completed, will thus cost about £40,000. It has been proposed to raise special funds for the restoration of a particular part of the edifice similar to the memorial windows and pulpits, as also for the organ.

GLOUCESTER CATHEDRAL.—The reredos presented to Gloucester Cathedral by the Masons of the province is now complete, and will be formally unveiled on Thursday, the 5th of June. It is 17 feet six inches in width. A horizontal line of carved stone extends above the altar; above this are seven niches filled alternately with statues and sculptured groups. The subjects from left to right are—"Moses bearing the

Tablets of the Law"; group, "The Nativity"; "S. Peter"; group, "The Ascension"; "S. Paul"; group, "The entombment of the Saviour"; "David bearing the Harp." The central group, "The Ascension," is five feet in height, and the side groups are about 4ft. 3in. high. Over the figures and groups are canopies; above these are three open pinnacles, with statues of angels, and surmounting the central pinnacle is a cross 37 feet from the floor. The sedilia have also been completed, from the designs of Sir Gilbert Scott; and a new flooring of marbles and tiles has been laid up to the altar rail, and the flooring within the rail has been relaid, the old tiles, some of which bear most interesting inscriptions, throwing much light on the ancient history of the sacred pile, being wrought in. The north transept is now under repair; and Sir Michael Beach has undertaken to have the great north window filled with painted glass as a memorial.

HANLEY.—A new Wesleyan Chapel was opened at Hanley on Sunday week. The building, which is Gothic in character, was designed by Messrs. Scrivener and Son, architects, Hanley. There is accommodation for 300 persons. The length is 60 feet, and the breadth is 33 feet, with schoolroom underneath of the same proportions. The building is of blue and red bricks, with stone dressings, and the roof is covered with blue and red tiles ornamentally arranged. The chapel is seated throughout with open benching, stained and varnished. The roof is open timbered, and there is a gallery at one end of the chapel. The rostrum is of pitch pine, with a polished oak rail, and the panels, like those in front of the gallery, are filled in with scarlet cloth. The side windows, fourteen in number, are of tinted glass. There are also two vestries, and a porch entrance from Keeling's-lane. Mr. R. Hammersley, of Bucknall-road, is the builder, and the contract was for £1,355.

LIVERPOOL.—The new portion of the church of S. James the Less, Liverpool, was consecrated on the 21st instant. The addition to the structure consists of a nave 30ft. wide, and a chancel 35ft long by 24ft. wide, organ-chamber and vestries and a gallery at the west end. The whole area of the church is paved with red and black tiles. There is no chancel arch, but a handsome rood-screen of carved oak, in seven compartments or arched openings, filled in with rich open tracery. The lower part of this screen is already fixed, and the centre opening protected by wrought iron Mediaeval gates. The chancel is divided into three bays, the first two having an arcade of moulded brick on each side, resting on polished red granite pillars, and filled in with screens of open tracery work. The eastern wall of the chancel is treated in a somewhat unusual manner, and affords groundwork for an effective reredos. Instead of there being a single large window, there are two two-light windows with massive piers between, and a pentagonal circular window in the apex. The arcade of the nave is of moulded red and black brick, of two orders, resting on red stone pillars. The inner arches to all the windows and other openings are of red pressed brick, as well as the lower part of the walls and the bands at wall heads and spring of windows. The only portion of the exterior which comes into view is the east end of the chancel, which has a niche in the centre pier for the reception of a figure of S. James-the-Less. The work has been executed by Mr. Burroughs, from the designs of Messrs. W. and J. Hay.

MIDDLESBROUGH.—On the 11th inst., the Friends in Middlesbrough took possession of their new meeting-house. The architecture is Italian, and the building is of white bricks, with stone dressings, from the designs of Mr. Blessley. The meeting-house proper consists of a large room, divided by a partition so constructed that a portion will slide into the roof, and the lower portion will slide downwards, so as to throw the male and female meeting-rooms into one, when desired. The total cost of the structure, which stands in a plot of ground 180ft. by 100ft, is estimated at £4,000.

MURSTON.—On Friday last the foundation-stone of a new church was laid at Murston, Kent, dedicated to All Saints. The materials used will be flints, interspersed with freestone facings. The dimensions of the building are:—Nave, 57ft. by 38ft. 6in.; chancel, 33ft. by 23ft., spire, 135ft. high, 12ft. square at the base. The walls are to be of the thickness of four feet. Messrs. Adecock and Rees, of Dover, are the contractors. The

amount required to complete the whole church is £3,800.

PAISLEY.—We learn from the *Glasgow Herald* that "the Old Low Church" is to be thoroughly renovated, "a most elaborate plan" having been prepared by Mr. J. A. Rennison, architect. The galleries, which slip up and cover the trellised windows are to be lowered, and the windows are to be filled in with ground glass. The sittings throughout are to be renewed, remodelled, and widened; the pulpit is to be of "an elaborate Gothic design," and the ceiling is to be raised, replastered, and ornamented. On the exterior the windows in the side walls are to be pointed so as to be in harmony with those at the gables. The work is estimated at about £700. In these days, when so much significance is attached to the sacredness of the mere externals of the church, it is curious to find that the area of the Old Low Church of Paisley, originally on the ground floor, is now used as a warehouse; and to know that in 1837 it was *inter alia* enacted "that the inhabitants of Paisley, having at their own expense built a new church, but could not provide for a minister to be called thereto, therefore a portion of the revenue derived from the Ale Tax shall be paid for the maintenance of a minister."

PENDLETON.—The foundation-stone of a new Unitarian Chapel was laid on Tuesday. The new building, the site of which is at the corner of Cross Lane, in Pendleton, will be in the Gothic style of architecture, and will be faced with stock brick, with stone dressings. Its total length will be 92ft.; width, 34ft.; and height to the apex of the roof, 48ft. It will have an open-timbered roof and traceried windows. It will contain sittings for about 300 persons. The cost is estimated at a little under £3,000. The architect is Mr. Thomas Worthington, King-street, Manchester; and the builder is Mr. James Herd, Clarence-street, Cheetham.

SALFORD.—A new (Roman) Catholic priests' seminary is about to be erected in Salford. It will form portion of a new building about to be erected on the unoccupied land attached to S. John's (Roman) Catholic Cathedral, Salford. This building will also contain the residences of the Bishop and Cathedral clergy, besides students' rooms, lecture-hall, sacristies, servants' apartments, &c. The cost of the entire building, which will include a chapter-house, is estimated at £15,000. The new building will be of brick, with stone facings on the side fronting Chapel-street; and the style will be an adaptation of the Modern Gothic.

SOHO.—The new chancel of the church of S. Mary the Virgin, Crown-street, Soho, was consecrated on Tuesday. The church was devoted to the use of the members of the Greek Church in London more than 100 years ago. It then became a Dissenting place of worship, and finally, through the exertions of the present vicar of S. Anne's, Soho, was purchased as a mission chapel in order to extend the work of the church in the poorest district of S. Anne's. The new chancel is the first instalment of the work of rebuilding the whole church, which is poor and mean. Its proportions have been designed on as large a scale as the site would admit, the width inside being 36ft. and the length 34ft., the height to the crown of the vault 60ft., and to the ridge of the roof 80ft. The groining is that known as "sexpartite," not so common in England as in France, though it is found in the Choir and Trinity Chapel of Canterbury. Red bricks with stone ribs are used in its construction, springing from massive buttresses; the walls are faced inside and outside with red brick, stone being used in the windows and elsewhere. The pavement and steps are of red and white stone, and Minton's mosaic. The altar is raised on three marble steps, and the reredos, a portion of which is at present in hand, will occupy the whole height of 30ft. under the east lancet windows. Mr. R. Herbert Carpenter (in conjunction with the late Mr. William Slater) is the architect. The new schools and the north aisle of the nave are now being proceeded with, after which will follow the rebuilding of the nave.

WEDNESBURY.—On Monday afternoon, the memorial-stone of the new (Roman) Catholic Chapel at Wednesbury was laid. The edifice, which will be known as S. Mary's Chapel, will afford accommodation for 700 worshippers. The cost will be about £5,000. The building will be in the Early English style of architecture, the materials used being red bricks, relieved externally with Box Ground stone dressings. In-

ternally, the columns and arches of the nave and chancel will be of Painswick stone, and the roof will be grained with wood. The architect is Mr. Gilbert E. Blount, of London, and the builders are Messrs. Barnsley & Son, Birmingham, the clerk of the works being Mr. Carew.

WITHYCOMBE.—Several additions have recently been made to the church of S. John the Evangelist, Withycombe, erected eight years since by Mr. Ashworth, of Exeter. A new reredos has been erected, mainly of fine Painswick stone, and consisting of a bold arcading of five bays, springing from polished Devonshire marble columns, and carved capitals. The bases of these columns rest upon a broad plinth, two feet nine inches in height. The panels beneath the arches are filled in with illuminated ornament. The spandrels between the arches are covered with diaper of a type similar in detail to some of the earlier diaper over the wall arcading of the Chapter House at Westminster Abbey. The whole is surmounted by a richly-moulded and delicately-carved cornice, the apex of each gable over the arcading being capped by an ornamental finial. The reredos has been carried out by Messrs. H. and F. Burridge, of Exmouth. The carving is the work of Mr. Harry Hems, of Exeter. The marble-work has been supplied by Messrs. J. and E. Goad, of Plymouth, and the painted decoration is by Mr. Hudson, of London. The east window, immediately above the reredos, has also been filled with painted glass. The window is divided into five lights, and the subject is the Ascension.

BUILDINGS.

BRADFORD.—S. George's Hall, Bradford, is now being redecorated by Mr. H. Briggs, of Bradford, from designs by Messrs. Lockwood and Mawson. The wall round the area is to have a dado, four feet in height, in black, divided into panels, with gold and small scrolls at the corners, the base being in maroon. From the top of the dado to the cornice underneath the stalls, the walls will be in Pompeian red, divided into courses with fawn-colour lines. This part of the wall also will be divided into panels, in the centre of each of which will be a wreath, enclosing a blue ground, on which will be inscribed in letters of gold the names of the great composers. The divisions of these panels will correspond with the trusses which carry the front of the stalls. The groundwork of the face of the stalls and the cornice beneath will be in cream colour, and the ornamental work will be enriched with pale green bronze, picked out with blue and gold. The partition at the back of the stalls will be in Pompeian red, as also will be the walls round the galleries and the orchestra. The front of the gallery will be treated in almost exactly the same manner as the front of the stalls, and the supporting columns, caps, and brackets will be in pale green bronze, relieved with gold. The mouldings round the gallery walls and windows will be in cream colour, with a blue fret and light maroon rosettes underneath. The windows and the railings will be bronzed, and the seats and woodwork will be painted fawn colour and varnished. The general colour of the great cornice round the hall will be cream, the trusses and moulding in pale green bronze picked out in gold. The ceiling will be similarly treated, the groundwork of the panels being in blue-grey, and the beams and mouldings in cream colour relieved with blue and gold. The pilasters at the orchestra end of the Hall will be cream colour, the groundwork of the panels being blue and the rich scroll ornament and surrounding moulding in gold. The masks in the centre of the pilasters will be in bronze and gold, the capitals will be in bronze, and the figures supporting the lights will be bronze, relieved with gold. The general colour of the organ will be cream colour, the arabesque panels in the pilasters being repainted as at present, though in somewhat stronger colours. The pipes will be pale green bronze, diapered in gold, and the trellis work in the panels will be regilded. The cornice and capitals will be picked out in blue. The orchestra front will be treated in cream colour, black, blue, bronze, and gold. The saloon, corridors, staircases, vestibule and ante-rooms, will all be repainted and decorated in uniformity with the hall.

DUNDEE.—The ceremony of laying the stone in commemoration of the restoration of the Old Tower, Dundee, and the presentation of the peal of bells just erected in the structure, took place on Wednesday week. The restoration of the tower was begun about three years ago under Sir Gilbert

Scott, of London, and has been satisfactorily carried on, the original details of the architecture having been faithfully reproduced. The cost of the restoration will amount to about £8,000. The tower was founded in 1189 by David, Earl of Huntingdon, in commemoration of his being saved from shipwreck in sight of Dundee when returning from the Holy Land, where he had been on a third crusade with Richard I.

MIDDLESBROUGH.—The "Erimus" club are about to erect a new club-house at Middlesbrough. The materials used in the construction will be brick and stone, the front facing to be in red pressed bricks, while the other external faces are to be in picked machine-made bricks of even colour. The stone for the copings, cornice, window heads, sills, columns, &c., is to be from the Ingelby district, whilst the steps and hearths are to be of Leeds stone. The contract has been let to Mr. William Nelson, of Coatham, who is to complete the works by November, 1873, for the sum of £2,880, from plans supplied by the architects, Messrs. Weatherill and Moses, of Stockton-on-Tees, whose designs were selected in competition. Mr. William Doughty, of Middlesbrough, has been appointed clerk of works.

OLDHAM.—The new Fishmarket at Oldham was opened on Saturday last. The corporation, more than twelve months ago, determined to erect a small market for the retail of fish, adjoining the present market. The designs of Messrs. Mangnall and Littlewood, architects, of Manchester, were selected in competition. The market is 80ft. in length by 40ft. in width, with ground floor and basement, the ground floor being set apart as the market, which is lighted chiefly from the roof with north lights. The roof has three bays, the construction being a combination of cast and wrought iron and timber. The contractors for the construction of the building, except ironwork, are Messrs. Greenup and Watts, of Manchester. The total cost of the market has been about £2,200, and about £500 for fittings.

SCHOOLS.

LONDON.—At the meeting of the London School Board on Wednesday, Mr. Charles Reed, M.P., on behalf of the Works Committee, presented a report stating that tenders had been taken for the erection of the Board's new offices on the Thames Embankment site, and the committee recommended that the lowest—that of Messrs. Cooke and Greene, of Marlborough-street, Blackfriars, for £18,281—should be accepted. There were fourteen tenders, and the highest was £21,500. The whole cost of the building and site would be within the £40,000 sanctioned. The report was agreed to, and the Board also agreed to purchase other sites and interests in sites for new schools.

SMALL HEATH.—A new Board School was opened at Small Heath, Birmingham, on Monday, and will accommodate 1,200 children. The new buildings, which have a frontage of about 200ft. are built of brick, with dressed stone facings, the roof being of Broseley tiles. The style of architecture is principally Gothic. The boys' school-room is about 63ft. in length by 20ft. in breadth, at the upper end being another room running at right angles with the first, but not divided from it by any partition. The second room is 43ft. in length by 20ft. in breadth. There are three classrooms opening into the main schoolroom, the dimensions of each being about 18ft. by 17ft. Entering by the porch, access to the girls' schoolroom is obtained by a staircase. On reaching the top of the stairs, on the right hand is a small room for the schoolmistress, 11ft. by 16ft.; and on the left a cloak-room for the scholars, 17ft. by 16ft., with a lavatory attached. The girls' schoolroom is 51ft. in length by 20ft. in breadth, there being a second room adjoining, as in the case of the boys' school, 43ft. by 20ft. in dimensions. Here are also three classrooms, similar in size to those in the lower schoolroom. The main infants' schoolroom is 60ft. in length by 32ft. in breadth. At the lower end is a raised step gallery for a class. Here a door opens into a classroom, 30ft. by 16ft., which is also fitted with raised step gallery. The walls and roof of the infants' schoolroom are very similar to those of the girls' school. The architects are Messrs. Martin and Chamberlain; the contractors Messrs. Horsley Brothers, of Newton-street; and the clerk of the works, Mr. Cowper.

Cheltenham Parish Church is to be restored, at a cost of £12 000 or £13,000.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

To OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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RECEIVED.—T. C. K.—C. W. S.—W. S.—Rev. T. B.—H. T.—W. H. W.—J. D. W.—R. T. B.—Bon Accord.—J. T. B.—E. W. G.—C. M.—W. H. C. B.—W. M.—C. B. A.—Dr. Z.—J. N.—R. P.—J. P. S.—T. B. S.—E. M.—P. E. M.

Correspondence.

THE CAFE ROYAL, REGENT STREET.

To the Editor of the BUILDING NEWS.

SIR,—The easy and cheap means of communication now existing between London and Paris has, necessarily almost, resulted in the introduction to each of the cities of some characteristic manner or custom of the other, and, as architects, we are being continually made aware of the fact that the French people have the greatest claim to be considered the most artistic on the face of the earth. Undoubtedly, modern French architecture contains all the qualities necessary for the perfection of an enduring style. Borrowed as it is from early examples, it is disguised and modified with such consummate skill that the parentage in many cases would suffer by comparison with its offspring. To those who may have had the advantage of a stay in Paris, the numerous cafés must have been a source of pleasure and amazement; it was the result of no little thought that produced such cafés as we find in the Boulevard des Italiens—the splendidly decorated saloons, the well-arranged plan giving rapid access to each and every apartment, the spacious billiard-rooms, the comfortable private dining-rooms, and, what is of very great importance, absence of that annoying reminder that the dinners are cooked upon the premises, and which is characteristic of so many of our hotels.

Londoners have imported, amongst other ideas, that of providing cafés on the French system, and if it continues to spread as it has recently done, the Café Royal in Regent's Quadrant bids fair to become pre-eminently French in style. It is unfortunate that the entrance in Regent-street is so small and tawdry in its appearance, forming as it does the main entrance to the café, which extends to the large premises in Glasshouse-street, the elevation of which is quite French in style. In communication are the houses in Air-street, principally used for private dining-rooms. The one nearest Regent-street is the work of a well-known architect, and although with a cement front (excepting the ground-floor), is a well

studied design. Adjoining, on the east, is the large and lofty building just completed; in fact, too lofty for so narrow a street, but this is the misfortune, not the fault of the architects. The upper part of this building is also of cement only, but the design, excepting the ornament to the window-heads of the second story, is worthy of close attention, not only on account of the boldness of its detail, but the general effect of the lines. To the ground floor, however, especial attention is directed. This work is of stone, and quite French in style; it is well studied, and the effect of the carving, and turning of the lines, all that could be desired. This ground floor is occupied as a billiard-room, the decorations being simple but effective, excepting perhaps the arrangement of some of the mirrors. The first floor is used as a general dining-room, the decorations being much more elaborate and pleasing, the furniture, carpets, and mirrors, enhancing the effect. The second floor is decorated with perhaps greater taste than the first story, and the enrichments are worthy of notice. Passing over the third story, not sufficiently advanced for criticism, the fourth story promises to be a success. With its large central dome and elaborate ornaments, this floor will be used for Masonic meetings. On the whole, this new building shows an advance on the commonplace architecture of the day, and reflects credit on the architects, Messrs. Archer and Green, from whose designs the whole has been executed by Messrs. Cooke and Green, builders. W. W.

"LET GLASGOW FLOURISH."

SIR,—In your issue of 16th May, it is said that "constructive energy has made the Tyne the mightiest river of the world in developing the material agents of civilisation." Not disputing this, will you allow me to say something of what constructive energy has made the Clyde?

During the past year more than fifty vessels drawing upwards of twenty feet of water entered the harbour of Glasgow, where many men still living have waded across; the number of vessels launched was a hundred and ninety-eight, representing the burden of two hundred and thirty thousand three hundred and forty-seven tons, and the money-value of close upon seven millions, sterling. The goods exported and imported amounted to considerably upwards of two millions of tons, by greatly more than a hundred thousand tons exceeding the tonnage of the preceding year; the amount of Customs duties greatly exceeded two millions; the expenditure upon the maintenance of the river was £141,908. 6s. 10d., and the receipts were £174,200 12s. 2d.

By "constructive energy" the Clyde was the cradle of steam navigation in Europe; it had twenty steamers on it before one had disturbed the waters of the Thames (and possibly the Tyne); on its banks have been built the largest British steamships afloat—the exceptional "Great Eastern" excepted; and by steam and sailing vessels it has long had extensive commerce with all parts of the world.

On the Clyde as well as on the Tyne there is such a "material agent of civilisation" as coal; moreover there is iron; there are great engineering as well as ship-building works; numerous and large factories for spinning, weaving, bleaching, dyeing, and printing; sugar refineries with an importation of the raw material of two hundred and thirty-two thousand nine hundred and forty-one tons; chemical works, perhaps the largest in the world; and hundreds of public works for manufactures and warehouses for commerce "in developing the material agents of civilisation."—I am, Sir, &c.

KENTIGERN.

THE INSTITUTE DINNER.

SIR,—I shall be much obliged by your allowing me to state in your journal, that the Institute Dinner (for architects and amateurs of architecture) has been unavoidably postponed until Saturday, the 21st of June, when it will be held at Willis's Rooms, at half-past six for seven p.m.

Gentlemen desirous of being present on the occasion should forward their names as soon as possible to the Institute. The price of the dinner-tickets will be one guinea each.—I am Sir, &c.

CHARLES L. EASTLAKE, Secretary.

THE MOUNTAIN CHAPEL COMPETITION.

SIR,—May I through your columns call the attention of the Committee of the Mountain Chapel Competition (if such there be) to the fact that it is now over three months ago since the designs were submitted to them, and yet we are apparently as far

off a decision now as we were before the drawings were sent in. I certainly have no ambition to rank among those who are continually grumbling and growling, but I do fear that such indifferent treatment is rather too bad. If such a system as this is to be tolerated, I for one shall be very chary for the future in entering upon competition work. By kindly inserting the above in your next issue you will oblige.

A DISAPPOINTED COMPETITOR.

P.S.—I am informed that the rev. gentlemen connected with the matter have been written to several times, but nothing satisfactory can be gleaned.

THE BUILDING NEWS.

SIR,—Permit me to express the general satisfaction, and my own personal appreciation, of your most successful efforts to make your Journal the *very best*. It is without doubt the most instructive, both to the practical workman and to the designer—to whom the plates, diffusing, as they do, the best notions of the best men to all parts of the kingdom, or perhaps world, are invaluable. Such a constant reproduction of good things cannot fail to influence the rapid progress of architecture. You are also to be much commended in not confining your articles, &c., to notices of current events connected with building—"Building News," in fact, but rather for the interest you show in that large body of your readers, the learners, to whom nothing can be of greater use than the practical papers which you issue on the many subjects connected with building.—I am, Sir, &c.

EDWIN SEWARD.

P.S.—The suggestion of a correspondent of a few weeks since, as to the procuring new subscribers, is undoubtedly a good one, and I am pleased to say I have been able to act up to it on several occasions; in fact, it is a great pity that any person should let slip the chance of procuring the best of instruction at so easy a rate.

Intercommunication.

QUESTIONS.

[2865.]—**Arsenic in Green Colour.**—Could any correspondent say if there exists any difference in the percentage of arsenic contained in green oil colouring? I wish to colour the walls of a bedroom a slight green tint, which would be best produced with ordinary emerald green, but I am afraid that the quantity of arsenic contained in this colour might be injurious to health in a sleeping-apartment. Is there any suitable green free from arsenic?—T. W.

[2866.]—**Gas-Fittings in Churches.**—This subject seems to me one on which a little discussion in your pages would be of considerable use. Does any one know of any church where the problem of so arranging the gas-fittings as really to light the church at night without offending the eye by their presence by day, has been satisfactorily solved? I heard it stated that a very good arrangement had been adopted in the Church of St. James the Less, Westminster. Will any correspondent describe it?—KAPPA.

[2867.]—**Resistance of Stone to Crushing.**—In a report of some American experiments on the resistance of stones to crushing, it is stated that the effect of pieces of sheet-lead placed between the stone samples and the steel surfaces of the testing apparatus was to occasion the failure of the specimen with about half the load it would sustain if pressed directly by the steel surfaces. What is the cause of this?—CHATEAU D'ESPAÑE.

[2868.]—**Lightning Conductors.**—Questions have been asked respecting these in the BUILDING NEWS at different times (2481, 2673, 2817), to which I have not yet observed a direct and full reply. The correspondents of the *English Mechanic*, in the pages to which reference is made by "Kappa," gives apparently very clear information respecting the end termination, the space protected, &c. but they differ on the question of insulation; for whilst "G. S. W.," at p. 101, says they should be insulated, "Jack of All Trades," at p. 150, considers such precaution unnecessary. The opinion of the latter is shared by Prof. John Phin, of the United States. (*Vide BUILDING NEWS*, Vol. XXIII., p. 119.) "G. S. W." and "Jack of All Trades" each recommend a metal tube for a conductor, whilst Prof. Phin recommends solid bars of a round, square, or flattened form, in preference to tubes, twisted wire ropes, bands, &c. The latter recommendation is endorsed by Mr. E. E. Quimby, in a paper partly given at p. 207 of same volume BUILDING NEWS. On being questioned for information, a noted lightning-conductor manufacturing firm stated that the conductor should not be connected with the iron eaves shooting, whilst Messrs. Phin and Quimby each recommend its connection with all masses of metal throughout the building. Who is right?—S. TREVAIL, Par Station, Cornwall.

[2869.]—**Bleaching Oak Board.**—Some oak boards intended for a floor have become black in patches, owing to exposure over the roof of a stable. Can I remove the stains without injury to the wood?—J. BARTON.

[2870.]—**Carvers' Putty.**—How can I make "carvers' putty" for filling up holes in wood?—C. S. F.

[2871.]—**Architectural Drawings.**—At a recent exhibition of architectural drawings, I noticed many were mounted on tinted paper, and stretched on deal frames. Will some one tell me how to do this?—LUX.

REPLIES.

[2854.]—**Mud in Rivers.**—If any one else uses the stream, and sustains damage by your turning the mud into it, you are certainly liable.—KAPPA.

[2857.]—**Pitch Pine.**—Oil the barge-boards and finials with two coats of good boiled linseed oil. Well wash the internal parts with water only; size and varnish twice with good copal varnish.—BLUE RUIN.

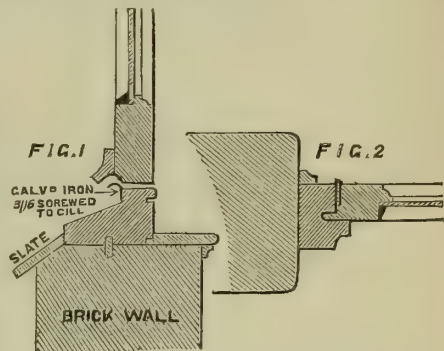
[2857.]—**Pitch Pine.**—Apply one coat of oil externally, *hot*—it penetrates better. When dry, give a coat of oak varnish. One coat of oil and one of varnish stands better than two oils. Don't stain the internal fittings; wash the woodwork all over with weak size and a piece of wash-leather, changing the size as it gets dirty. When quite dry, give another coating of size, applying it this time with a brush, and then give two coats of French oil varnish or pale oak varnish.—KAPPA.

[2857.]—**Pitch Pine.**—"Canadian Subscriber" should use two coats of linseed oil mixed with a small quantity of boiled oil and "dryers," leaving each coat as long as possible to dry in, after which varnish in the ordinary way. This process gives a good natural colour, brings out the figure of the wood, and is better in every way than staining.—MAURICE B. ADAMS.

[2858.]—**Varnishes Used by House-Painters.**—The copal and oil are boiled together, but "Painter" had better not attempt it, as it is dangerous. Copal may be melted by itself and a certain amount of its more volatile properties (only to be determined by practice) evaporated, when it can be dissolved without difficulty in good turpentine, and a portion of drying oil being added, a very fair varnish, suitable for rough work, may be obtained.—T. D. S.

[2859.]—**French Casement.**—The plan which I have in several instances adopted, and which I find most effectual in preventing rain and wind from penetrating beneath small casements is this:—(See sketch.) Place a bead (A) on the oak cill with a projecting tongue, well fitting into a corresponding groove inside the casement. This bead can be continued all round the casement if requisite, but I have generally found that one on the cill only is sufficient.—THOS. ROGERS WAGSTAFFE.

[2859.]—**French Casements.**—In reply to "Poppington," the following arrangement, used by Mr. Phené Spiers at his Board schools at Bow Common, is a good



one. Fig. 1 is a sketch of cill, and Fig. 2 section of frame showing manner of hanging.—A MEMBER OF THE ARCHITECTURAL ASSOCIATION.

[2861.]—**Organ Construction.**—There is no difficulty in placing the keyboards at the end of the soundboards, instead of the general plan of having them in front. In such cases horizontal frames of rollers are employed. Examples of this will be found at St. Alban's, Holborn, and All Saints, Blackheath. The keyboards may be any reasonable distance below the organ floor—for instance, the organ at Canterbury Cathedral is in the triforium, while the keyboard is in the choir stalls.—MONTAGU HEPPWORTH.

[2864.]—**Plans for Double Villa.**—In answer to "Double Villa's" question in last week's BUILDING NEWS, about a book on plans for double villas, there is a book entitled "Domestic Architecture," by Jas. W. Bryce, architect, Edin., and published by Messrs. A. Fullarton and Co., London and Edinburgh. Your correspondent will in that book find what he wants.—J. W. B.

[2864.]—**Plans for Double Villa.**—I would advise "Double Villa" to consult an architect, and not look for the required information or designs for "neat-looking houses" from any book. The BUILDING NEWS is not intended to occupy the position of "Every man his own architect."—STUDENT.

[2864.]—**Plans for Double Villa.**—"Double Villa's" question, as it appears to me, savours very strongly of impertinence. In the first place, he is not anxious to purchase a book containing the information required, but merely to obtain a sight of one, and goes on to carefully indicate (always excepting grammar) the kind of house he requires and the price he is willing to pay for one that would not be a continual eyesore to him. How delightfully innocent "Double Villa" must be; but why does he select the "Intercommunication" column of the BUILDING NEWS to display his innocence? He is really in want of architectural taste and the professional skill necessary for the selection of good property; and why does he not, in the usual way, advertise, or look at advertisements, and when he has discovered a house that is likely to suit him, pay a surveyor the proper fee for advice? This endeavour to obtain professional advice gratuitously is by far too prominent in the architectural profession, and leads to that cheap and common character distinguishing it from the other professions. It would by no means surprise me to see in this column applications for the gratuitous loan of surveyors' original dimensions for an estimate, or the working drawings of some important building, or distinct advice as to the best and most expeditious means to become a very great architect or surveyor; and there are certain men who would, no doubt, for the sake of a little brief notoriety, supply these impertinent questioners with what would most likely be very indifferent matter, and consequently would produce very indifferent results.—W. W.

STAINED GLASS.

LIVERPOOL.—S. Margaret's, Prince's-road, Liverpool, has been enriched by the addition of three more stained-glass windows, from the studio of Clayton and Bell, of London. Two of the new windows are over the choir, and contain figures of the Evangelists; the third is in the north aisle, and consists of figures of S. Hilda, S. Werburga, and S. Ebba. The painting of the roof, nave, and aisles in S. Margaret's is to be proceeded with immediately, at a cost of £2,000.

STATUES, MEMORIALS, &c.

THE LANCASHIRE STATUE TO THE LATE EARL OF DERBY.—On Saturday, the pedestal for the Lancashire memorial statue to the late Earl of Derby was erected in Miller Park, Preston. The statue itself, which has been executed by Mr. Noble, will be unveiled on Whit-Tuesday.

WATER SUPPLY AND SANITARY MATTERS.

WHITECHAPEL.—Since his last quarterly report, Dr. Liddle, the Whitechapel Medical Officer of Health, states that eight additional water-waste-preventers have been erected in this district, and consequently there has been a considerable diminution in the number of butts and cisterns. From the satisfaction which these machines give to the poor, he hopes that the time is not far distant when butts and cisterns in the poor localities will be entirely abolished, and that water will be supplied to the poor on the constant service, direct from the main.

LAND AND BUILDING SOCIETIES.

OXFORD.—The annual meeting of the Oxford and Abingdon Building Society was held on Saturday week. 228½ shares, amounting to £22,825, have been advanced during the past year, upon various freehold and leasehold properties, making an aggregate sum of £239,660 advanced by the Society since its formation. The present value of the Society's securities amounts to £68,069. 14s. 10d., secured by mortgages upon properties in Oxfordshire, Buckinghamshire, Kent, Surrey, and in the City and Suburbs of London. A very careful valuation of the assets and liabilities has been made, and after providing for the table value of all unadvanced shares, debenture debt, and other contingencies, the Society has a reserved fund of £4,995. 15s. 3d., and the Directors recommended a bonus of £20 per share on all shares arriving at maturity during the ensuing year.

FROME PERMANENT BUILDING SOCIETY.—The thirteenth annual meeting of this Society has been held. The report stated that the income of the Society from subscriptions and repayment of advanced shares during the year amounted to £9,482. 16s. 5d. The money paid for redemption of 61 4-12 shares amounted to £1,922. 18s. 10d. The advances of the past year were £7,400, a sum considerably in excess of the previous year. £3,267. 10s. 6d. had been paid on withdrawal of 124 8-12 shares. There was a small reduction in the loans, and £1,000 had been deposited with the bankers at interest for a short time. The balance for payment of losses and future contingencies was £1,154. 8s. 7d., being an increase of £290. 12s. 11d. during the year.

NORTH STAFFORDSHIRE PERMANENT ECONOMIC BENEFIT BUILDING SOCIETY.—In their ninth annual report the committee of this Society state that the past year has been by far the most successful the society has had. The receipts (exclusive of redemptions) have amounted to £21,000. 17s. 11d., being an increase of £6,150 over the receipts of last year. The amount received from depositors has been £7,360. 0s. 1d., which is upwards of £3,000 more than the sum received on this account last year. The advances on mortgages have amounted to the large sum of £15,821. 3s. 2d., which is more than has been lent in any two previous years. The number of shares on the register at the commencement of the year was 1,767 3-5th; 982 3-5th shares have been entered, 447 shares withdrawn, 95 2-5th redeemed, and three transferred to the deposit account, leaving 2,204 4-5th shares on the register at the end of the year, being a net increase of 437 1-5th shares. The stock account shows a balance in favour of the Society of £937. 12s. 2d., and the committee recommend that a dividend of 2 per cent. upon the amount of subscriptions received be paid to those members entitled thereto until the next annual meeting.

WARRINGTON WORKING MEN'S BUILDING SOCIETY.—The third annual meeting of this Society was held on Monday week. The balance sheet showed:—Subscriptions as per last report £1,163. 1s. 3d.; received this year, £1,055. 1s. 1d., making a total of £2,218. 2s. 4d. The sum of £298. 14s. 5d. had been withdrawn during the year, leaving £1,919. 7s. 11d. as the net amount due to shareholders. The mortgages as per last report and advances made during the year amounted to £2,045, and deducting repayments of advances, £198. 2s. 8d., left a balance of £72. 10s. 4d. in favour of the Society. The profit and loss account showed that the sum of £155. 16s. 3d. had been received in bonuses. Of this sum £95. 6s. 5d. had been apportioned in payment of the dividend of 7 per cent., £30 for a contingent fund, £10. 2s. 3d. towards the reserve fund, exclusive of secretary's salary and one or two smaller items.

LEGAL INTELLIGENCE.

EXETER 'COUNTY COURT.—Before [M. Fortescue Esq., Judge.—KENSHOLE v. JOHNSON (Jury Case).—Claim of £45, as architect's fees, for preparing plans and specifications for alterations in buildings.—Mr. Friend appeared for the plaintiff, a builder, of this city; and Mr. B. J. Ford for the defendant, a gentleman residing at Farrington.—Mr. Friend, in stating the case to the jury, mentioned that in November, 1868, the plaintiff was called upon by the defendant to come down to his house at Farrington for the purpose of taking the levels of certain grounds and buildings, in order that he might prepare drawings and specifications for alterations defendant required to be made in the premises, and also for the purpose of furnishing him with an estimate of what the cost of the proposed alterations would amount to. The plaintiff was employed for six weeks in taking the necessary levels and preparing the plans, and having furnished the defendant with his estimate, he awaited information from him as to the carrying out of the work. No communication, however, reached him until, in the spring of 1872, he heard that some other persons had been employed to effect certain alterations at the defendant's house, and then it was that he thought it necessary to look about for something like a fee. He accordingly communicated with Mr. Johnson, and some time afterwards the sum of ten guineas was tendered him, but this he declined to accept, on the ground that it was altogether inadequate for the services he had rendered. In offering this amount, however, the defendant admitted his liability, but his terms were most unreasonable, inasmuch as he had only allowed the plaintiff a little over £1 a week for doing an amount of work the accomplishment of which required an educated mind and a large experience. An ineffectual attempt had been made to settle this dispute by arbitration.—The plaintiff was called, and gave evidence in detail as to the work he had been requested to execute. He had charged for the plans in accordance with the usual scale. In cross-examination plaintiff said he went to the defendant under the impression that he should be employed to carry out the work, and from the fact of his not having been so employed he had made his charge.—Mr. E. Luscombe, builder, of Exeter, said it was the usual practice that a builder charged for his plans if he was not employed to carry out the work. He had always charged 2½ per cent., that being at the rate charged by architects. The plans prepared by the plaintiff were properly executed. A vast amount of labour appeared to have been bestowed upon them, and he considered the sum of £45 not by any means an unreasonable charge.—Mr. William Cummings, builder, and Mr. H. Stafford, architect, gave evidence of a similar character. Mr. Ford, in addressing the jury for the defence, contended that it would be absurd for them to entertain the impression that a builder could charge for plans for work which he proposed to carry out, for the very reason that it would be to his interest to charge an exorbitant price. He submitted that this was merely a matter of speculation—that the plaintiff designed these plans in the hope of getting the job, and the job he unquestionably would have had his terms been acceptable.—The defendant, on being called, stated that the plaintiff was introduced to him by the late Mr. Solater. He gave Mr. Solater to understand that the plaintiff, if he prepared the plans, would do so on his own responsibility, but could not recollect whether he told the plaintiff so, nor was he prepared to swear that he told him the sum he contemplated expending. His reason for tendering the plaintiff ten guineas was to save annoyance.—Mr. John Hayward, architect, gave it as his opinion that builders were not entitled to charge professionally for plans. The plans produced appeared to be very unfinished, and he considered that a competent drawing-clerk could have prepared them in a considerably less time than six weeks. In cross-examination, witness stated that if he had prepared proper and complete plans, such as an architect could produce, he should have charged 2½ per cent. upon the outlay.—Mr. Harbottle, the next witness called, stated that after having heard both sides of the case, he regarded the plans sent in by Mr. Kenshole as "a kind of illustrated tender." The plans were wanting in detail, and were not, in his opinion, of such a character as deserved to be charged for.—Mr. Ashworth, architect, also spoke as to the incompleteness of the plans, giving it as his opinion that they were not sufficiently explicit to be worked from.—Other witnesses having been examined, to show that it was not the custom for builders to charge for plans submitted as in the present case, Mr. Friend briefly addressed the jury, contending that his case had not been shaken in the slightest degree by the evidence adduced on the part of the defendant.—The jury returned a verdict for the plaintiff, for £30.

[It will be seen from the above report that a builder considers himself entitled to 2½ per cent. for providing drawings, &c., or the same percentage as an architect would charge. The jury appear to have split the difference.—ED. B. N.]

IMPORTANT MEMBERS OF BUILDING COMMITTEES.—WHITTIER v. IRBEY AND OTHERS.—This was an action tried on Monday, in the Court of Common Pleas, before Lord Chief Justice Bovill, and Justices Keating and Brett, by a builder against Mr. Roberts, a member of a committee for building a church. The case was originally tried before Mr. Justice Keating, when a verdict was found for the plaintiff, with leave to the defendant to move to enter a verdict if the Court should be of opinion that there was no evidence of his liability to go to a jury. A rule having been ob-

tained, cause was now showed against it. The defendant was a gentleman of property in the parish of Christ Church, Lower Clapton, and became a member of a committee to superintend the building of a new church in that parish. He attended a meeting of the committee on the 26th of November, 1869, when it was agreed to accept the architect's plans, if a tender could be got at a price not exceeding by 10 per cent. his estimates. The committee subsequently entered into a contract with the plaintiff for the building, but the defendant was not present at any meeting of the committee after the 26th of November. It was now sought to make the defendant liable for a share of the expenses incurred, the other members of the committee having paid their proportion. The Court made the rule absolute to enter the verdict for the defendant, on the ground that he had not, either expressly, or by holding out, or by ratification, authorised the other members of the committee to pledge his personal credit.

Our Office Table.

CONVERSION OF FORESTS INTO BOGS.—Natural woods have long ceased to exist, except in a few instances. This has been owing to various causes. Extensive forests, occupying a long tract of tolerably level ground, have been gradually destroyed by natural decay, hastened by the increase of the bogs. The wood which they might have produced was useless to the proprietors; the state of the roads, as well as of the country in general, not permitting so bulky and weighty an article to be carried from the place where it had grown, however valuable it might have proved, had it been transported elsewhere. In this situation, the trees of the natural forest pined and withered, and were thrown down by the wind, and it often necessarily happened that they fell into, or across some little stream or rivulet, by the side of which they had flourished.

FIDDLING A BRIDGE DOWN.—In an article on the *Journal of the Franklin Institute* on the effect of sympathetic vibrations of structures in harmony with certain sounds, the following story is told:—When the bridge at Colebrooke Dale (the first iron bridge in the world) was building, a fiddler came along and said to the workmen that he could fiddle their bridge down. The builders thought this boast a fiddle-de-dee, and invited the itinerant musician to fiddle away to his heart's content. One note after another was struck upon the strings until one was found with which the bridge was in sympathy. When the bridge began to shake violently, the incredulous workmen were alarmed at the unexpected result, and ordered the fiddler to stop.

LEAD WATER-PIPES.—The report of the Board of Health of Washington, U. S., recently published, contains an account of some experiments made in that city to test the action of the aqueduct water upon lead pipes. The experiments were made by B. F. Craig, M.D., the Chemist of the Board, and the following extract from his report of the results is to be noted as confirming what we have said on former occasions, with regard to the influence of a combination of metals upon the corrosive action:—"The only piece of lead pipe in my laboratory which has been in use for any length of time, is a piece about nine inches long, which connects a zinc-lined tank with an iron pipe. This has been in use for several years, and may, therefore, be supposed to have received its full amount of protective coating. As, however, it joins with dissimilar metals at both ends, there would be an unusual amount of chemical action upon it in proportion to its length. Now, from six litres of water which passed through this pipe, at the rate of one litre an hour, I obtained forty-seven thousandths of a grain of metallic lead, which gives an impregnation of about three hundredths of a grain per gallon. This result would show that where lead pipe joins iron or zinc, the impregnation of the water with lead will go on for many years."

THE NATIONAL PORTRAIT GALLERY.—The trustees of the National Portrait Gallery have submitted to Parliament their 16th annual report. The donations now amount to 103, and the purchases to 257. Want of space, both for pictures and for sculpture, is again beginning to make itself severely felt. Considerable improvements in the loftier rooms at the eastern extremity of the buildings have been effected by the assistance of the Board of Works. But when the sculpture, comprising terra-cotta busts and bronze monumental effigies, has been arranged as contemplated in the

further room, there will remain no accommodation for anything else. A new feature of interest has, within the last year, been added to the Gallery by the presentation of various autograph letters and signatures written by persons whose portraits are already in the collection. The late Mr. John Partridge had shortly before his decease contributed a large number of letters which he had received from eminent persons represented in his large picture of the "Fine Arts Commission," making arrangements for sittings whilst the work was in progress. Contributions, selected from valuable family correspondence, have also been received from Earl Stanhope, Lord Roakey, and others. One letter, from Lord Roakey's collection, addressed by William Pulteney, Earl of Bath, to Mrs. Montagu, dated 15th October, 1761, bears special reference to the fine portrait by Reynolds, now in the Gallery, of Lord Bath, which he appears to have presented to Mrs. Montagu, naming the time for his last sitting, and revealing the extent of assistance which the painter, then only Mr. Reynolds, was in the habit of receiving from other artists. Several letters, also from eminent persons, of a more recent date, addressed to the distinguished portrait painter, the late Thomas Phillips, R.A., have been added to the collection.

THE NEW COURTS OF JUSTICE.—The following facts are interesting when taken in connexion with Mr. Ayrton's explanations—an abstract of which is given in our Parliamentary Notes. The tenders for the building were delivered on the 25th of March last. The lowest of the 19 tenders delivered was that of Messrs. J. Bull & Sons, of Southampton. The total cost of the building, if erected in Chilmark stone, is to be £732,095, and if erected in Portland stone, £744,344, while the fittings of each of the courts (18 in number) are tendered for at £804. The foundations have been completed at a cost of £31,500. For a sum of £790,316, therefore, it seems that Messrs. Bull & Sons are willing to undertake the erection and completion of the building exactly according to Mr. Street's original plans, using Portland stone for all stonework, and oak for all the furniture and joinery. The amount which was originally to have been spent on the fabric was £750,000, but this sum was settled many years ago when prices were much lower than they are now.

THE BRADFORD BUILDING TRADES TECHNICAL SCHOOLS.—These schools, established in 1868, for the purpose of enabling journeymen and apprentices in the building trades of Bradford to acquire a good technical knowledge of their respective trades, have proved of great value. Since the formation of the schools about 800 pupils have been instructed in reading, writing, arithmetic, mensuration, geometry, algebra, working drawings for joiners, masons, &c., and freehand drawing. Instruction is also imparted in the theory and practice of handrailing, skew arches, and circle upon circle doorways, painting, &c. A joiner's shop was fitted up with bench and tools, and a place was found for the masons. The pupils were furnished with material, and some creditable specimens of handrailing, staircase building, bridges, &c., have been produced on the premises. The models are worked to scale, and it is presumed that when a young man can construct a model in this manner he can carry out a larger structure. The pupils are shown how to make a plan, to read it and complete the work, enabling them to take in hand and execute the most intricate job. The schools are open on week nights, and specimens of all kinds of wood are placed in the rooms. Journeymen study apart from the apprentices, and thus one ground of objection on the part of the men to attend the schools is removed. The charge is 3s. a quarter, and rather more for the advanced class. The attendance has, on the whole, been pretty good, but not so large as could be desired, considering the large number of inferior workmen which abounds. The expenditure has been about £1,200, and has been defrayed by voluntary subscriptions, by payments made by employers for their apprentices, by the school fees of the pupils, and about £30 from the Government grant.

THE LATE MR. CHARLES LUCY.—By the death, on the 19th inst., of Mr. Charles Lucy, at the age of 59, we have sustained the loss of an artist of as wide a reputation as any English painter of his time not a member of the Royal Academy, and the only one who, whether meeting with success or discouragement, devoted himself with life-long constancy to the highest branches of historical

painting. Mr. Lucy was born at Hereford. In his youth he was apprenticed to his uncle, a chemist of that city. The love of art which had manifested itself in boyhood proving, however, irrepressible, he came to London to study painting as a profession, but shortly afterwards went to Paris, where he continued his studies at the Ecole des Beaux Arts, principally under Paul Delaroché. Returning to England he became a student of the Royal Academy. After the completion of his studies, employment was given him by a Mr. Jones to make copies of works of old masters at the Hague and Paris. He again returned to England on the completion of this task, but after a short stay he went back to Paris, and at length settled in the artist colony at Barbison, near Fontainebleau, where he resided nearly 16 years.

THE ROYAL ACADEMY.—On Friday week the Royal Academicians met, and elected, by a large majority, Mr. John Marshall to succeed the late Prof. Partridge, as Professor of Anatomy in the Royal Academy. Mr. E. M. Barry, was, at the same time, elected Professor of Architecture, and Mr. Weekes, Professor of Sculpture. The resignation of Mr. J. P. Knight, who has been for so many years Secretary of the Royal Academy, has been accepted. His successor will be a layman, no Member of the Academy being, in future, eligible for this office. The election of the new Secretary will take place as soon as this decision has been ratified by the Queen, which is expected to be done shortly.

THE SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—On Thursday evening last, Mr. George Browning delivered a lecture to the members and friends of the above Society. The subject, the "Art-Treasures of Italy," was rendered perhaps the more deeply interesting by the fact of the lecturer's recent return from a tour in Italy, enabling him to give most graphic descriptions of scenes and places with which all true lovers of art must long to become acquainted. A large collection of old Roman curiosities, as well as a number of photographs taken from some of the important scenes and works of art, helped materially to illustrate the paper. After the lecture, an animated discussion took place, touching, more particularly, on the pre-Raphaelite school, between the Chairman (Dr. Zerffi), Mr. Daniel Grant, Signor Pagliardini, and other members of the Society. The evening closed with a cordial vote of thanks to the lecturer.

TEST FOR THE PURITY OF WATER.—Place a cubic centimetre of the water to be tested on an object-glass of a microscope, made into a little cup by cementing a glass ring on it. The water is then evaporated at 40–50° C., and the residue examined with the microscope. If the water is pure, as it is found in nature, the residue shows only colourless, dendritic, or sharply defined hexagonal crystals of carbonate of lime. If, on the other hand, the water holds organic substances in solution, more or less imperfectly formed, yellowish or reddish hexagonal or rhombohedral crystals are seen, according to the amount of impurity. When greatly contaminated, twin crystals, and triangular crystals with the angles blunted, and, finally, dumb-bell shaped crystals are found, partially of fat and partially the germs of fungus. In doubtful cases, these latter may be placed in suitable moist chambers, and cultivated until they are developed. Experiments prove that less than the thousandth part of sewage or of urine added to water produces a great change in the appearance of the residue.

VENTILATION AND WARMING.—In a lecture on ventilation, lately delivered before the Franklin Institute, Mr. L. W. Leeds, after detailing the abominations he encountered in his examination of the ventilating arrangements of the Treasury building at Washington, gives the following practical directions concerning provisions for ventilation and warming in the construction of buildings: "First, never have long underground fresh-air ducts. Second, never allow a sewer, soil-pipe, foul-air flue, or smoke-flue, to come near the fresh-air supply-flue, for fear of some connection being made between them by carelessness or accident. Third, never heat a building exclusively by currents of warm air. Fourth, always put the heating-flues on the outside walls instead of on the inside walls. Fifth, endeavour strenuously to avoid the fresh-air chamber becoming a common receptacle for all the rubbish of a filthy cellar."

CHIPS.

A new Unitarian chapel was opened on Thursday week at Stockton-on-Tees. The chapel will accommodate 300 persons, and provision has been made for the erection of a gallery to seat 200 more. The chapel and schools have been built from the designs of Mr. E. E. Clephan, Stockton, at a cost, including land, of £2,800.

A school to accommodate about 170 children is about to be built at Longhill, West Hartlepool, near the ironworks of Messrs. T. Richardson and Sons, who have given the ground. G. Martin, Seaton-Carew is the architect.

Galvanised iron cornices have been entirely adopted in the erection of an important group of railroad shops at West Philadelphia, U.S., as a safeguard against the communication of fire from one building to another.

Messrs. Hunter and Carr are erecting twelve cottages on the estate of Mr. Bolckow, at Marton. They are in three detached blocks, Gothic in style. Plans have also been prepared by the same architects for three cottages for the farm on the same estate. These cottages will be warmed by Shillito and Shorland's patent stoves. There will be no fireplace in the upper rooms, which will be warmed from the rooms below.

On Saturday afternoon the foundation-stone of a church was laid at Rishton, near Blackburn. The building will be in the Gothic style, will accommodate 600 persons, and the cost is estimated at upwards of £5,000.

The German Parliament has rejected the scheme of its commission for the construction of a palace for the Parliament on the site of the Kroll Gardens. The commission has been asked to suggest another scheme.

While Glasgow has been obliged to modify its scheme for public halls, the suburb of Paisley has more money for a similar purpose than it knows well what to do with. After £14,000 had been contributed by the townsmen, a Mr. Clark bequeathed £20,000. There has been a proposal to build a town hall with the joint sum, but Mr. Clark's relatives are desirous that his gift be put to its purpose independently of extraneous aid. It has become a question whether to return the £14,000 to the subscribers, or to apply it to the building of an infirmary.

Trade News.

WAGES MOVEMENT.

OLDHAM.—The masons of Oldham, who have been out on strike for an advance of 3s. per week, have decided to go in on the terms offered by the masters—1s. 6d. per week advance at once, and another advance of a similar amount on the 1st of August. When the whole of the concession has been obtained by them, the men's wages will be 33s. per week.

WIGAN.—An arrangement has been entered into between the Wigan carpenters and joiners and their employers, whereby the wages of the men are to be advanced from 6½d. to 7d. per hour all the year round, 55 hours to constitute a week's work in the summer, and 47½ for three winter months, from November 12 to February 2.

WALSALL.—The strike of the Walsall bricklayers for an advance of 3d. per hour, making 7d., is over, the advance having been granted.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.

24 by 12	22 by 12	20 by 10	18 by 10	18 by 9
37s. 6d.	33s. 6d.	25s. 6d.	21s.	19s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8
19s. 6d.	14s.	17s.	11s. 6d.	6s. 6d.

Per m of 1,200 Slates, Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A & G's Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, St. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BAWTRY.—For erecting a malthouse at Ranskill, near Bawtry, for Messrs. Jenkinson. Mr. Charles Baily, architect, Newark-on-Trent.

Johnson	£1,980 0 0
Cawthorne	1,796 0 0
Wilson	1,784 0 0
Hopkinson	1,783 0 0
Hill (accepted)	1,697 0 0

BRIGHTON.—For rebuilding and additions to No. 29, King's-road, Brighton, for Mr. James Butler, Messrs. Gouly and Gibbins, architects, London and Brighton.

Lyons and Sons (accepted) £4,347 0 0

BURTON-ON-TRENT.—For addition of new ward to the Burton Infirmary.

Gee and Co.	£1,181 0 0
Bennett	1,150 15 0
Deville	1,124 15 0
Price	1,079 0 0
Mason	1,075 0 0
Lowe and Sons	1,070 0 0
Bowler and Beck (accepted)	1,055 0 0

GATESHEAD.—The Gateshead School Board has accepted the tender of Mr. John Bulmer, of Darlington, for the new school in Alexandra-road, Gateshead.

KENT.—For erecting house at Knockholt, Kent. Mr. Alex. R. Stenning, architect.
Woodward (accepted) £4,400 0 0

LANCING.—For erection of block of three cottages for Mr. Henry Hounsom. Messrs. Goulty and Gibbins, architects, London and Brighton.
Hindess (accepted) £550 0 0

LEWISHAM.—For erecting S. Stephen's Vicarage, Lewisham. Mr. Alex. R. Stenning, architect.
Woodward £2,420 0 0
Lascelles 2,285 0 0
Jerrard 2,249 0 0

LONDON.—For building studio, &c., at No. 14, Great James-street, Bedford-row. Messrs. Raynes and Shum architects.

Langmead and Way £290 0 0
Foxley 274 0 0

LONDON.—For alterations to No. 2, Old Fish-street-hill, Upper Thames-street. Messrs. Edmund Woodthorpe and John M. K. Hahn, architects.

Conger £2,300 0 0
Hill and Sons 2,248 0 0
Ashby and Sons 2,197 0 0
Pritchard 2,152 0 0
Turner and Sons 2,107 0 0
Perry Brothers 2,073 0 0
Woodward 1,860 0 0

LONDON.—For the erection of steam-printing works, for Mr. H. M. Pollett, Bridgewater Gardens, Barbican. Mr. John M. K. Hahn, architect. Quantities supplied by Mr. Morris Evans, 7, John-street, Adelphi.

Avis and Co. £4,520 0 0
Perry and Co. 4,150 0 0
Henshaw and Co. 3,970 0 0
Dove Brothers 3,775 0 0
Hill and Sons 3,745 0 0
Jackson and Shaw 3,677 0 0
Little 3,570 0 0
Woodward 3,545 0 0
Brass 3,427 0 0

MIDDLESBROUGH.—For the erection of stabling near Middlesbrough, for Mr. J. P. Hornung. Mr. W. H. Blessley, architect.

Oliver £978 0 0
Buck 833 0 0
France (accepted) 780 0 0

MIDDLESBROUGH.—For the erection of a residence and stabling at Marton Grove, near Middlesbrough, for Mr. R. H. Charlton. Mr. W. H. Blessley, architect.

Bellerby £5,974 0 0
Shafto and Barry 4,998 0 0
Johnson 4,900 0 0
Johnson, John 4,835 0 0
Oliver (accepted) 4,414 0 0

MIDDLESBROUGH.—For the erection of a school in East-street, for the Middlesbrough School Board. Mr. W. H. Blessley, architect.

Johnson £3,986 0 0
Stainsby 3,890 0 0
Bellerby 3,738 0 0
Hallgate 3,275 0 0
Shafto and Barry 3,243 0 0
Oliver 3,184 0 0
France 3,175 0 0
Johnson (accepted) 3,070 0 0
Adamson 2,997 0 0
Bulmer and Co. 2,180 0 0

MIDDLESBROUGH.—For the erection of a Jewish synagogue, Middlesbrough. Mr. Edward Tidman, architect.

	Stone	Terra Cotta
Sharpe	£3,533	£3,500
Wood	3,530	3,500
Bellerby	3,333	3,276
France	3,060	
Chapman	2,966	
Chappell	2,200	2,150

MILDENHALL.—For West-row schools and master's residence, Mildenhall, Suffolk. Messrs. John Young and Son, architects, London. Quantities by Mr. A. L. Buzzard.

	Estimate No. 1.	Estimate No. 2.	Variation.
Kendall	£3,831	£3,260	£571
Bell and Son	3,360	2,865	495
Merritt	3,273	2,861	412
Conger	3,197	2,777	420
Robbins	3,000	2,613	387
Brass	3,022	2,632	390
Laughton	3,330	2,617	713
Andrews	2,888	2,444	444
Tooley (accepted)	2,958	2,433	525

MILDENHALL.—For Cross Bank Schools, Mildenhall, Suffolk. Messrs. John Young and Son, architects, London. Quantities by Mr. A. L. Buzzard.

	Estimate No. 1.	Estimate No. 2.	Variation.
Kendall	£1,819	£1,644	£175
Merritt	1,435	1,340	145
Condon	1,439	1,296	143
Robbins	1,363	1,218	145
Tooley	1,313	1,181	132
Laughton	1,397	1,170	227
Brass	1,277	1,137	140
Bell and Son	1,220	1,055	165
Andrews (accepted)	1,111	951	160

NEWARK-ON-TRENT.—For erecting a residence at Newark-on-Trent, for Mr. John Harvey. Mr. Charles Baily, architect, Newark-on-Trent.

Clark £2,600 0 0
Fretwell 2,380 0 0
White Bros. (accepted) 1,991 0 0

NOTTINGHAM.—For double villa, Portland-road, Nottingham. Mr. John Collyer, architect, Nottingham.

Bell and Son £1,429 0 0
Wool and Slight 1,423 0 0
Vickers 1,389 0 0
Stevenson and Weston (accepted) 1,380 0 0
Bradley and Barker 1,377 0 0
Daubney 1,346 15 0

NOTTINGHAM.—For Wesleyan chapel and schools, Tennyson-street. Mr. John Collyer, architect, Nottingham.

Ward	£5,630	0	0
Johnson	5,380	0	0
Wood and Son	5,235	0	0
Underwood	5,234	0	0
Lowe	5,182	0	0
Wooland Slight	5,170	0	0
Hind	5,155	0	0
Fish and Son	5,150	0	0
Dennett	5,149	0	0
Bradley and Barker	5,100	0	0
Jelley	5,090	0	0
Hodgson and Facon	5,075	0	0
Lyman	4,970	0	0
Stevenson and Weston	4,900	0	0
Bell and Son	4,816	0	0
Vickers (accepted)	4,640	0	0

NOTTINGHAM.—For shop and warehouse, Lincoln-street, for Mr. J. Leighton. Mr. John Collyer, architect, Nottingham.

Lowe	£1,507	0	0
Hind	1,490	0	0
Messom	1,330	0	0
Vickers (too late)	1,295	0	0
Jelley	1,255	0	0
Stevenson and Weston (accepted)	1,235	0	0

READING.—For a rifle manufactory to be erected at Reading, for Mr. W. Soper. Mr. J. S. Dodd, architect.

Pegler	£893	0	0
Mathews	869	0	0
Barnicoat	868	0	0
Wheeler Bros.	855	0	0
Sheppard	853	0	0
Strong	836	0	0

SHORTLANDS.—For erecting stables at Shortlands. Mr. Alex. R. Stenning, architect.

Crossley (accepted) £700 0 0

SOUTH STOCKTON.—For the erection of fifty-two workmen's cottages, near South Stockton, for the "Erasmus" Iron Company (Limited). Mr. W. H. Blessley, architect.

Stainsby (accepted) £7,400 0 0

SURREY.—For mission chapel and cottage at Oxshott, Surrey. Mr. Henry Peak, architect, Guildford.

Mission Chapel, Cottage.
Clark (accepted) £134 10... £148 15 0

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[ADVT.] TO ARCHITECTS.

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COMPETITIONS OPEN.

BASSENTHWAITE, CUMBERLAND.—June 30.—For plans, &c., for the erection of a chapel. A premium of £25 is offered for the best design. Mr. Jos. M. Richardson, Hut-ton House, Penrith.

DEVON COUNTY ASYLUM.—June 24.—For plans, specifications, and estimates for additional buildings at the Asylum at Exminster. The architect whose plans may be adopted will be employed to superintend the works, on the usual terms of commission, provided it be found that they can be executed within the estimated amount. The sum of £25 will be given for the second best design, namely, £10 for that of the chapel, and £15 for that of the other buildings. T. E. Drake, Clerk to the Committee, Exeter.

NORFOLK AGRICULTURAL ASSOCIATION.—For a design for Norfolk labourers' double cottage. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NORFOLK AGRICULTURAL ASSOCIATION.—For designs for farm buildings for a Norfolk farm of about 300 acres. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NOTTINGHAM.—July 15.—For designs for a new Gothic church. Premiums of £75, £50, and £25 will be awarded to the second, third, and fourth designs. The one accepted will be adopted by the Committee, should it fulfil all the necessary requirements. Mr. Wm. Clarke, The Park, Nottingham.

SHREWSBURY.—June 21.—For design for a memorial drinking fountain. A premium of £5 will be given for the selected design. Mr. Kent, 38, High-street, Shrewsbury.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 23, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

BOARD OF WORKS, WESTMINSTER DISTRICT. June 3.—1. For the supply of horses, harness, and drivers to be employed in carting away the slop and other street sweepings, and in watering the roads. 2. For removing the dust, ashes, dirt, filth, rubbish, and other refuse. Mr. J. Harris, 25, Great Smith-street, Westminster, S.W.

BOARD OF WORKS, WESTMINSTER DISTRICT. June 10.—For the execution of general works and repairs to sewers, &c. J. Harris, Clerk to the Board, 25, Great Smith-street, Westminster.

BUENOS AYRES. June 2.—For the water supply, drainage, sewerage, and paving of the city. Mr. J. F. Bateman, Engineer, 16, Great George-street, Westminster, S.W.

CHURWELL CO-OPERATIVE SOCIETY. June 8.—For the erection of premises for the above society. Daniel Dodgson, architect, 18, Park-row, Leeds.

DAWLISH, DEVON. June 7.—For altering and re-seating the parish church. Mr. St. Aubyn, architect, Lamb-buildings, Temple, London.

ELTHAM. June 3.—For the erection of a villa residence, coach-house, and stables. T. C. Haworth, Surveyor, Park-place, Eltham, S.E.

FRAMLINGHAM. June 4.—For the erection of a court-house and alterations to police-station. Mr. Eytton, County Surveyor, Lower Brook-street, Ipswich.

HALIFAX. June 4.—For the erection of public elementary schools, with out offices, boundary wall, &c., at Booth Town. Messrs. Leeming and Leeming, architects, Halifax.

LANCASHIRE AND YORKSHIRE RAILWAY. June 10.—For the construction of the Ripponden Branch Railway. Engineer's Office, Hunt's Bank, Manchester.

LEWES. June 7.—For the erection of a race stand. Mr. J. D. Verrall, The Mulberries, Denmark-hill, S.E.

LLANELLY SCHOOL BOARD. June 2.—For the erection of a school and offices at Pontyates, to accommodate 100 children; a boys' school and offices at Upper Park-street, to accommodate 300 children; an infant school at Felinford to accommodate 90 children; and for making alterations at the existing school at Felinford. Mr. John Jennings, Clerk to the Board, Llanelly.

LONDON COMMISSIONERS OF SEWERS. June 3.—For the supply of cast-iron work. Joseph Daw, Principal Clerk, Sewers Office, Guildhall.

MORLEY LOCAL BOARD. June 4.—For levelling, kerbing, paving, and flagging the east end of Mill-street. John Rayner, Clerk to the Board.

MORLEY LOCAL BOARD. June 4.—For levelling, kerbing, paving, and flagging the Old Fold and Jackson-lane. John Rayner, Clerk to the Board.

NORTH LONDON RAILWAY COMPANY. June 3.—For the purchase of about 25 tons of old material. R. S. Mansel, Secretary, Euston Station.

RAMSGATE LOCAL BOARD. June 2.—For the supply of flint, gravel, beach, broken stone, and other road material; limes, cement, bricks, and stoneware pipes; for smiths' and ironmongers' work; for unloading ships and barges; also for slopping, watering, and carting. W. A. Hubbard, Town Hall, Ramsgate.

RHOYADER. June 3.—For the erection of a workhouse to accommodate sixty inmates. Mr. John Jarman, Clerk to the Guardians, Rho-yader.

SHAWFORTH, NEAR BACUP. June 9.—For the erection of a new Wesleyan chapel and schools. W. Waddington, architect, Burnley.

SMALLTHORNE. June 5.—For forming, kerbing, sewerage, channeling, and paving Lord and Derby streets. Mr. Cope, Surveyor to Local Board, Smallthorne.

ST. PANCRAS. June 9.—Contract No. 1.—For paving York-road. Contract No. 2.—For repaving part of Tottenham Court road, Percy-street, &c. Mr. W. B. Scott, C.E., 10, Edward-street, N.W.

SULLINGTON, SUSSEX. June 3.—For restoring, re-seating, and adding vestry to the church. Mr. L. W. Ridge, architect, 23, Bedford-row, W.C.

SURREY.—For the erection of a range of stabling and coach-houses, with coachman's house, at Down place, near Guildford. Mr. H. Peak, architect, 3, Market-street, Guildford.

TILNEY S. LAWRENCE SCHOOL BOARD, NORFOLK. June 16.—For the erection of schools and teacher's residence. Adams and Son, architects, Bridge-street, Lynn.

TORQUAY. June 10.—For the erection of a police-station. Mr. H. Ford, Clerk of the Peace, Exeter Castle.

WAR DEPARTMENT CONTRACTS. June 4.—For constructing a drain from the ditch of Stokes Bay Lines, near Gosport. Lieut.-Col. J. H. Smith, Royal Engineer Office, Portsmouth.

WATLINGTON, OXON. June 18.—For the erection of schools to accommodate 262 children. Mr. W. Wiggins, Watcomb Manor, Watlington.

WELSHPOOL. June 3.—For taking down a portion of the present town-hall and adjoining buildings, and reconstructing the town-hall. Mr. B. Lay, Architect, Bridge House, Welshpool.

BANKRUPTS.

SITTINGS FOR PUBLIC EXAMINATION.

D. H. Haley, Birmingham, June 25.—G. Dixon, Hartlepool, June 24.

DECLARATION OF DIVIDEND.

W. Tyson, Wavertree, builder, 2s. 1½d.

PARTNERSHIPS DISSOLVED.

Watson and Wormald, Leeds, blue slaters.—J. and D. Shea, New-cross, Deptford, and elsewhere, glass manufacturers.—R. B. Richardson and Co., Gateshead, iron-founders.—W. and J. Jopling, Vincent-square, Westminster, builders.—John Anwell and Son, Liverpool, road and sewerage contractors.

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THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 6, 1873.

COMPETITION DESIGNS FOR THE LEICESTER MUNICIPAL BUILDINGS.

LEICESTER eminently needs a noble municipal group of buildings. It is a typical example of a modern English town. Situate in the heart of the Midland district, amid a rich and smiling, but somewhat tame and monotonous, landscape; with spacious streets, composed of houses mainly built of brickwork, it has a cleanly, comfortable, well-to-do aspect, but yet it is deadly dull withal, in an architectural sense. Although its origin dates back to a remote period, and blends in its history fiction with fact, boasting to have taken its name from King Lear, and to have been the burial-place of that ill-fated monarch and his daughter Cordelia, all traces of Roman, Saxon, and Mediæval times alike have well-nigh faded away. A few fragments of rubble walling, seamed with thin brick, which once formed part of the Jewry wall, and some insignificant ruins of the Abbey, which was "the last resting-place of the great Cardinal Wolsey, on his compulsory journey from York," are still to be found, imbedded in market-gardens or incorporated into manufactories. What remains of the Castle exist are encased in modern and incongruous work; and here and there some domestic buildings of past days, for the most part so decently restored that their antiquity has been effaced, may be cited as actual if not visible records of the good old times when cleanliness was not esteemed as very near, even if next, to godliness, and picturesqueness was certainly obtained, if not specially aimed at, in street architecture. Ancient Leicester, with its walls, gates, and narrow, winding streets, has been completely remodelled into a large, comfortable, commonplace manufacturing town; some of the old churches, however, alone remain of its former architectural features, and are in sad isolation from all their harmonious surroundings. Many other new churches have been added in recent days, and their numerous spires are quite able to hold their own among the forest of tall chimneys which mark, if they do not decorate, the suburbs; but few other public and private buildings could attract more than a passing glance, not even excepting the pretentious, but small, fussy, and ineffective "New Cross Memorial Structure," as it is called, and which the author of the local guide-book considers "a handsome clock-tower, which is at once a noble and useful ornament, and a suitable memorial of four of the worthies of Leicester."

It is much, therefore, to be desiderated that some municipal buildings of really dignified character should elevate themselves above the level of the "banks and warehouses, the post office, the news-room, temperance-hall, Congregational churches, &c.," which fairly indicate the character of the town," &c., and give the good folk of Leicester some ideas higher even than successful hosiery and bootmaking.

Our readers are aware that some aspiration after better things has for some time existed in the minds of the Corporation and townsmen, the architectural profession having now been twice called upon to assist them in their endeavours. Leicester has not, however, risen boldly to the occasion, although a glimmering of what is befitting the place appears to animate the minds of its authorities.

The truth is, they are educating themselves at the expense of architects, and architects, with their wonted Quixotic generosity, have undertaken the almost gratuitous task. Unwearied by disaster, unstimulated by even hope of adequate remuneration, for the second time the profession has responded eagerly to the invitation of the Leicester Corporation to supply designs in competition for their pro-

posed town-hall and its associated buildings. Twenty-five gallant volunteers on this occasion enrolled themselves for the struggle in which one alone might possibly win the prize—a dwindling band, for forty, who fought as doughtily in the first competition, when the prize was withheld, are still chewing the cud of disappointment. On the principle, however, that it is useless to waste regrets over spilt milk, we dismiss the consideration of the past contest, in order to turn to that of the present, simply calling attention to the cost entailed upon the profession by the system adopted, and expressing a hope that, at any rate, this time the labour so freely expended may not prove equally in vain. Fifteen out of the twenty-five competitors are, however, already relieved from suspense, their rejected drawings having been eliminated, and the remaining ten being still kept upon the tenter-hooks of anticipation.

In one respect it seems likely that as regards this competition it will turn out that the old adage, "Second thoughts are best," will prove correct. This is with respect to the site now proposed to be given for the purpose. On the former occasion it was a long irregular slip of ground in anything but a commanding situation, and the difficulties entailed by which spoilt some admirable designs. Now, thanks to the energetic representations of the intelligent surveyor to the Corporation, Mr. E. L. Stephens, an infinitely superior piece of ground has been set aside for these municipal buildings. The present one is a well-proportioned parallelogram, surrounded on all sides by streets of considerable importance, and with the possibility of a large open space being hereafter cleared and left before the main frontage of the new structure.

The want of confidence engendered in the minds of architects generally by the untoward result to their brethren of the first competition, taken in connection with the many other mishaps which have recently occurred under the competition system elsewhere, have reduced the number on the lists of this contest to far less than the importance of the building might have been expected to call forth. Only twenty-five sets of drawings were sent in for it, and of these only one is of first-class rank, so that it is evident that the principal architects have abstained from the temptation offered them. Ten sets out of the twenty-five, as we have said, have been selected for further consideration, and the selection has been made with apparent good reason and judgment, mainly on account of fitness of requirement and accommodation, in which respects these ten all show considerable merit, together with varying degrees of architectural excellence. By far the greater majority of the authors of these designs, including that alluded to above as being, without question, far the best, have taken pure English Gothic of the Early Decorated period as their style, and we observe the lately fashionable French variety conspicuous by its absence. Of course the influence of the "Queen Anne" mania of the day is observable, and has one powerful adherent among the selected ten; a few competitors have halted between two opinions, either by combining eclectically the features of Gothic and Italian in the same design, the result being queer enough in most instances; while others, dubious which style it would be safer to affect, have striven to persuade the Corporation that they would be able to make them equally happy with either; but with the usual result accorded by fate to such trimmers, they betray that they are on sufficiently intimate terms with neither.

The competitors were, by the conditions, left at liberty to shroud their names under mottoes or not, at discretion—in our opinion a wise plan, because many architects reasonably object to its being known they have failed in such contests, which the motto system to a certain degree insures, while to enforce the use of mottoes upon all is but a

farce. The following are the ten designs selected for further consideration:—

No. 1. "Simplicity" (authorship unknown, and, as far as we can learn, unsuspected). The title assumed is fully deserved, as simplicity characterises all its treatment and management. It is pure English Decorated Gothic in style, most ably treated, as by a master hand, in a thoroughly common-sense and Mediæval spirit. The group of buildings express the purpose of every part. There is no straining after symmetry or "architecturesque" effect, but all rises naturally from the plan and its requirements. It is clearly but slightly sketched in pencil, which method of execution places it under a disadvantage among the competing drawings.

It consists of three main blocks, which occupy three sides of the allotted quadrangle—the north official block, next Horsefair-street, which is by far the most noisy and frequented; the Council Chamber, western block, occupies the centre next New-street, which will have the largest vacant space before it, and the south or Police-court block is towards Bishop-street. These three blocks inclose a large court 85ft. by 82ft., which is that demanded for the police parade-ground, the requirement for which is privacy and freedom from exposure to the outside, and in this case accordingly there is but the one wall to the rear, with the necessary entrance gateway in it. The corridors are well lighted, and the courts are retired from the streets towards the centre of the parallelogram; perhaps the minor court is somewhat exposed and less happily situated than in some plans, being at the south-eastern corner of the site, still not near the noisy thoroughfare. The judges' retiring-room is not so well placed as in other plans, but generally the arrangements are simple and good, and the plan is a very excellent one, if not the best. Architecturally speaking, however, this design is not only by far the best submitted in this competition, but it is one that would hold the highest rank in comparison with any of the other municipal buildings of present times, and would be an ornament and a credit to the town. The site requires that the principal features should be brought to the several street façades, as any tower or feature centrally placed on the parallelogram would lose its effect. The principal perspective in this case has a central feature in the New-street façade, in which the council chamber is marked by four fine two-light traceried windows and an effective oriel at the dais end, with a lantern with *flèche* rising from the roof. A pretty circular turret marks the one end of this façade, and a noble tower the other. This latter, though slightly exaggerated in height, and to be improved by some reduction in height, is well conceived and ably carried out, and a rich doorway near its base forms the principal entrance to the building.

Perhaps we should place next in order the design marked No. 9, by Messrs. Ordish and Traylen, of Queenborough and Leicester. This is also a good plan and effective general design, and the perspective view from the rear shows a striking pyramidal pile of buildings of a picturesque character. Such a view, however, could never be obtained of the actual buildings if erected, as the tower, being centrally placed, could never sufficiently dominate the rest. The style is eclectic and eccentric, and the combination of Italian parapets with balusters and pots, and stepped gables and windows, some mullioned and some pointed, is incongruous. In the principal façade regularity and irregularity combat for precedence, the main block being slightly out of the centre. This has a high chisel-edged roof, and the wings Mansard ones, and one side only, with the centre, has niches for gigantic statues. This façade would not be successful in execution. The retired and relative position of the courts is good, and the parade-ground well inclosed and protected.

No. 13.—“*Contranando Incrementum*,” we should place next in order. The author gives two designs, one Gothic and the other bastard Renaissance, which are creditable and painstaking, but not masterly. The main tower in each is set at the north-eastern angle, and generally the same grouping of the blocks obtains as in No. 1, but without the picturesque or harmony. The Gothic version of this tower is a weak imitation of that which occupies the same position in the group of buildings which form the Midland Station and Hotel at S. Paneras. This tower, in itself to our mind but an indifferent one, appears to have been copied in other instances besides in this competition. The plan has many good points, but is deficient in the area of the parade-ground, to which 430 yards, instead of the 700 specified, only have been allotted. The courts are central and quiet, and the entrance staircase better than in most of the designs. The detail of the Gothic design is only moderate, and the composition and skyline poor, nor is the jumble of mullioned windows and the Italian features of the alternative one better worked out.

No. 8.—“*Bosworth*,” is a design of moderate excellence, with a fairly good plan, defective as to limited size and exposed position of the parade-ground. The courts are central and quiet. The style Gothic. The principal façade towards New-street tolerably well composed with a central tower and pavilion-roofed angle-blocks. The first-floor range of two-light traceried windows are a successful feature, and the sky-line is satisfactory.

No. 20.—Mr. F. J. Hames, Woburn-place, London, has a clever design in the Queen Anne style, after the fashion of Hampton Court Palace. The central block of the façade towards New-street has a very dignified effect, but the composition, as seen in the perspective, is spoiled by a poor ill-placed tower near the north-east angle. The long, square windows, cut up into minute squares by wide sash-bars, and other vagaries of the style, are carried to exaggeration. The design might harmonise with modern Leicester, but as we have indicated, we think some contrast to its prevailing character would be preferable. The plan is arranged round the front and ends of the parallelogram, leaving the parade-ground to the rear, so that it is well protected, and all the principal courts and rooms deriving their light from it are kept quiet and retired, as they should be. Mr. Hames sends a pleasing drawing of the interior of his proposed Council Chamber, with an Elizabethan plastered semi-circular ceiling and effectively panelled walls.

No. 4, by Messrs. Goddard & Spiers, we should rank next, the plan being good, with prominent entrance and staircase in the centre of the principal façade, and the courts retired and close, as they should be. The parade-ground is of proper size, and open on to the one side at the rear. The perspectives are very sketchy and careless, and not particularly well grouped. There is an ugly, heavy tower in the centre of the façade, and the detail is indifferent and eccentric. The interior of the Borough Court is shown in a good sepia drawing, and the arrangements appear satisfactory and the design of it simple. There is an alternative design by these gentlemen in Renaissance, not worked out, to our mind, more successfully than the other.

No. 16, “*Invicta*,” has a plan differing from the prevailing type of the rest, which surround three sides of the site, and are open on the fourth. The author of this design has carried his blocks of buildings round the entire parallelogram, and left his open parade-ground or area in the middle, thus securing privacy to it, and ample light to his corridors which surround this court, but throwing all his apartments next the streets, and losing the privacy and quiet which are so important. The design is in passable Gothic detail, but has a tower in the centre of its façade, and turrets at the angles, which are terribly exaggerated. A whole story might be spared out of the former with advantage.

Mr. F. W. Roper, of Adam-street, Adelphi, sends a design in an effective eclectic style, treated with ability and originality, which can only make us regret he did not apply his powers to a better and purer style. All the windows are grouped with pilasters carried up at the sides, with all the strings broken round them, to get a preponderance of verticality in the effect. A tower is carried up in the centre of the façade, and the angles are marked by pavilion-roofed blocks. The composition would be improved by the omission of the upper spire-like portion of this tower, when as a composition it would be satisfactory and grandiose, though marred by impurity of detail. The positions of the principal court and judges’ retiring-room are excellent, but the position of the parade-ground, exposed on two sides at the south-west angle, mars an otherwise good plan.

No. 25, by Mr. R. Stack Wilkinson, of Torquay, is a Gothic design of but moderate excellence, with a tower unduly heavy in effect. But the plan is a particularly good one—in fact, one of the best; the position of the parade-ground, open only at the south end, and partially covered over at the other, is convenient. The two courts are admirably placed side by side. The arrangement of the male and female witnesses’ accommodations, and barristers’ consulting-room, appears very satisfactory.

No. 17, by Messrs. G. Gilbert Scott, jun. and J. O. Scott, we must place last on the list out of the selected ten, mainly on account of the indifferent treatment of the style (Gothic). We miss in it that quiet evidence of mastery of detail which characterises the several churches in the town built after designs by their father, and wonder and regret that the class of work here placed before us should in no way tend to maintain that reputation which no doubt gained them position among the preliminary selected competitors. Even the drawings are not up to the mark we have been accustomed to associate with the name, but are heavy and laboured. The design is ill-composed, has a bad sky-line, and ungainly detail. The plan is tolerably satisfactory as to the position of the courts, but the parade-ground is open and exposed. The main façade resembles others in having a central block with roof raised above the rest. This block is divided into three bays, roofed dormer-wise against the main roof. The lower part seems, but only seems, to present an open arcade, which, by reference to the plan, is but a sham, shallow, useless recess. A range of ugly two-light windows occupies the first floor, between which and the gables of the dormer runs a sham parapet, and the wings, which have objectionable battlements, are stopped by a depressed tower with four gables at one end, and by the ugliest tower it has been our misfortune to see designed for a long time, at the other. Of the remaining fifteen designs, which at our visit had been withdrawn from exhibition, we can only give slight information from alea source. Two among them—No. 19, “*F.R.I.B.A.*,” and No. 20, “*Competitor*,” Gothic—had many excellent qualities, which, it is thought, might fairly have entitled them to further consideration. Of the rest, No. 2, “*Comme il faut*,” had a Fourteenth Century front, central block, and clock-tower, and police-parade in the centre. No. 3, by Mr. T. C. Sorby, to whom the town owes its charming Wigginton Hospital, was Gothic, with tower over central epoch. No. 5, “*W. B. H.*,” Gothic, with central tower; No. 6, “*Floreunt Artes*,” by Messrs. Highton and Ayres, Gothic; No. 7, “*Hope against Hope*,” Gothic; No. 10, Maltese cross; No. 11, “*Fidelitas*,”—both Gothic; No. 12, E. H. Gibbs, (Sheffield) Italian; No. 14, Mr. J. Robinson; and No. 15, “*Sirius*”; No. 18, “*Leo*”; No. 23, “*Richmond*”—all Gothic; and No. 24, Mr. E. G. Brunton, “a design in a massive peculiar style.”

As to the respective cost of these designs, it would not appear that there was great variety to be apprehended; probably a difference of 10

per cent. would cover that entailed by either of the designs now under consideration, with, at any rate, slight modifications, which would in some cases improve rather than injure them. The requirements seem to have been so fairly and equally fulfilled that we trust the architectural character may receive its full and fair consideration. The Corporation have the advantage of the independent advice of their able surveyor, who has shown by his own excellent building, the Borough Lunatic Asylum in the suburb of the town, that he is capable of appreciating the artistic as well as the practical requirements of the case.

MONUMENTAL PARIS.

THE French nation is about to restore all the monuments ruined or disfigured by that ill-omened Government which styled itself “*The Commune*.” Since in these pages no political questions are discussed, we shall only treat of the destruction and dilapidation effected, and the processes by which the traces of them are to be obliterated. As a beginning, the superb Vendôme Column, which, in a moment of madness, was overthrown, is to be reared upon its pedestal again, with all its history, sculptured in gun-metal, of the victorious French campaigns in 1805. But this will be merely a commencement of the renovation, part of which was rendered necessary, not by the incendiaries of Montmartre, but by the German bombardment. Seventy miles of new streets were constructed by the Empire; in all of them are rents and ruins. Two hundred boulevards, thoroughfares, and eighty squares—in the Parisian sense of that term—were added. There is not one that bears no trace of the late convulsions. The Tuileries itself, notwithstanding reparations, wears the marks of outrage; the noble colonnades of the Louvre are only redeemed by masses of patchwork masonry; the frantic resolve of the mob to efface the Imperial initials, N. and E., have irretrievably spoiled those vaulted roofs; and the ragged hosts of Belleville would have levelled the very structures which they themselves had erected. In times of passion, historical monuments suffer. It was so at Athens; it was so in Rome; Anni, that ancient city of Armenia, of which Chardin speaks in a language of wonder approaching to reverence, are illustrations of the results wrought by similar popular explosions. But the idea which prompted the tearing down of those memorials, hitherto the pride of the French people, must for ever remain among the mysteries of human nature. That vast work, the junction of the Louvre with the Tuileries, raised Paris to a height of splendour incomparable elsewhere in Europe. The original architect, had he been gifted with more than a triply centenary life, would not have known his own erection, though fragments of it are still imbedded in the modern mass, and though the idea which Napoleon III. fulfilled was the dream of Henry IV. Battered by Revolutionary cannon, swept clear of its dusky rookeries by the First Emperor, vamped up by Louis Philippe, and worked at by the Republic of 1848, the vast palace slowly progressed, until the Second Empire set an army of men to labour at its completion. They built “*pavillons*” capable of barracking a thousand men each; they reared a watch-tower whence nearly all Paris could be seen, distinct in outline, with all the various currents of its life; they levelled all inconvenient hills and mounds; they constructed fresh bridges; but they left the monuments standing—the Vendôme Column—the Column of July—the Obelisk of Luxor. In the unlucky days of the Commune, even this grace, on the part of the Revolution, was not conceded, and Paris suffered not less from some of her infuriated citizens than from the balls and bombs of the foreign enemy. It must have been a pitiable thing for Frenchmen to think upon when German fire flashed into that rich “*hall of the seven passages*”

in the Louvre, wherein hung the canvases of David, Gros, Guerin, Gerard, Lebrun, and Delacroix, with Girodet's "Endymion," and Guerin's Atalanta; when a shell burst in "the gallery of the Seven Masters," clouding the beauty of Da Vinci's "Madonna," and piercing with a fragment Luini's "Sleep of Jesus." The only wonder is that the havoc did not extend further. Sufficient mischief, however, was wrought to be irreparable. A bullet, for instance, coming through a window, hit the lovely mouth of "The Iliad," by Ingres, and a cannon-shot passed within a few inches of the "Venus of Milo," while the "Wounded Eurydice" received an injury which the Parisian restorers have endeavoured in vain to conceal. But we are more concerned, just now, with the open-air relics of Paris—the Hotel of Cluny, the Baths of Julian, and the newer monuments, among which the Column in the Place Vendome was the most conspicuous. The Cluny Hotel escaped with comparative impunity; the Julian Baths were untouched; but the mighty pillar of stone encased in bronze was ruthlessly pulled down, though, strangely enough, the Column of July, illustrating the very monarchy against which the Revolution of 1848 constituted a protest, was spared. The first stone of this memorial was laid by King Louis Philippe, on July 28th, 1831, and finished in the following year, on the site where Bonaparte, for some occult reason, had determined to erect the colossal image of an elephant in bronze. It is a massive structure, though hollow, surmounted by a gilded "Liberty" bearing broken chains in one hand and the "Torch of Civilisation" in the other. Beneath are catacombs containing the bones of six hundred and fifteen men who perished in the struggle with the "White" army of Charles X., and all their names are inscribed upon the Column. On the base are twenty-four bronze medallions, relieved by a surface of snowy marble, just a little tinged by age, with Barye's famous "Lion of July" gazing up at them, side by side with the arms of the City of Paris, and three Gallic cocks, all of the same metal as the monument—bronze. This structure, curiously enough, though the memorial of a revolution, was the design, and even the work, of two noblemen, MM. Le Duc and d'Alavoine. From its summit can be seen all monumental Paris—the Boulevards of the Seine, the Jardin des Plantes, the great Keep of Vincennes, Pere la Chaise, the clock-towers of St. Denis, the clustered Cemetery of Montmartre, and, not long since, the mighty column which the Commune, in an hour of frenzy, overthrew. This edifice, erected, as we have said, in honour of the Grand Army and its Commander, and the triumphs of 1806, and now decreed to be restored, was even more popular, in the sight of Frenchmen, than the Column of July, because it celebrated no civil war—it was simply a record of French victory beyond the frontier. It was in 1805, in the midst of the exasperated maritime war following the dissolution of the Peace of Amiens, when Napoleon had proclaimed himself Emperor of the French, Mediator of the Helvetic Confederation, and almost universal ruler in Europe, that he, with twelve hundred cannon in his crucible, resolved to rear this magnificent pillar of stone, but hollow, with a winding staircase inside, and a wreathed panorama of battle-scenes, in bronze relief, outside, reaching from base to summit. Denon, Gandonin, and Lefrere, were called to his councils. They undertook the task, including the bronze effigy of Bonaparte, in Roman costume, by Chaudet, for £80,000. The trophy was raised aloft; in 1814 the Royalist party would have levelled it—they were prevented by the more moderate spirits among the Allies, the Duke of Wellington included; but they succeeded, at a subsequent date, in removing the statue, and substituting the White Flag of the Bourbons in its place. This change was not for long, however. In 1833

a new effigy of the conqueror appeared, above the roof of the Place Vendome, crowned with the famous little hat, and wearing the famous little riding-coat of grey. The former image had been melted, indeed, to make a Henry the Fourth for the Pont Neuf. In 1835, so far had the Napoleonic sentiment revived, that "the figure of bronze" was still further elevated upon a pedestal of Corsican granite. Thirty years later, the grey coat and corporal's hat were discarded in favour of a Roman laurelled like Caesar. The vicissitudes of the Column and the Statue almost vied with the vicissitudes of the man. But the great misfortune of the monument was yet to come. It lay, in 1871, at the mercy of the Montmartre Commune. The members of this party saw in that stupendous trophy, more than a hundred and fifty feet in height, an egregious waste; the bronze coating, they estimated, was worth two millions of francs. Even the statue of Napoleon, melted down, would be worth securing for the Republican Exchequer. In a similar spirit they eyed askance the triumphal arches of Paris—that of St. Denis, of somewhat sepulchral appearance; that of St. Martin, carved with vain-glorious reliefs in stone, that of the Carrousel, dating simultaneously with the Vendome Column, with Italian bronze-work in the capitals of the pillars, and that of the Star, the most splendid of all, which still awaits the hand of the renovating artist. This, too, belongs to the year 1806, but it was thirty years in course of completion by the Empire, by the Restoration, and by King Louis Philippe, and it cost ten millions of francs. Beneath its noble span what processions have not passed!—that of Marie-Louise, on her marriage; that of the Duke of Angoulême, returning at the head of an army from Spain; that of Napoleon's coffin, brought from St. Helena; that of the Princess Helena herself, in 1837; that of the dead Duke of Orleans; that of the Republic of 1848; and that of the victorious Prussians, in our own time. But, popular though this monument is, it, nevertheless, inflamed the vanity of Frenchmen less than the Vendome Column, twelve feet in diameter, with its boastful tale of war engraved from foot to summit. It was not an entirely original design, being copied from the celebrated Antonine Column at Rome. The whole surface, however, is covered with modern illustrations of cannon, mortars, culverins, shells, bullets, muskets, bayonets, carbines, pistols, lances, flags, swords, cymbals, drums, trumpets, helmets, epaulettes, and all else appertaining to the pride, pomp, and circumstance of war, with eagles, and crowns of oak, the mass constituting a prodigious weight, which rests upon a granite foundation, sunk thirty feet into the earth, and even then strengthened by a solid substratum of ancient masonry. Little wonder that, by most Frenchmen, this monument was beloved. It told the tale of their glory, from the Camp of Boulogne to the "Sun of Austerlitz;" it presented to them nearly three hundred separate pictures of their achievements in the field; these metal plates were firmly riveted to the stone, and it was with great difficulty that the Iconoclasts of the Commune wrenched them away. A hundred and sixty-six steps, constructed in the interior, led up to the lantern, above which the figure of Napoleon, from time to time, appeared and disappeared in a phantasmagoric manner, in usurpation of the pedestal originally intended for Charlemagne. The work has in all periods worn a varied aspect, exhibiting at once the lilies of the Monarchy and the bees of the Empire. But how was its construction carried out? An enormous erection of timber, drum-shaped, and about sixty feet in circumference, was carried, by degrees, up to the necessary height (the French are celebrated for their scaffoldings); within, a series of platforms, capable of being raised or lowered by the action of suspended weights, held the materials and the artificers. When the stone

column was finished, a superior set of artists was employed, and they joined plate to plate of metal so exquisitely that not a sign could be perceived that the whole bronze spiral had not been wrought at a single casting. It was on May 16th, 1871, that this majestic trophy fell, after an ineffectual attempt to blow it up with gunpowder. Never did the Parisians witness a more humiliating sight than when, sawn through at its base, steadied by ropes and chains, and surrounded by an immense crowd, the stately column slowly descended from its base, the masonry and the bronze separating, and the latter uncoiling itself in gigantic rings, upon which the anvils and hammers of the demolitionists were speedily at work, as well upon that as upon the expiatory chapel of Louis XVI., the Tuileries, the Palais Royal, and the noblest tombs in Pere La Chaise—all of which are now, in succession, to be restored—though whether the re-erected structures will equal those that fell victims to civil fury may be matter of speculation. The Column Vendome, thus inscribed by Visconti:—

Neapolio. Imp. Aug.

Monumentum. Bellum. Germanica.

Anno M.D.C.C.C.V.

Trimestri. Spatio. Ducto. Suo. Profligati.

Ex. Ere. Capto.

Gloriæ. Exercitus. Maximi. Dicavit.

Such was the monument which, on the 16th May, 1871, slowly toppled over, and lay upon the heavy bed of faggots prepared for it. It had been expected to descend in one piece; but it perversely broke into three fragments, after several hours' tugging. Public excitement rose to the highest pitch. The strangest surmises ran from mouth to mouth as to how far the structure would be thrown—how the crazy windlass, and the three cables attached, would lighten its fall, and what balconies and roofs in the vicinity would be shaken out of their places by the shock. Two beams were applied, one on either side, to give it the proper inclination; more ropes were called for—they snapped, and several of the workmen were injured; a hundred sailors were then brought into requisition, and a shapeless mass of shattered metal and stone, separating into rings in the air, lay in uneven coils, like some mighty serpent mutilated, upon the ground. The statue was decapitated by the shock; and it is the work of that foolish day which the Government of France has, at length, resolved to undo.

ARCHITECTURAL ASSOCIATION.

At the usual fortnightly meeting of this Association on Friday evening last, the President, Mr. J. Douglass Mathews, A.R.I.B.A., in the chair, on the motion of Mr. B. A. Paice, one of the honorary secretaries, the thanks of the members were heartily accorded to the Dean and Chapter of St. Paul's for allowing them to visit the cathedral on the 24th ult., and to Mr. Penrose, F.R.I.B.A., for kindly conducting them over the building.

It was announced that the next visit of the members would take place to-morrow (Saturday), when the works of Messrs. Moreland, the engineers and iron girder manufacturers, in Old-street, S. Luke's, will be inspected, Messrs. Moreland having promised to keep most of their machinery going on that occasion to a later hour than usual on Saturdays. It was further announced that a special additional visit would be made on Thursday afternoon next, the 12th instant, at 3 o'clock, to the well-known glass works of Messrs. Powell and Co., in Temple-street, Whitefriars, when the works will be in full swing, and some particular processes will be witnessed.

The preliminary programme of the Association's annual architectural excursion, as drawn up by Mr. Edmund Sharpe, F.R.I.B.A., was read to the meeting. It is proposed to start on the third Monday in August, going to Grantham first, and then to Newark, Southwell, Minster, Nottingham, and Derby, the concluding day (Saturday) being devoted to Lichfield and its beautiful cathedral. Mr. Sharpe remarked in his letter that although it was not proposed to visit quite so many

buildings as hitherto, the programme embraced a great many buildings of first-rate importance architecturally.

The PRESIDENT announced that in addition to the prizes that had been offered by or through the Association, a prize fund was started at the commencement of the session. This fund had not attained very great proportions; nevertheless, it was sufficient to enable the Committee of the Association to offer three prizes, of the value of five guineas each, to members of the Association as an incentive to summer sketching, to be awarded at the last meeting of the present session on the 23rd inst. The recipients of the prizes will be expected to devote a portion of their holidays to sketching, and to exhibit the sketches at the opening *conversazione* of the next session of the Association in October. Further particulars may be ascertained on application to the hon. secretaries.

Mr. WILLIAM WHITE, F.S.A., F.R.I.B.A., then read a paper

ON THE RESTORATION OF THE CHURCH OF THE HOLY INNOCENTS, ADISHAM, KENT.

Mr. WHITE prefaced his paper by remarking that he gladly came forward to supply the place of Mr. Dollmann, who was to have read a paper "On Altars," although he was afraid that the present paper would be very dry and technical. There could be no doubt that it would be practical in one way, inasmuch as the first part of it would be really a report which had been given upon the restoration of a church, and it might serve, perhaps, as a useful illustration of what such things were—not to say of what they should be. The church of which he was about to treat was a very interesting one, situated between Dover and Canterbury. The substance of the report was as follows:—Adisham Church is one of unusual architectural as well as archaeological interest. It is cruciform in plan, with a central tower. It has a north porch, adjoining which is a chantry aisle in the angle between the nave and the north transept, or rather forming one with this transept. The chancel is long and lofty, with an eastern triplet, and five lancets in either of the side walls. The priests' door is on the north side, beneath the pier of the second and third windows from the east end. The jambs of this door being internal, show that there was no vestry. As the parish did not become a rectory until A.D. 1292, it is probable that there was previously a religious house here to which the chancel belonged, and by which the parish church was served. In this case the nave alone would belong to the parish, being served by one of the clergy attached to the house. The site of the house was probably that of the house now in the tenure of Mr. Sladden, but the rectory house was built three-quarters of a mile away. Probably the timber framing in the old portions of the rectory-house is the original work of this date. The south transept, which is of the Late Thirteenth Century date, has a gabled projection on its eastern wall, forming internally a recess for an altar, and is provided with a piscina. Indications remain, also, of a piscina and two altars on the east wall of the north transept, and a painting of the Crucifixion in *tempera* is still visible. The north transept and chantry aisle now form, as it were, one body, divided transversely by a screen of timber framing reaching to the height of the walls to support the roofs at their intersection, the lower part being filled with panels and tracery. There is a doorway in the centre of this screen, but no indication of its having been inclosed with doors. Although the eastern part of this chantry aisle is now transeptal, it appears originally to have been built at the same time as the chancel (in the twelfth century), as an aisle or chapel parallel to the nave, so as to include the space formerly occupied by the transept in the earlier Norman church, for, like the chancel, it has in its eastern wall a triplet slightly graduated, with its centre light only a little higher than its side-lights, and of similar detail. There were three lancets in the length of its north side-wall, two of which remain, the other (the easternmost one), having been converted at a later period into a geometrical traceried window—when the roof likewise was altered back to its original transeptal form to admit of it. The timber framing over, and partly forming the screen already referred to, was required to carry this roof. It cuts vertically the middle one of the side lancets. To connect the nave with this north aisle, there is a pointed arch

with plain soffit and chamfered quoins, and over this is a small blocked lancet, of a date previous to the erection of this aisle. The west wall of this aisle, moreover, is abutting to the wall of nave, showing that the nave itself is of earlier date.* The lower stage of the central tower is of the Norman period, but with the exception of the north-west angle, which exhibits the remains of an original vaulting shaft, the abutments above the spring were rebuilt when the Norman arches were removed. The drip-courses, however, or in every case indications of them, showing the position of the roofs of the earlier periods, with their cruciform arrangement, still remain beneath the present roofs. This tower, though massive, was but insecurely built, and at the time of the enlargement of the general scale of the building the walls of the church were reduced in thickness from their inside, while the walls of the tower were reduced externally above the spring of arches to nearly half their thickness, the abacus on the north pier of the nave showing their original extent. The old piers thus became contained almost within the external walls, and the arches were rebuilt in pointed form, with square soffits slightly recessed. The tower thus became very small in proportion to the size of the church. Besides these arches, and the stage of the tower above them, the walls of the nave, with its north or principal door, are the only remains of the second church, built in the period of the earliest First Pointed—or Early English style—perhaps as early as 1150 or 1160. Then came the rebuilding of the chancel and of the north aisle or chapel before referred to, at a later period in the same age, at which time also a belfry-stage was added to the tower. The next material alteration in the following century (viz., the thirteenth, the age of the Middle Pointed style), was the rebuilding of the south transept, at which time also the north transept was restored to its transeptal form by the throwing up of its gable flush with the face of the north wall and its intersecting roof in the eastern bay of the then north aisle and the insertion of the lofty three-light traceried window in the place of its lancet light. In the next century the piers again needed strengthening. They were accordingly underpinned and partially rebuilt and supported by other massive piers. These were weathered into the form of buttresses, and a sub-arch, of segmental pointed form, was introduced on the north and east side, beneath the old pointed arches, to afford a counter-thrust to the piers. At this period the old windows of the nave (except the easternmost one on the north wall, already blocked up by the south aisle, were taken out, leaving no trace inside or out, except in the flint masonry with which they were filled, and large windows, of Late Decorated character, were inserted. These were placed in fresh positions in the wall at longer intervals. The stonework of the old south doorway, inside and out, was likewise removed, and the opening built up with flint and a west doorway inserted. The cradling which supports the bellcage appears to be of the same date, blocking as it does the small windows of the middle stage. Several centuries later an addition was made to the tower, in the shape of an ugly upper stage, void of windows, and surmounted by a battlemented parapet rebuilt in brick during the present century. This stage, which was added probably on the decay of its earlier wooden spire, or pyramidal roof, whichever it may have been, was added evidently for the purpose of giving height to the small dumpy tower—not for a belfry, for it was but indifferently built, requiring iron ties subsequently in order to keep it together. And not only is it without openings, but without preparations for a bell-cage.† The west window is a modern one of wood, of the poorest description. The roof of the chancel also is modern, with a hipped termination, but the roof of the nave is old, having been reconstructed to a lower pitch, the old tie-beams, kingposts, and other timbers being retained. The other roofs appear to be of about the same date. The font is square, of simple form, and of Norman date, upon a brick plastered pillar ‡ A con-

siderable portion of the chancel and of the south transept retains its Mediæval encaustic tile pavements undisturbed, but the buff pattern of very many of the tiles has become erased by wear. On some of them, however, there is just enough indication of the pattern to show that they are in their original position. The pattern, much worn, and almost impossible to trace, would not, indeed could not, have been kept so accurately had they been relaid. There is a rapid fall in the pavement towards the east end, and a single step down into the chancel for the central tower. The pavement is in a very dilapidated state altogether. There seems to have been never more than a single footpace—no other elevation at the east end. The details of the church generally are simple, and the proportions very fine. There are no indications of sedilia remaining, but there is an "original piscina," richly moulded and cusped, in the east wall of the north transept. There is, too, a similar recess in the south wall of the nave near the east end, which may have served for sedilia for the parochial services in the nave. The original interior stringcourse remains in the north aisle and transept, but in the chancel it has been cut away. There has been none, apparently, in the other parts of the church. The only old gable copings that remain are upon the south transept and its projecting chapel. With the exception of this transept, the church has no buttresses. The old bench-table in the nave, round a considerable portion of the walls, still remains. There is a remarkable specimen of Early Mediæval wood framework behind the altar. It is furnished at the ends with massive oak posts with carved tops. These posts have been mortised in front as though to receive other framework, or a canopy. It might have been a piece of secular furniture originally, but possibly a canopy for an altar. The four Evangelists, seated, are painted on a panel at the back in a burnt-sienna sort of brown, on a gold ground. But they are rude, and appear to have been twelfth century work repainted at a subsequent time. Mouldings similarly gilt have been inserted round the panels, apparently of about a century and a half ago.* The framing may well have been the head of a bedstead. Possibly the paintings were suggested by, if not suggestive of, the traditional familiar invocation—

"Matthew, Mark, Luke, and John,
Bless the couch that I lie on."

According to existing records, it was brought to Adisham from Canterbury by Archdeacon Battley, the rector, in 1703, and the panels were probably repainted under his direction. There is nothing to show what was the ecclesiastical status of the church originally; but it appears that William de Upton was the first Rector of Adisham (in the twenty-second year of Edward I., which brings us down to the latter part of the thirteenth century), and that he was buried there. It was he, therefore, no doubt who built the south transept, the chancel having already been built on a grand scale by his predecessors a century before. The old stalls of the fifteenth century period remain, much mutilated and decayed. They have been cut into several pieces, removed and converted into seats and pews, though still in the chancel. The lower part of the chancel screen, of the same period, with napkin panel, likewise remains *in situ*, but the posts have been sawn off some 12in. or 15in. above the middle rail. There are several indistinct remains of colour decoration on the walls. There are also indications on the chancel walls of the original lining-out in red ochre, or Indian red, into oblong blocks, with a rose in the alternate blocks and a running pattern on the quoins of window jambs. There are also a few fragments of rich stained glass remaining *in situ* in some of the windows of transept and nave. It is a difficult church for restoration and proper rearrangement, in consequence of the smallness of the arches of the central tower as proportioned to the size of the several parts of the building; and the chancel is of too noble proportions not to be used for its proper choral purposes. Mr. White estimated the cost of the thorough restoration of this church at about £2,500. Having given this report upon the church, Mr. White proceeded to describe what was done and what was found during the progress of the works. The eastern triplet had its interior arches cut down and

* Upon the jamb of this window, upon its being opened out, was found an original painting in distemper, almost in outline, and very rude. The subject of it is not very clear.

† On the removal of this upper stage the rotten wall-plates were found, showing that it had had a pyramidal roof originally.

‡ During the restoration marks of a central shaft and four detached pillars were found under the basin of the font; also a number of radiated stones, which look as if they might have formed a circular step for a font.

* Upon further examination this proved to have been painted on thin deal board—a miserably poor imitation of the figures cut on the original panels with diaper background. These figures had been chopped off to allow of the fixing of the panels.

reconstructed in brick plastered over, in order to admit of the hipped roof. When these arches came to be removed the stonemason insisted that the exterior arches had been reset and the heads of the windows lowered. Certainly the bedding seemed to have been disturbed, and several of the joints, but the proportion was perfectly satisfactory to the eye, and Mr. White took the pains to draw it out to a half-inch scale to test it geometrically by proportions which he had made out from other windows of the same date. He found the window to agree so accurately with these proportions that no doubt whatever remained in his mind as to its being in its original state. During the works corroborative evidence was found of the relative periods of several portions of the church through the description of mortar employed. The nave was built with flint boulders. The walls were patched in places with Kentish rag of the same description as the underpinning of the tower, with its buttresses and sub-arches, but in the south-west angle of the tower the remains appeared of a large early buttress, against which and over which a further buttress had been extended. The mortar in the nave was composed of rather poor local stuff for sand, and this prevailed in this early buttress just alluded to, and in the lower stage of the tower, except in the underpinning, &c. In the chancel and vestry the flints were partly faced and built with mortar made from sand with very large quantities of shells mixed with it. The north transept seems to have been built with sand from the seashore, but with less shell, and more of the flints were faced. The south transept was built with very much the same description of mortar, but with still more faced flints in it. The observance of details of construction of this sort would very often prove of the greatest consequence. Mr. White next proceeded, by the aid of drawings, to describe what was actually done. First of all, the chancel roof was renewed, the walls being lowered, and the pitch of the roof raised. The nave roof was almost entirely renewed, retaining as many as possible, however, of the old timbers. The roofs of the north and south transepts were in fair condition, and were only repaired and re-covered. The porch has been entirely reconstructed as it formerly existed, and it has a very picturesque effect. The top stage of the old tower was taken down, and in place thereof a pyramidal roof was put up. The roofs generally of the church are covered with plain tiles, but this pyramidal roof is covered with deal shingles Burnetised, which makes a very pretty colour, and if one of the shingles should get loose, and drop off, there is no fear of its doing any damage. These shingles have already attained the colour which is seen upon the old shingles upon the Rhine, and in various parts of Germany. The old levels of the pavement were retained, although this church presented the peculiarity of the chancel being one step down from the nave; Mr. White, while retaining this old arrangement, has raised the sanctuary two steps. The old stalls, which had been cut up and converted into pews, were restored. The sub-arch of the chancel, which, as before stated, came considerably below the old pointed arch, was removed. This sub-arch had been evidently put in to offer resistance to the thrust of the jambs, which it was evidently feared might come down. It was a very critical question whether this sub-arch should be removed or not. It was of the Late Mediæval period, and as such Mr. White would have liked to retain it; on the other hand, it was not of the original period of the chancel, which it very much disfigured, and on this, and other grounds, it was very desirable to remove it. Then came the question whether the structure would be safe if the sub-arch were removed. After full consideration, it was concluded that it could be removed with perfect safety; but in order to "make assurance doubly sure," the old screen was restored to its original height, and two strong oak straining-pieces were put in, side by side, and framed into the uprights of the screen. These it was considered would form quite sufficient abutment, even supposing there was to be a little yielding in that direction. The restoration of the screen has added very much to the character of the church. The pulpit is placed on the south east angle—its original position. Mr. White remarked that there seems to be a popular notion that the pulpit ought to be on the north side, but in all old churches where he knew the pulpit to have occupied its old position, that position was the south side, and this

was particularly noticeable in some of the South Devon churches. A new altar table was provided, 8ft. long, 2ft. 6in. wide, and 3ft. 3in. high. At the back of the altar table is a reredos, which has a very crude outline indeed. It is divided into three panels, of which the central one represents the Adoration of the Magi, and the side panels contain representations of the Murder of the Holy Innocents and the Flight into Egypt. The estimate was £2,500, but the actual cost was only £2,480. Having given some particulars as to the contemplated decoration of the church, and recounted the difficulties experienced in satisfactorily disposing of the organ in a church of this kind, Mr. White concluded by making some remarks upon restorations generally. From what he had said in this paper, it would be gathered that he preferred *under-restoration* to *over-restoration*—(Hear, hear). One very great, if not the greatest, difficulty that an architect had to contend with in restorations, was that of getting workmen to understand what he required, for workmen were so prone to exceed what was necessary. After citing one or two glaring instances in support of this statement, Mr. White said that the reproduction of absolutely decayed work was a very difficult question, and the architect had to steer between eclecticism on the one hand, and severe antiquarianism on the other. If a thing was not so utterly decayed as to be incapable of restoration, its value was gone so soon as it was reproduced. But in all restorations of churches the real aim the architect should keep in mind was the general effect of the interior, which should be made as solemn and religious in character as possible, and in order to do that, the architect must follow as strictly as possible certain forms of arrangement.

DISCUSSION.

Mr. QUILTER, in proposing a vote of thanks to Mr. White for his paper, asked how he obviated the inconvenience caused by the smallness of the central arch, which must necessarily prevent a large portion of the congregation from seeing the altar. He also wished to know upon what date Mr. White fixed for the work which he had entirely reconstructed.

Mr. MARNOCK, in seconding the motion, asked Mr. White what determined the date or style of work in which he would restore a church which had been erected during (say) two or three periods, and the details of which varied considerably?

Mr. CLARKSON, in supporting the motion, said that no doubt Mr. White had good precedent for retaining the old level of the chancel, but he imagined that the descent of one step into the chancel was a constructive defect, and why should such a defect be perpetuated for all time?

The PRESIDENT then put the motion to the meeting, and it was carried unanimously.

Mr. WHITE, in reply, said that he did not attempt to obviate the difficulty of the smallness of the central arch, but he left a passage 3ft. wide along each side of the nave, leaving the old bench table against the walls, and this arrangement gave the church a very much better effect than if the bench table had been removed. The chancel was so spacious that the blocking of the arch was not so much felt. As to the date to fix upon or the style of work for a restoration, there was no rule which could be laid down—it was a point which must be left entirely to the judgment of the architect after careful examination of the building. The old level of the chancel was retained because it was manifestly the old level, and it was not a constructive defect, but a constructive necessity, owing to the slope of the ground. Mr. White, in conclusion, illustrated on the blackboard the geometrical proportions which the Mediæval builders invariably observed between the various portions of their buildings.

Mr. G. H. BIRCH, A.R.I.B.A., then read a short paper "On the Fortified Churches of the Border," which was almost exclusively of an archaeological character. It described the churches of Great Salkeld and Burgh-on-the-Sands, and one or two other churches in Cumberland. A brief discussion ensued, in which Messrs. Paice, Stannus, and W. White, F.S.A., took part, and the proceedings closed with a vote of thanks to Mr. Birch for his paper.

A New (Roman) Catholic chapel was opened at Leeds on Friday week. Mr. G. Goldie, of Kensington, is the architect, and Mr. Wood, of Headingley, the contractor. The cost has been £2,500.

THE "SATURDAY REVIEW" AND THE ARTISTS.

THE *Saturday Review* contains an article, in its usual caustic style, headed "The *Times* and the Artists," in which are propounded those conventional phrases on art which are already known *ad nauseam* by every one. We are far from wishing to vindicate the accuracy of the art criticism of the *Times* or the *Quarterly Review*, but we cannot overlook the fact that the *Saturday Review* is singing a "Hallelujah," whilst the two other papers mourn "in gloomy despondency on the present condition of English art." Had the *Saturday Review* ever shown a tendency to be an impartial and intellectual guide for our artists, we certainly should be the last to find fault with its fastidious opinions. But a paper that is spiteful when ever it suits its purpose, and becomes Quixotically chivalrous when any one else finds fault with English art, is really a curious phenomenon. We never yet could find out what the real principles of the *Saturday Review*, with regard to art, were. Why does the critical weekly paper object to the wish of the *Times* that our artists, instead of painting Lear and Cordelia, Lady Godiva, Hamlet and Ophelia, Chatterton, Dr. Johnson in Bolt-court, Lord William and Lady Russell, the Eve of St. Bartholomew, &c., should record historical events of our own times? This would certainly not be a mere illustration of the articles of the "*Times*' Own Correspondent," but what contemporaneous art ought to be. Are the pictures of Mr. Werachagin not more interesting than idyllic representations of English rural life, with a green tree in the middle and a quantity of yellowish-brown roots around it? If the artist is not to record the present from a historical point of view, why should he record the past? Why should it be better to paint a scene from the Thirty Years' War than one from the last Franco-German war? Is history less history because an event happened two instead of two hundred years ago? What business had Shakespeare to bring a Henry VIII. or a Cardinal Wolsey on the stage? According to the *Saturday Review*, this was merely putting into form the prosy records of the Own Correspondents of those times. The Flemish, French, and German painters must have been out of their artistic minds when they ventured to paint scenes of their own age and history; they were merely subservient to the Own Correspondents of their times. Horace Vernet, with his studies of African life, was in fact no better than a draughtsman of the *Illustrated London News* or the *Graphic*. When sketching tourists can be found who immortalise our contemporary history by a few woodcuts, one may ask by what right M. Doré paints Elsass as an old woman with a shabby tricorne in her arms, and a spiteful-looking urchin at her side? Our artists must, according to the *Saturday Review*, "even without being sordidly mercantile, be influenced by the tastes and desires of the people who buy pictures." *Hinc ille lacrimæ*. When a citizen wants to give fifty or a hundred pounds for his (to him, important, but to others highly insignificant) portrait, the artists of England should waive all higher aspirations, and paint Mr. Smith or Mr. Snooks, &c., without meddling with historical paintings. How is an English artist to be inspired by higher conceptions and grander ideas, when he is influenced by the tastes of the people "who buy pictures"? Who ever heard that a tanner like Cleon influenced a Phidias or a Polykleitos? The question is how to make a stand against the actual state of things, as described by the *Saturday Review*, that "in a generation of rich men *destitute of intellectual culture or artistic perception*, and given over to the indulgence of mere personal vanity, art should reflect the narrowness and triviality of their tastes and intelligence"? [The italics are ours.] The remedy for this could be found in sound and good criticism.

We should, however, really be at a loss to direct an artist where to look for advice. If we blame the bad taste of our rich, we must ask, Who formed that taste? Where are our heavily-endowed chairs of *Æsthetics* at the great centres of instruction? "It is doubtful whether artists do well to take their subjects from books," says the *Saturday Review*. Whence then should they take them? Did not Greek art entirely originate in books? How did the artists make themselves acquainted with mythology, and with the heroes who conquered and defended Troy? Have Shakespeare, Milton, Tennyson, Schiller, and Goethe, not served a Retsch, a Doré, a Kaulbach, and many other great artists, with subjects for painting, drawing, or sketching? The Greek artists, however, had around them, in the place of critics who spoke only of the L. S. D.-Trinity, philosophers, poets, statesmen, and a people to whom a charming poem, a victory in the Gymnasium, or the representation of a tragedy, a well-constructed temple, a marble statue, or a chapter read from history at some public festivity, was a national event. It is to be wished that we could have historical paintings, whether of ancient, mediæval, or modern history, in the style of a Kaulbach, Schnorr, Piloty, Menzel, Lessing, or Knaus. But the reason for the scarcity of such paintings is not to be sought for in the painters themselves, but in our own educational institutions. We even teach our young ladies anatomy, physiology, chemistry, geology, mineralogy, electricity, and political economy; but it never yet occurred to us to make them acquainted with the principles of taste and beauty. We have a Newton and a Bacon, an Adam Smith and a Darwin; but we have neither a Baumgarten, a Winkelmann, a Lessing, a Herder, a Goethe, a Kant, a Schiller, a Schelling, a Hegel, a Schassler, a Charles Blanc, or a Taine. We are left in these matters to have our own opinions, in the same way as we consider the mischievous influence of the high price of meat and coals, and the comparative merits of Cheshire or Stilton cheese. Art and its votaries, we must remember, require intellectual food as well as literary men. We have undoubtedly the most valuable collection of relics of Classic art. Nothing can surpass our Elgin marbles; nothing equals our South Kensington Museum for the study of mediæval and modern art. But can art students resort to the British Museum when convenient? Those of the South Kensington Museum are altogether shut out from that national sanctuary, though they have to contribute their mite for its keeping. We will not deliver a "prononciamiento" on the unfairness shown to our artistic brethren by shutting them out during a seventh part of the year from our Museums, and thus depriving them of opportunities for improving their taste by studying the remains of Classical or modern art. Yet we may reasonably ask how our artists are to compete with those of the Continent, when for a seventh part of the year public-houses only are open to them, whilst the Continentals may roam over the finest art collections, thus gathering ideas, cultivating their taste, and enriching their imagination? "An artist must study humanity for himself, as it exists under his eyes," says the *Saturday Review*. But if our artists follow out this rule, what will their studies be worth? for this same paper asserts "that artists live in an atmosphere destitute of intellectual or artistic perceptions." Besides, the well-worn phrase "*Go to nature*," as the whole intellectual outfit for an artist, is rather too scanty. What if he has no opportunity to study nature, or if our social machinery does not permit him to study nature? is he not to study those who had such opportunities, and have left us the results of their studies in so perfect and idealised a state, that after a lapse of nearly two thousand years, they were capable of creating the whole of our modern art? The revival of Classic art is the more glorious because in modern Christian art the principal element is not

nature, but the *ideal*. The form is secondary; the thought, the composition, is primary. The objections raised to this theory are mere "anachronistic" phrases, used with a view of convincing us that philosophy cannot be anything but Plato or Aristotle. Just as a philosopher of our time would look very foolish if he knew no more of Natural History than Aristotle, so also would our artists appear lamentably deficient if they did not take the experience and art productions of past ages into consideration. They would always have to begin "ab ovo," and go through the same mistakes, and the same phases of evolution as our South Sea Islanders, who have also nature before them, but do not become Raphaels. The hypothetical objection raised to battle-pieces as "*outrunning the artist's efforts*," is altogether erroneous. Why should a battle-piece *outrun* the artist's efforts more than the painting of a thunderstorm with its black clouds, its dazzling lightnings; or a sea-storm with its foaming and angry waves? In the historical thunderstorm of a battle, men with distinct forms enter into a struggle of wild indomitable passions for a good or bad cause; whilst in a thunderstorm, only clouds, shadows, chemical elements, bearing, instead of "Krupp's" or "Armstrong's," little particles of negative and positive electricity, are at issue. Why should not the former struggle be a fit object for a painter as well as the latter? The *Saturday Review* hints at the reason and says, "Passing events are too large to be brought within the focus of true art; and the medium through which they are seen is almost necessarily fatal to artistic insight and impartiality." Are passing events larger than an Alpine scene, or the water-fall of the Niagara, or the charge of Ironsides at the Naseby, when Charles I. fought his last battle, and a passionate, but at the same time, cool and determined phalanx of free men finally broke up his army? The artist who speaks in colours and forms should be impartial, for, like the true poet, he stands above petty partialities. The artist and the poet, in union with the historian, raise themselves above hypothetical party assertions, and look not only nature but also the ideal in the face. The assertion that there is to be found in

"This live, throbbing age
That brawls, cheats, maddens, calculates, aspires,
And spends more passion, more heroic heat,
Betwixt the mirrors of its drawing-rooms
Than Roland with the Knights at Roncesvalles"—

is mere verbiage. There are no drawing-rooms in which men *brawl* or *cheat*; nor do they spend more passion and more heroic heat than the old Greeks, Romans, Teutons, Anglo-Saxons, Italians, Germans, and French in their historical development. And if they did, their passion and heroic heat are invisible, because it is a general law in even half-bred society, to suppress any outburst of *heroic heat*, or in fact any outbursts whatever. This field is only too much cultivated, and our artists are truthful to nature. The smiling, passionless portraits, the self-contented faces of merchants and clerical celebrities, who move in our drawing-rooms, and are reflected in our mirrors, are no Rolands, and would have been very tame knights at Roncesvalles. If art were treated from a higher and nobler point of view by our art critics, our practical artists would become able to understand "the more *spiritual* aspects of life," though they are always told "to go to nature" and to neglect the ideal. G. G. ZERFFI.

THE PAINTERS' COMPANY AND TECHNICAL EDUCATION.

MR. J. G. CRACE, Renter Warden of this Company, delivered a lecture "On Colour" at the Hall of the Company on the 15th ult., before a large audience of painters, decorators, and others. Mr. Crace, before entering upon the subject of his lecture, expressed his satisfaction, and that of the Court and Livery of the Painters' Company, at seeing their old hall filled

by those who were so intimately connected with the trade or craft which their ancient guild had represented for so long a period. He could confidently express their earnest desire to make the Company the means of advancing a knowledge of their art. As they were perhaps aware, this company had extremely limited means. They were the distributors of about £2,500 yearly, which was left for, and was now paid to, poor painters, disabled by the sickness peculiar to their trade, and to other poor persons. He thought it was an honour to belong to such a company. He would be very much gratified if some means could be found to associate with it all those who hold any rank in the trade as clever workmen and upright men. Mr. Crace then proceeded to the delivery of his lecture, the subject of which, "Colour," was, he said, a most important element of their trade. The earlier part of the lecture treated of the division of colours into primary, secondary, and tertiary, with a sketch of the opinions of noted writers as to which of the prismatic colours should come under each denomination. The relations of these colours to each other was illustrated by numerous experiments, which, from the nature of the subject, could only be properly described in connection with the diagrams used. Some of these experiments were very striking, as, for instance, one which went to show that a colour may appear most widely different according to the colours with which it is placed in contact. It is obvious that it is of the utmost importance in choosing colour for decorative work to remember the principle—"Colours have no settled tone, but are what they are made to appear." For harmony of colour it was laid down that the three primary colours should appear in one form or another. All harmonies should be modified agreeably. Thus blue and orange, or red and green, cannot be used without some colour between them to modulate them. Mr. Crace referred to the combinations found in flowers as examples of perfect harmony and colour, and applied the rules he laid down to the decoration of rooms, and the harmony to be preserved between wall, cornice, ceiling, and carpet. For the latter he recommended a rich, deep, retiring colour, as maroon or green, enlivened with a pattern in more cheerful colours. With regard to the doors of a room he did not proscribe graining, but he thought it was used far too frequently. Why not employ a good brown maroon, or black, taking care to face up the work with a very smooth varnish? Above all other plans, though, he liked the real wood, for this, if well finished, would have a handsome effect. In staircases, imitation marbles had a very beautiful effect, especially as the art had been brought to a high pitch of perfection in this country; but he thought that good stencilling looked well, and was preferable to a sham. The use for which a room was to be employed should regulate the colours to be employed on it. If, for instance, a room was to have heavy pictures in it, green was a good colour, with cinnamon for the windows and doors; for statues he was in favour of a decided colour, which should be red. But regard should be had to the condition of the marble; if it was old, the surrounding colour should be toned down to correspond with it. For prints or photographs the room should be a rich brown or leather colour, which gives lustre to the photographs. Speaking generally, it might be said that whatever colours had to be brought together, gold was the universal harmoniser which did equally well for all. In treating of the decoration of churches, the lecturer said he was not surprised that architects should dread the indiscriminate use of colour. Decorators should remember the architectural effect of the construction of the building, and try to emphasise it. At any rate he abominated mere whitewash, and could see no beauty in stone walls unrelieved by any colour whatever. The decorative arts among the Egyptians, Greeks, and Romans, were then described, and illustrated by a number of beautiful specimens, the study of which, the lecturer said, would have a most salutary effect on English decorative art. In conclusion, he said that the subject was so varied and extensive that it seemed impossible to do more than point out some of its most important features. Much would depend on the industry and intelligence of the individual workman. It was certain that those who absolutely studied to improve themselves would be on the road of advancement, which, perseveringly followed, must lead to success. Many journeymen became masters, and there was, he thought, no trade which offered

better openings for such results than theirs. He might say that nothing was denied to well-directed labour. Mr. Crace gave an illustration of this the fact that a now eminent artist, in whose company he was the other day, told him that thirty years ago he was at work in his (the speaker's) workshop as a journeyman. He was as surprised as he was delighted to hear this, and he honoured the artist for the success he had achieved. He would only tell all of them to study hard the principles of their art, and they would rank, as he believed their painters would, amongst the highest class of artisans in this great metropolis.

THE NEW POST-OFFICE, NEW YORK.

THE new post-office now being erected in New York is an extensive building, according to the *Scientific American*, the frontage on Broadway being 340ft., looking down Broadway 130ft., on Park-row 320ft., and looking toward the City Hall 200ft. The entire area covered is about $\frac{1}{4}$ acres, and this space, for the cellar, basement, and entrance floors, is unbroken by any interior walls, the supports for the upper stories consisting of 122 cast-iron pillars for each (cellar, basement and entrance) floor. These pillars are 18in. in diameter each, the iron being $2\frac{1}{4}$ in. thick. There will be four stories from the ground up, besides the high Mansard roof; the cornice will be 120ft. above the sidewalk at the lowest parts, and the front elevations will be considerably higher, according to the elevations of the design on the corners and in the middle of each facade, besides the domes on the northern and southern fronts, which will tower high above the main building.

The roof will be of copper, with two corrugations in each sheet to allow for expansion and contraction by heat and cold. Numerous substitutes, less expensive, have been urged upon the superintendent, but this was decided upon as most perfect and durable. Each window will have fireproof shutters made of a composition somewhat lighter than fire-brick, and which has been tested up to a white heat without showing any change.

In the ventilation of so large a building, the difficulties presented are of no ordinary nature. It is believed, however, that the plan for effecting this object will be the most perfect of any yet contrived in the United States. It is on the principle of that first applied on a large scale in the north wing of the Treasury Department at Washington, under the direction of supervising architect A. B. Mullett, who is the architect of the new post-office and general superintendent of all new public buildings. For the three lower floors, in which all the post-office business will be transacted, there are four ventilating shafts, with an inside area of 50ft. each on the bottom. These shafts run from the cellar to a little above the roof, and in the centre of each will be a smoke-pipe from the furnaces, thus heating the air so as to make a constant upward current. At the bottom, these shafts are connected with what are called foul-air chambers, into which run flues from all the rooms on the ground floor and below. These flues are made to run from openings at the bottom in the hollow cast-iron pillars which support the whole interior of the building, so that, by the upward current which is created by the heat in the ventilating shaft, the foul air is drawn down from the bottom of each room to the foul-air chambers and thence into the ventilating shafts. In addition to openings into the ventilating shafts, the rooms in the upper stories are provided with flues which terminate in ridge openings at the angle of the pitch of the Mansard roof and the centre of the water-shed. These openings have what are called pitch-top covers, to make a draught, no matter in which direction the wind may be. In cold weather, the rooms are to be heated by steam coils supplied from the exhaust steam furnished by the boilers which will supply power for the engines to run the elevators. The floors throughout the building, are all made with iron and brick arches. These arches have been built according to a method of Mr. W. G. Steinmetz, the superintending engineer, by the use of centre hangers, which has lately become quite popular with builders. It does away with the necessity of building platforms, as formerly, is very simple, and the men can thus readily work on as many floors as desirable at the same time. In many of the arches in the building, where a flat ceiling is wanted, a large sized hollow brick is used, which is moulded to make a perfect arch on the top

and be level on the bottom. The same end can be attained by filling out under the arches, in the old way, but the work is not so durable. The cost is about the same in one way as in the other, but the hollow bricks are lighter, so that the weight on the iron is not so great, and the ceiling is more certain to be dry.

The granite used all comes from Maine, where 600 men have been employed for many months in cutting and dressing it, so that no work of this kind is done on the ground. There have, thus far, been used 300,000 cubic feet of granite, 10,000 yards of concrete, 27,000 barrels of cement, 9,000,000 bricks, and 5,500,000 pounds of iron; and the excavation previous to laying the foundation amounted to 100,000 cubic yards. It is impossible at present to say when the work will be completed, but as Congress at its last session appropriated 2,500,000 dols. to carry on the building, it is now being energetically pushed forward, with a probability that the roof will be on during the present year. New York has waited long for a post-office suited to its needs; but with the completion of this building, it will have such an one as befits the importance of the leading city on the American continent.

THE AQUEDUCTS OF ROME.

IN his third lecture on the Archæology of Rome, delivered at the Royal Institution on the 27th ult., Mr. J. H. Parker remarked that no city in the world was ever so well supplied with excellent water as the ancient City of Rome, which abounded with noble baths, and he stated that as the remains of the aqueducts were of great historic interest, he had devoted several years to their investigation, tracing them from their source to their mouth and back again; that he had made many discoveries, which resulted in his constructing an entirely new map of the whole. Nineteen streams are mentioned as running through Rome in the *Reginary Catalogue* of the fourteenth century, but only nine are described by Frontinus, the superintendent of them under Nerva and the succeeding emperors, in his valuable treatise. These principal aqueducts conveyed the water from the elevated regions of Subiaco, forty miles from the city, in tunnels or in stone pipes 6ft. high and 2ft. wide, one-third at the upper part being left for air. The pipes were placed in a gentle descent all the way, for a large proportion of the distance underground, and in crossing the gorges of the hills were sometimes borne by lofty bridges 100ft. high. The stone pipe was technically termed *specus* (a cave), because the earlier aqueducts were generally beneath the ground. The noble arcades of the aqueducts, containing perhaps the finest brickwork in the world, crossed the Campagna, or flat, open country, for the last seven miles into Rome, in two parallel lines about 100ft. apart, and of these three or four miles still remain in the district named Roma Vecchia (Old Rome). During his lecture Mr. Parker commented on the remains of these ancient aqueducts, referring particularly to those of the Aqua Felice, the Aqua Marcia (the finest water in Rome), the Aqua Appia, and the Aqua Claudia, and he especially alluded to the skill manifested by their constructors in overcoming engineering difficulties. The law of Rome forbade the erection of any building over an aqueduct except another aqueduct, for which proper arrangements were made. The common opinion that the ancient Romans did not know that water rises to its level is completely disproved by the numerous instances in which they applied the law in constructing the great reservoirs and piscinas, or filtering-places, placed at every half-mile in the course of the aqueducts. They used the large stone *specus* because they could not trust lead or terra-cotta, and at the present time the cast-iron pipes of the new company are continually bursting in the streets of Rome, which seems to show that the ancient Romans were better engineers than we are. The lecture was illustrated by numerous plans, drawings, and sections, and upwards of a hundred photographs.

MEXICAN HARD LIME FLOORS AND ROOFS.

IN a communication to the American Society of Civil Engineers, General T. G. Ellis, C.E., gives an account of the method adopted by the Mexicans for constructing hard lime floors, "as hard and smooth as a piece of polished marble."

The limestone used was a hard, compact, blue

material. It often contains iron pyrites in small proportion. This was calcined in kilns cut out of a very soft limestone, that likewise is found in that section of country, and which on account of its whiteness and softness is called "cal lecho." After calcination the lime was removed from the kilns and slaked as soon as cool. Some of it was used within a day or two, and some remained a month or more in barrels. All the work made with it seemed to be equally good. In making the floors, a layer of broken limestone, three or four inches thick, was first laid evenly over the surface of the ground, the stone being about the usual size for macadamising roads; over this a mortar of about two parts of sand to one of lime was carefully and evenly spread to the thickness of $1\frac{1}{2}$ to 2in.; this was allowed to remain for about twenty-four hours, or until the surface had become quite dry. It would probably take longer in this climate, where the air possesses a greater amount of moisture than in Mexico.

The floor was then thoroughly pounded all over with a tool composed of a block of wood about a foot square and three inches thick, having a handle rising from the middle, so that a man could stand while using it. The whole surface was beaten over with this ram until it was again as soft and moist as when first laid. This operation of ramming brought the water in the mortar to the surface so as to form a layer of semi-fluid substance on top. The floor was again allowed to dry, and again beaten over each day for about a week, when the operation brought only a slight amount of moisture to the surface.

Immediately after the last pounding the whole surface was powdered with a thin layer of red ochre, evenly sifted on, and then polished as follows:—A smooth, nearly flat, water-worn stone, a little larger than the fist, was selected from the bed of the stream which ran through the place, and with this the whole floor was laboriously gone over, rubbing down and leaving the surface of the lime as smooth as a piece of polished stone; the red of the ochre rendering it of a rich brown colour. In less than a week the floors made in this way were sufficiently hard to bear the weight of a horse without indentation. Roofs were made in the same manner without the colouring matter, which was added only to give the floors a better tint than the grey of the mortar. These roofs were perfectly waterproof, and were unaffected by sun or rain.

In the city of Monterey, sidewalks in the principal streets are made in the same manner, and some of them have lasted for years, wearing through like a block of stone. The great durability and strength of these floors and roofs is, according to General Ellis, entirely owing to the pounding operation above described, as the same materials were tried in the ordinary way without success.

In a note appended to the Report of General Thomas's communication by the Printing Committee of the American Society of Civil Engineers, it is suggested that this "pounding process" of the Mexicans may be nothing more than a simple yet effectual method of freeing the mortar of its surplus water, and thereby insuring a condition in which the lime can pass to a crystalline carbonate, at the same time compacting the whole mass into the best possible state.

ALBERT DURER AT THE VIENNA EXHIBITION.

—In the International Exhibition at Vienna there is a chess-board, with figures carved in ivory, representing the principal heroes of the last Franco-German war. Certain chessmen, however, will soon be exhibited, which are sure to surpass these in an antiquarian and artistic sense. The figures are carved in wood by Albert Dürer, and excite the admiration of all who have seen them. The kings and queens are on horseback, and the collection contains also humourously carved riders on donkeys, "lansquenets," in necessary numbers, all in the costumes of their times, and several inches high. They are in composition, as well as in execution, in the great master's very best style. This precious work of art is in a perfect condition, and was preserved for centuries in a wealthy Austrian private family, whose ancestors were citizens of Nuremberg. The same family is also in possession of an original picture by Lukas Kranach, representing an old relation of the family, the patrician of Nuremberg, M. Berchtold Tucher, and his young wife. Albert Dürer's work will now become common property, and may serve to enrich some art collection, or perhaps our own South Kensington Museum.

THE NEW TOWN HALL AT BOLTON.

THE leading event in the building annals of the present week is the opening of the new Town Hall at Bolton by the Prince of Wales. The new building is the fifth monument of municipal wealth and dignity in the manufacturing districts of Lancashire and Yorkshire erected within the last few years in a Classic style: S. George's Hall, Liverpool; the Town Hall, at Leeds; and the Municipal Offices at Halifax and Liverpool being the four preceding it. Ten years have elapsed since designs for the Bolton structure were submitted in open competition. The local predilection in favour of style at that period was marked by the fact that Professor Donaldson was called in by the Corporation of Bolton to select a Classic design out of the thirty-eight sets of drawings submitted. He selected one by Mr. William Hill, architect, of Leeds, suggesting at the same time the addition of a more lofty tower, and that design in all its main features, with the suggested addition, has been carried out. After the whole of the working-drawings had been prepared by Mr. Hill, Mr. Woodhouse, architect, of Bolton, was associated with him in conducting the work, Mr. Hill acting as designing architect, and Mr. Woodhouse as resident architect and quantity surveyor, both architects jointly superintending from the commencement of the building operations. Less in size than S. George's Hall, Liverpool, or the Leeds Town Hall, the Bolton edifice is nevertheless in extent a worthy companion to those sister buildings, while it is the more important of the triad in the extent of its interior coloured decorations. In the large public-hall, the council chamber, the banquetting-room, and the corridors, there is a profusion of coloured ornament already completed, and another apartment, called the Mayor's reception-room, offering favourable scope to the decorator, is also to be worked up to a lustrous halo of corresponding tone to that in the completed apartments. A description of these decorations, executed by Messrs. W. B. Simpson and Sons, of West Strand, London, appeared in the BUILDING NEWS a fortnight since.

Externally the building presents, from all points of view, a good Italian composition, having a central feature and well-balanced masses, with details inclining to playfulness of treatment rather than Classic severity. It covers an area of 207ft. in width by 160ft. in depth. There are three principal floors, contained in a rusticated basement, and a single order of columns of Corinthian character, 33ft. 4in. in height. The central tower stands behind a portico of six columns, in a line with the face of the principal façade. It starts from the parapet line with a rusticated base supporting a single order surrounding a belfry; having a central window on each face fitted with gilded metal grilles. Over the belfry is an illuminated clock-chamber and external gallery, with plain-face walls and re-entering angles in elevation, relieved by the dials and the open balustrades and tall angle terminals of the order below. Above the clock-chamber rises a somewhat elongated cupola, and a total height given to the tower of 200ft. from the ground is reached at the apex of an open elegant stone lantern crowning the cupola and supporting a gilded terminal. Each façade has a projecting central mass; that on the north side has an order of six three-quarter columns, flanked by two pilasters, right and left; on the south side six three-quarter square shafts stand in alternation in the centre, flanked as on the north side; on the west, or back elevation, central columns are dispensed with, and a cornice marks the division into floors; on the east, or principal elevation, there is the portico in the centre, with a flight of steps much too cramped for proper dignity. The parapets throughout sustain circular spiral terminals, enriched with wreaths. The tym-

panum of the portico contains a group of symbolical figures executed by Mr. W. Calder Marshall, R.A. The walls of the large hall rise in the centre of the block to a considerable height above the external portions of the structure. At each angle a small square shaft, or secondary ventilating tower, crowned with pediments and terminals, rises still higher, forming intermediate features in the composition between the central tower and the terminals of the external parapets. These four towers stand over the intersections of the inner corridors surrounding the large hall. They contain smoke flues and shafts for ventilating the corridors and offices. The vitiated air from the principal hall is exhausted by means of a shaft carried up to the open lantern of the great tower.

The accommodation provided consists of a central hall upon the principal floor, 105ft. by 55½ft. in the clear, and 60ft. high, capable of seating 2,000 persons. In the rear of this hall is the Borough Magistrates' Court, with retiring, waiting, refreshment, and witnesses' rooms. To the right and left of the central hall are committee-rooms; and in the front there are offices for the borough treasurer, and committee-rooms. A spacious and well lighted corridor surrounds the hall, and gives access throughout. On the sub-floor are offices for the police, with cells under the magistrates' court, and a parade-ground, lighted by gas, under the large hall. In front and on the north side are offices for the officials of the Board of Health, for rate-collectors, the clerks of the borough treasurer, for the borough surveyor, nuisance inspectors, and other subordinate officers. On the super-floor there is a corridor, as on the principal story, giving access to the gallery of the great hall, to the council-chamber and mayor's parlor on the north side; and to the town-clerk's offices, mayor's reception-room, and banquetting-room on the east. On the west and south sides are the grand jury room, baristers', witnesses', refreshment, and committee-rooms.

The great hall has pilasters of two orders, superposed with an intermediate gallery. A detailed description of the interior of the building may be dispensed with, because the description of the decorations before referred to conveys an idea also of the general architectural treatment of the hall and the principal rooms. One of the most powerful organs in this country, and only excelled by those of Germany, will, in a few months, be erected in a semi-circular recess at the orchestral end of the hall. The instrument, constructed under the direction of Mr. Woodhouse, will cost over £2,000, and the casing, designed by Mr. Hill, will cost £1,000.

Regarded as one of the latest contributions to the art of this period, the Bolton Town Hall is fully up to the average standard of merit. Mr. Calder-Marshall's sculpture is, perhaps, too rigid in style for such an architectural purpose; four groups of figures in lunettes in the great hall are a mistake; the figures and carvings upon the entrance doorway by Messrs. Burstall and Taylor, architectural sculptors of Leeds, are very nice in feeling, but the figure portion might have been more carefully drawn. Messrs. Simpson's decorations, uniformly good, are most successful in the banquetting-room. The carvings were executed by Messrs. Simpkin and Stewart, of Manchester.

The cost of the building will be about £120,000. The principal contracts for the works was taken by Messrs. Ellis and Hinchliffe, of Manchester; Messrs. Horne and Nicholls, of Liverpool, were the joiners; Mr. Harwood, of Manchester, the modeller and plasterer. The handsome door-furniture was supplied by Messrs. Smith & Son, of Birmingham; the stained glass by Mr. Barnett, of Newcastle; the illuminated clock by Messrs. Potts & Sons, of Leeds; the chime of bells by Messrs. Warner, of London. Elaborate mantelpieces, in pollard oak and ebony, and dead gold, with handsome mirrors and grates,

were supplied by Mr. Lamb, of Manchester; and the beautiful parquet-work in the dados of the council-chamber and the gallery of the great hall was executed by Messrs. Arrow-smith, of London.

Although the building has been formally opened, it is by no means completed. The plasterers, painters, and other workmen are still engaged upon it; the orchestral fittings of the great hall and the grand organ (for which Mr. Best, organist of St. George's Hall, prepared the specification, in conjunction with Mr. Woodhouse) have yet to be introduced; and two colossal lions, to complete the porticos, are still in the hands of the sculptors, Messrs. Burstall & Taylor, of Leeds.

A double-page illustration, with plans of the building, will appear in next week's number of the BUILDING NEWS. C. C.

NOTES ON THE RESISTANCE OF BRICKS TO A CRUSHING FORCE.*

By GEORGE S. GREENE, JR., C.E.

THE bricks were of the kind used in the construction of the South Gate-House of the New Reservoir in the City of New York, by Fairchild, Walker & Co., contractors.

The experiments were made by Gen. George S. Greene, at Cornell & Co.'s, Centre-street, September 20th, 1860, in Hatfield's Hydraulic Press for testing building materials, built by R. Hoe & Co.

The bricks were what are known as hard brick, and manufactured at the yard of Wm. Call, Haverstraw, on the Hudson river; they are regarded as average samples of the mass of brick used in the construction of the Gate-House. The experiments were not made in the interest of any person, but solely to determine the actual strength of the brick. In order to bring them within the power of the machine, but little more than half of a brick was used. The pieces of brick were first dressed by a stone-cutter, and then ground down on a grind-stone. The faces exposed to pressure were not perfect planes, and therefore a layer of wood and sand was interposed between the faces of the machine and those of the bricks.

Dimensions of the Brick used in Experiments
Inches and Decimals.

	Thick.	Wide.	Broad.	Exposed to pressure.
No. 1.—	2.30	by 3.52	by 4.40	15.488 sq. in.
No. 2.—	2.24	by 3.50	by 4.46	15.610 "
No. 3.—	2.34	by 3.50	by 4.52	15.820 "
No. 4.—	2.34	by 3.46	by 4.46	15.4316 "
No. 5.—	2.30	by 3.46	by 4.50	15.570 "
No. 6.—	2.28	by 3.46	by 4.60	15.916 "

No. 1.—At 30,000lb. (= 1.937lb. per sq. in.) cracked in centre; kept at 50,000 (= 3,288.3lb. per sq. in.) without crushing. Brick between two pieces of board, half an inch thick.

No. 2.—Had a layer of sand. Sign of crack at 50,000lb. (= 3,203lb. per sq. in.); kept at 52,500 (= 3,362.2 per sq. in.) for three minutes, but did not crush. Crack did not extend through brick, nor was it broken into two parts.

No. 3.—Crushed to pieces at 43,500lb. (= 2,749.7lb. per sq. in.); packed with sand.

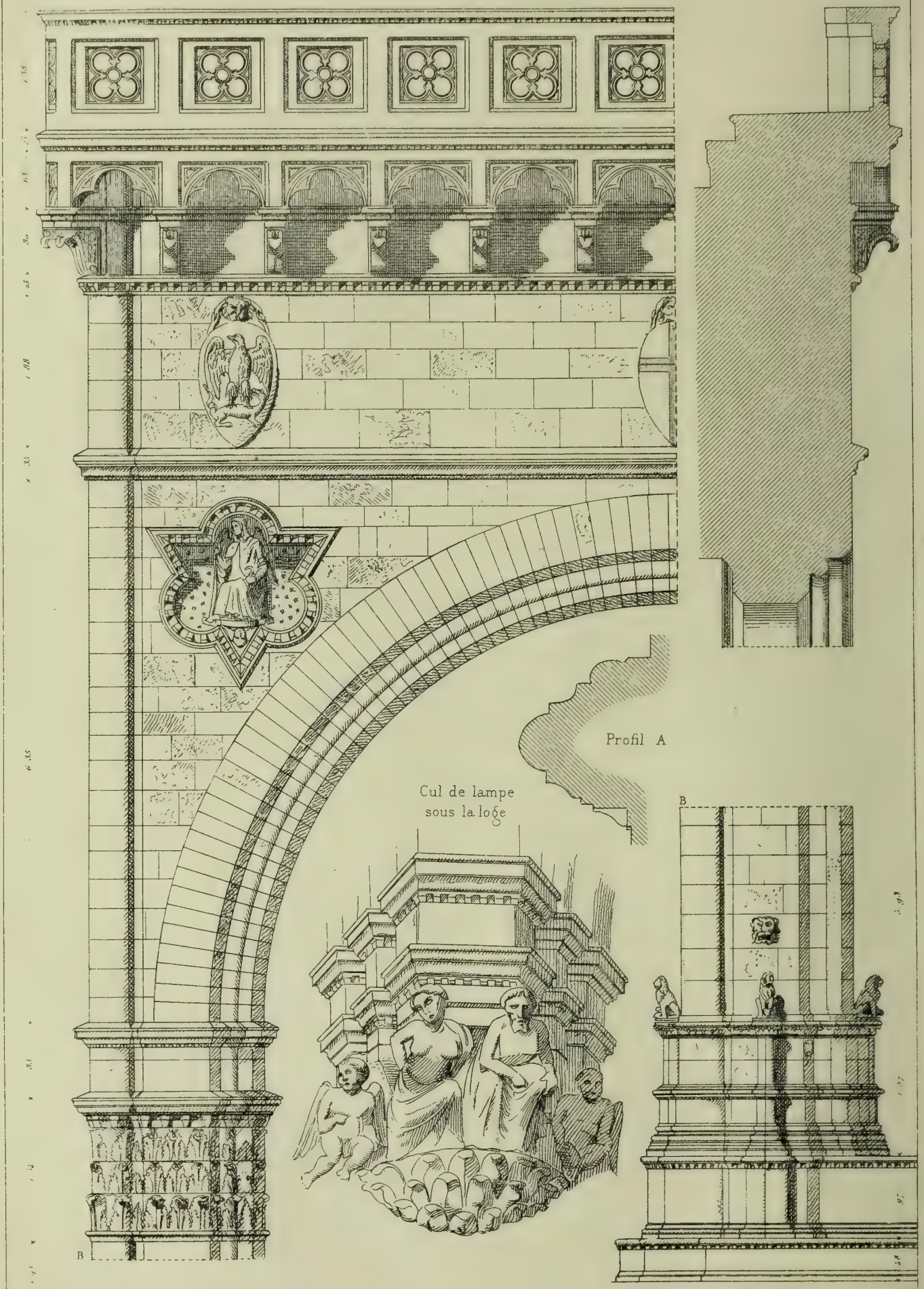
No. 4.—Packed with two pieces of cigar-box wood; edges crushed off at 30,000lb. (= 1,994.1lb. per sq. in.).

No. 5.—Packed with sand; cracked at 27,000lb. (= 1,734.1lb. per sq. in.); crushed at 32,000lb. (= 2,055.3lb. per sq. in.). Brick crushed and cracked in all directions; did not fall to pieces as did No. 3.

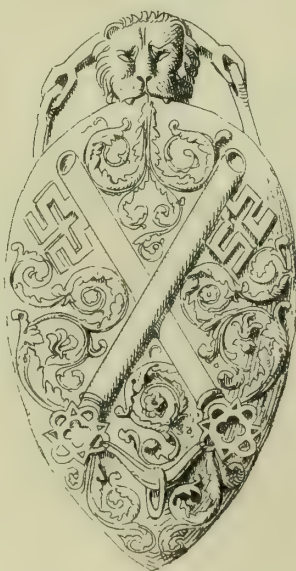
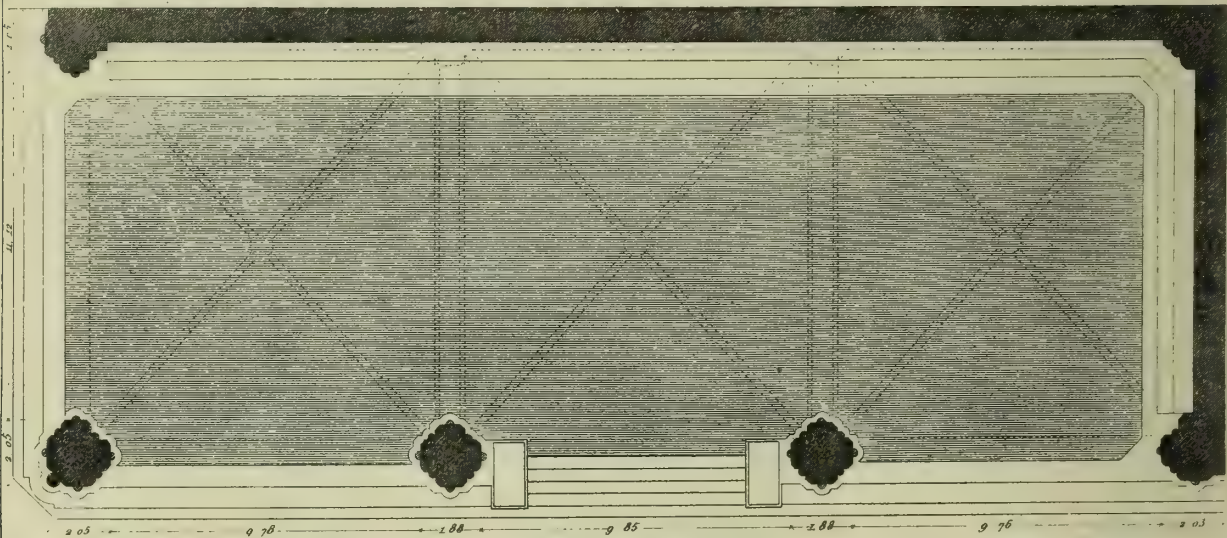
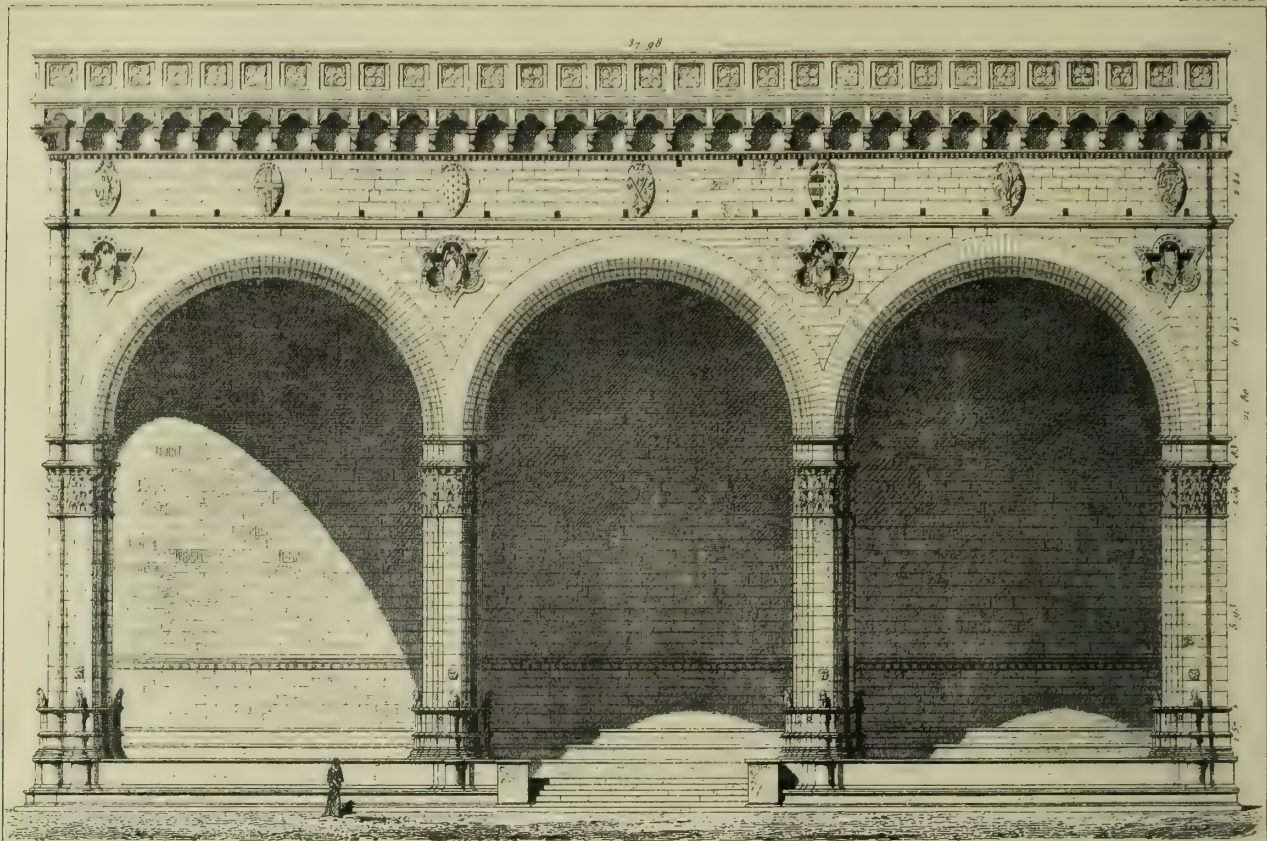
No. 6.—Packed in sand; commenced to crack at 30,000lb. (= 1,884.9lb. per sq. in.); crushed to pieces at 46,500lb. (= 2,921.6lb. per sq. in.).

A rather serious impediment to the building of the Edinburgh Cathedral has unexpectedly occurred, as the estimated cost of the foundations will, according to the *Guardian*, probably be trebled if the proposed site be retained. It was taken for granted, and not without good reason, that the rock of the site was of the same quality as that immediately adjoining, but it turns out that there is a serious "fault" in it, which will necessitate excavations to a probable depth of thirty feet.

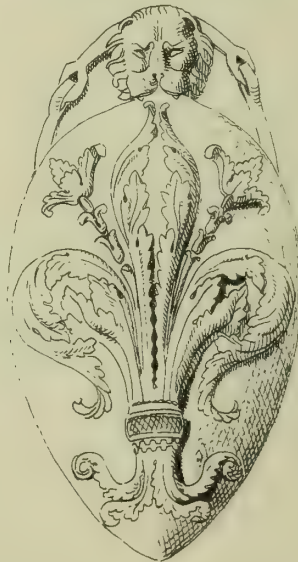
* American Society of Civil Engineers.



LOGE DE LA SEIGNEURIE, AT FLORENCE.
DETAILS.



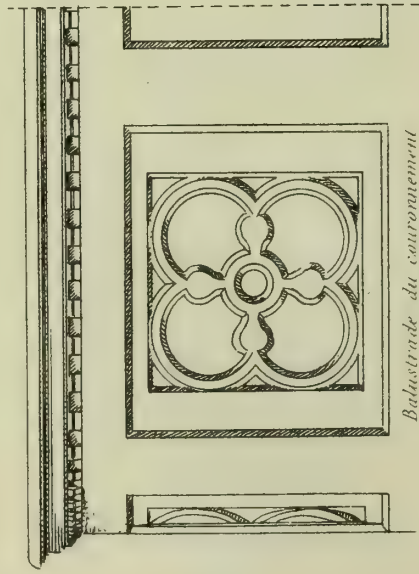
Armes du Pape



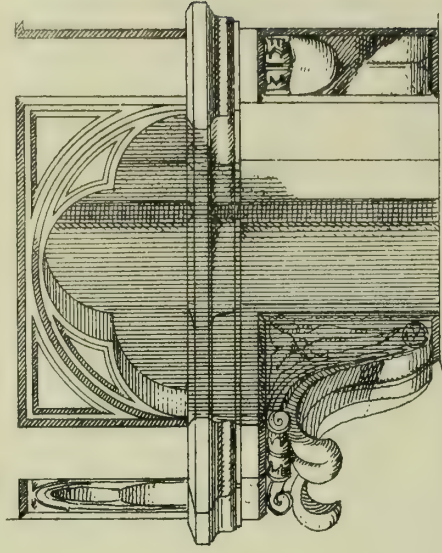
de Florence.



des Dix de la liberte



Balustrade du couronnement



Détail

des consoles



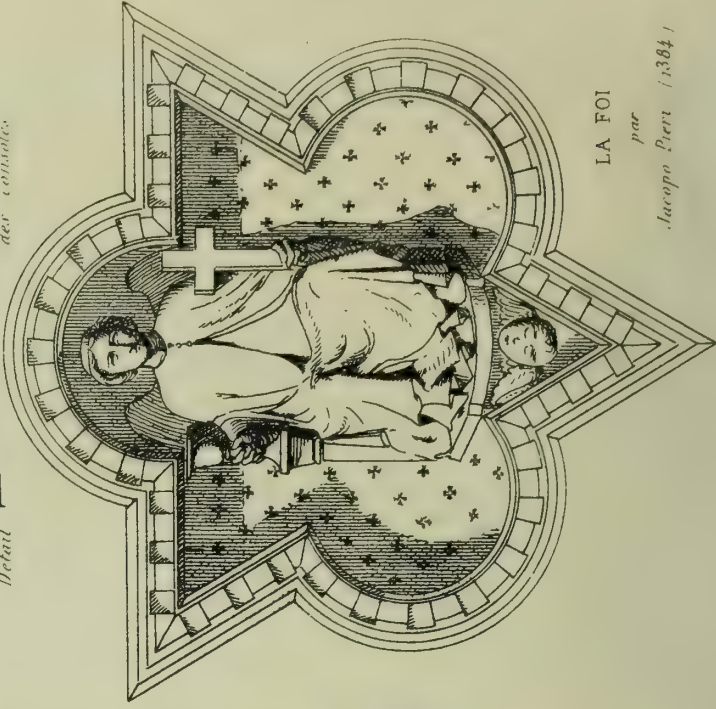
L'ESPÉRANCE

par
Jacopo Perti (1385)



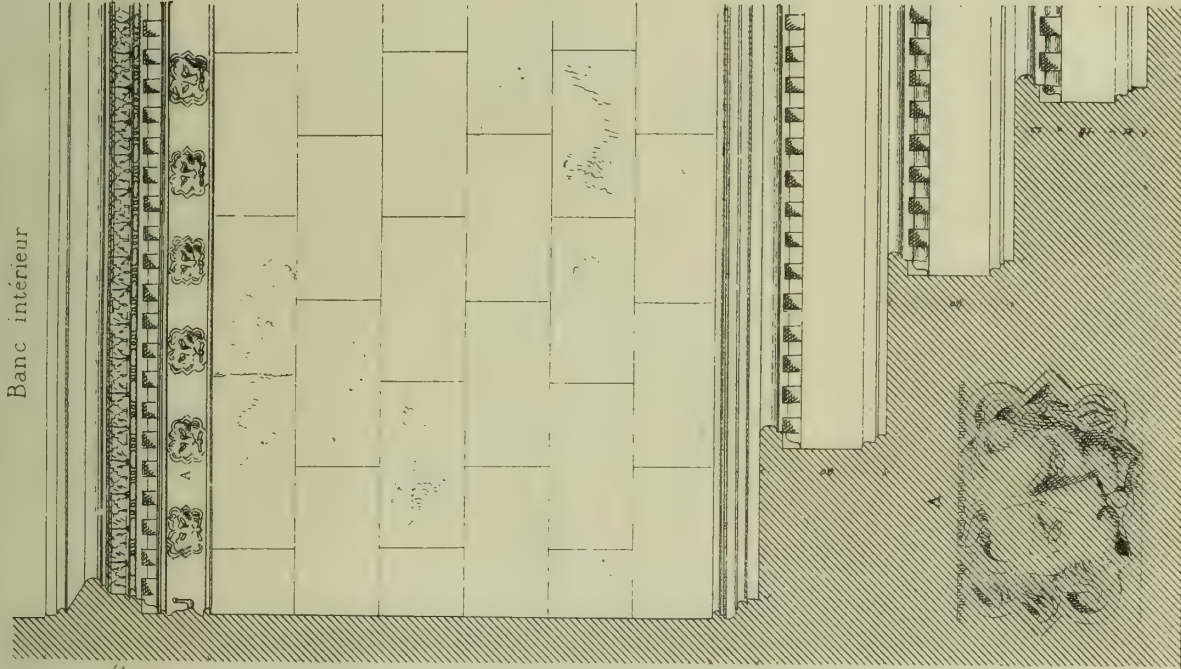
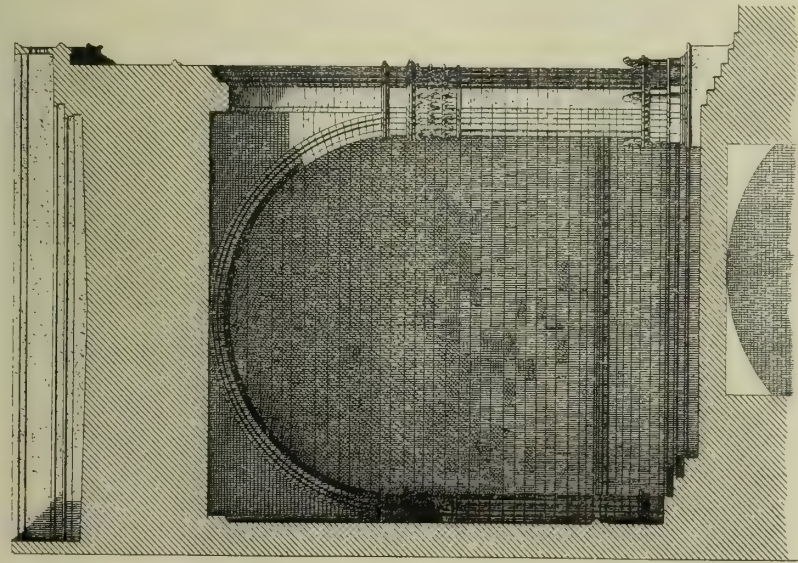
LA CHARITÉ

par Piero di Guido (1386)



LA FOI

par
Jacopo Perti (1384)



Banc intérieur



Lion
sur la face
du Pilastre



Lions des



Pilastres

LOGE DE LA SEIGNEURIE, AT FLORENCE.
SIDE ELEVATION-SECTION- & DETAILS.

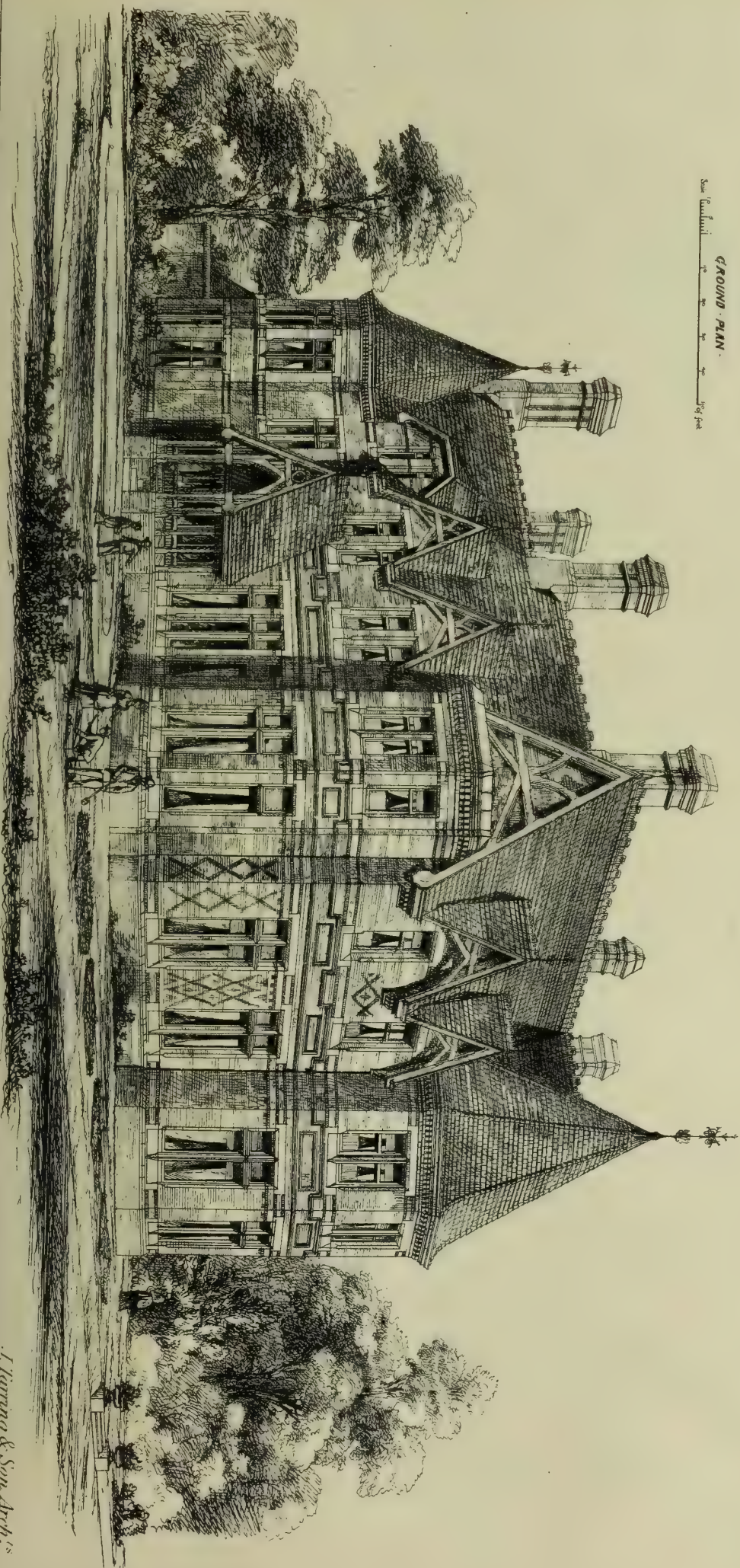
OAKWOOD
— Christchurch —



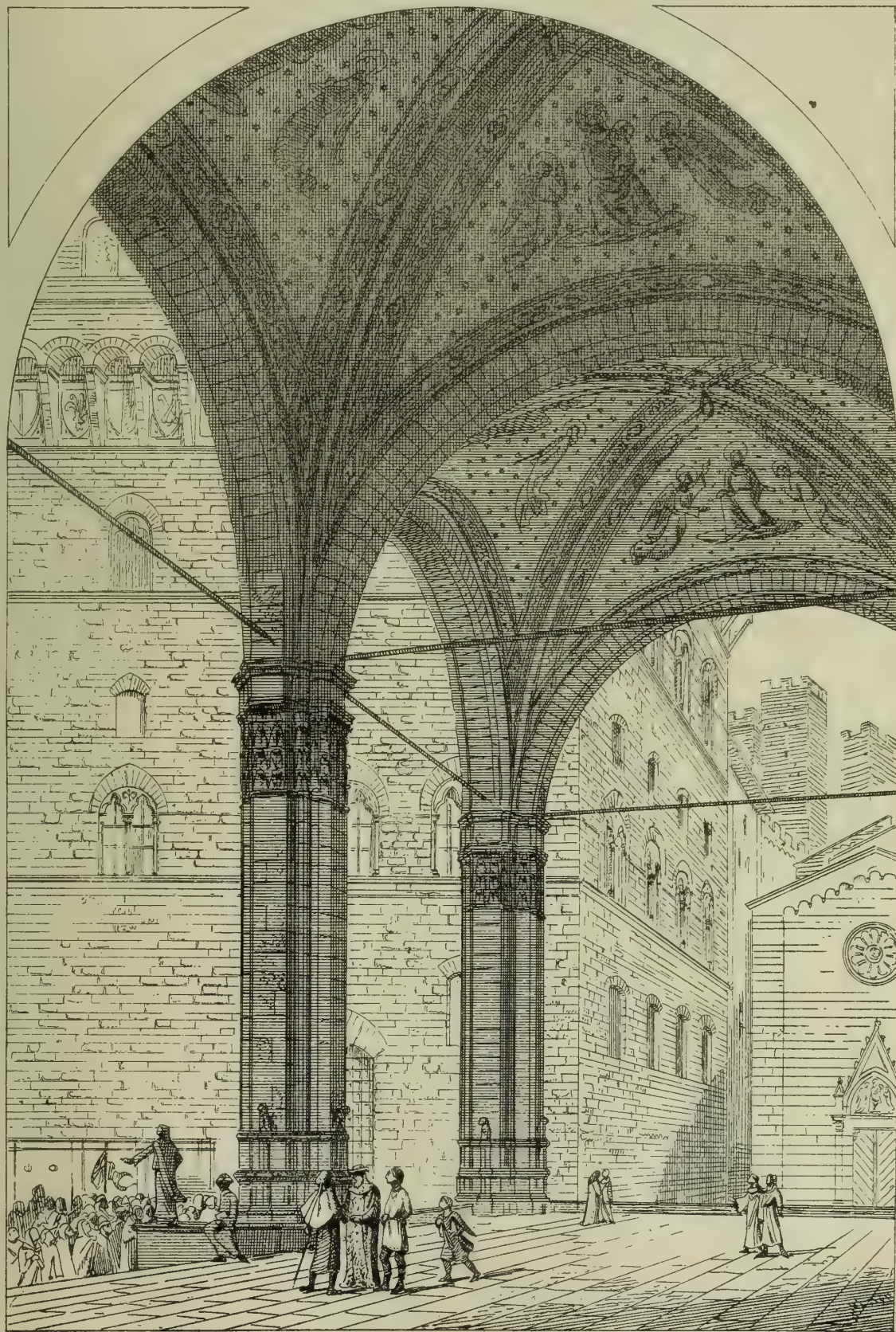
Dimensions.
A 100 ft. x 40 ft. 6 in. 3,200 sq. ft.
B 20 ft. x 10 ft. 200 sq. ft.
C 20 ft. x 10 ft. 200 sq. ft.
D 20 ft. x 10 ft. 200 sq. ft.
E 20 ft. x 10 ft. 200 sq. ft.
F 20 ft. x 10 ft. 200 sq. ft.
G 20 ft. x 10 ft. 200 sq. ft.
H 20 ft. x 10 ft. 200 sq. ft.
I 20 ft. x 10 ft. 200 sq. ft.
J 20 ft. x 10 ft. 200 sq. ft.
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R 20 ft. x 10 ft. 200 sq. ft.
S 20 ft. x 10 ft. 200 sq. ft.
T 20 ft. x 10 ft. 200 sq. ft.
U 20 ft. x 10 ft. 200 sq. ft.
V 20 ft. x 10 ft. 200 sq. ft.
W 20 ft. x 10 ft. 200 sq. ft.
X 20 ft. x 10 ft. 200 sq. ft.
Y 20 ft. x 10 ft. 200 sq. ft.
Z 20 ft. x 10 ft. 200 sq. ft.

See Engraving
Scale 1/4 inch = 10 feet

GROUND PLAN.



J. Fanning & Son, Archts.



LOGE DE LA SEIGNEURIE, AT FLORENCE.
PERSPECTIVE VIEW OF INTERIOR.

PHOTO-LITHOGRAPHED & PRINTED BY JAMES ASHERMAN, 51 GRAYS INN ROAD, W.C.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE LOGGIA AT FLORENCE.

THAT commerce and art are not antagonistic elements is proved by the relics of Italian art. That art is not the cause of progressive civilisation, but its effect, is a truism continually forgotten not only by the public, but by the artists themselves. Like Pallas Athéné, who sprang from the head of Zeus, art originates in the intellectual atmosphere of a certain historical period. In every stone of a building, and in every line in a picture, the character, thoughts, and aspirations of a nation are reflected. The more we study the forms of the past, the more we become convinced that art is not merely an accessory to, but the *finishing* phase of, civilisation. After an interval of nearly one thousand three hundred years, the old Greek artistic spirit revived, and influenced the productions of the Florentine artists with renewed power. But what made the rough Tuscans turn to art? Why should they not have contented themselves with the old forms—the Basilicas, the Gothic churches, the emaciated saints, and the symbolic carvings, ugly and vulgar, pointed and angular as they were? Although the struggle between the Guelphs and the Ghibellines was nearly at an end, citizens were still arrayed against citizens. "Blacks" still hated the "Whites," and the victorious "Whites" banished the "Blacks." The Signoria began to rule, and they were merchant-princes—manufacturers, wealthy citizens, who had gained their riches by weaving cloth, carving stone, working gold and silver, or by forging steel and iron. Commerce was not hostile to art. But commerce alone did not resuscitate taste and refinement, nor enliven the imagination and power of composition of the Tuscan artists. What, then, produced this change? This question can be easily answered by the historian. It was the revival of the earnest study of the Antique, in poetry as well as in art, that produced first a Dante and a Petrararch, and subsequently a Raphael and a Michael Angelo. The spirit of Classical refinement, which had been silent for more than a thousand years, had sufficient power, when again invoked, to produce the regeneration of art. Neither Buddhist mysticism, Egyptian symbolism, the unwieldy hatred of plastic art amongst Mahomedans; the rustic customs and manners of the so-called Northern Barbarians, the sanguinary and adventurous crusades, the unlimited power of the Church, the fearful superstitions of those times, which fostered the firm belief that the world was to perish in a general conflagration, or by a universal inundation; nor the influence of a garrulous scholasticism, could hinder Italy, once touched by the wand of Remembrance, from becoming inspired and understanding the whispers of Nature, or from seeking solace and comfort in poetry and art. Giotto and Orgagna did not precede Dante and Petrararch, but followed them, imbibing, through these geniuses, the immortal spirit of ancient Greece and Rome. Without the Iliad, the Odyssey, and the Æneid, there could have been no *Divina Commedia*; without Phidias and Skopas, no art revival in the Florentine school; and without Homer there could have been neither a Phidias, a Virgil, nor a Dante. The spirit conceives, and also gives form to the conception. At the time when Cola di Rienzi at Rome thundered forth his republican phrases, borrowed from Cæsar, Cicero, and Livy; the Visconti tyrannised over Milan, and Venice was sighing under the dominion of the *Nobili*; Florence (founded as *Florentia* by Sulla), the "*bellissima and famosissima figlia di Roma*," inhabited by a people uniting the spirit of polished antiquity with the indomitable individualism of the Teutons, shook off its quarrelsome aristocracy, and established a democracy of wealth and intellect, of passion and activity. Suddenly we find a sensitive refinement revived in the charming valley of the Arno. The pride of every nobleman in Florence was to have a tower, and more especially a lodge, attached to the palace of his ancestors. This fashion was half Roman and half Teuton. As in language and manners, so also in the architectural products, we can trace the influence of the Teuton upon the Roman survivals. It was this happy union of the two conflicting and heterogeneous elements which were brought into homogeneity by poetry and art that produced the masterpieces of Florentine architecture, sculpture, and painting. The Tuscans never could altogether forget the past. They were free and independent, like the knights of the dark forests of the North, and polished and pompous, theatrical

and ostentatious, like the old Romans, who were inspired by Greek poetry and delighted in Greek statuary. The lodge or out-house, a separated or partly-connected building, is entirely of Teuton origin. We find it in Scandinavian peasant dwellings, and near our own Anglo-Saxon and Norman mansions. The "Loggia" at Florence had a character of its own. When the citizens of Florence had conquered their aristocratic tyrants, they built the palace of the "Signoria." Being now masters, they used their privilege by having a splendid tower attached to their common property, the town-house, and wished to add to it a lodge, magnificent in its general outlines, imposing by its earnest sobriety, and charming in its splendid details. It was to be a Romanised lodge; a Teuton out-house, in the splendid form of a portico. The Grand Council ordered its construction, by a resolution passed on the 21st of November, 1356, and intrusted Andrea Orgagna with the work. Twenty years elapsed, and Orgagna was dead, when the building (now called "*Loggia dei Lanzi*") was completed by Bensi Cione and Simone Francesco Talenti, who were, however, only elected master-builders of the "*Loggia dei Signori*." Vasari may, perhaps, be right in ascribing the building to Andrea Orgagna, who was born 1329, and died, it is supposed, in 1368. Twelve years before his death, he was commissioned to prepare the plans of the "loggia," and there does not appear to have been any reason why he should have neglected this, or why the Town-council should have omitted to preserve his sketches and plans, and to have them carried out. The admirable proportions and excellently combined details bear the stamp of Orgagna's genius. The reliefs are in his peculiar style, resembling those of the tabernacle of the church of "Or-San-Michele" at Florence. He was a great architect, sculptor, and painter. The division of labour not having been carried out to a technical nicety, the architect had to unite in himself the qualifications of the ornamentist and the painter. He had to decide how far the cornice, the frieze, the spandrels, the arches, and the pillars, should be decorated, and in what style. The educated and artistic mind of one man had to draw up the plan, and to bring harmony into its details. This unity of composition strikes us more than anything else in the architecture of the "*Loggia dei Signori*." The Roman cross-vault asserts its mighty predominance as may be seen in Plate I. of our illustrations. We have some indication in the balustrade and cornice of Gothic forms (see Plate II.) The shields on the frieze remind us of the triglyphs of Greek temples, and of the frequent use of this ornament in Moresque buildings. The spandrels are undoubtedly ornamented with medallions of Gothic trefoils uniting triangles into one complicated frame (see Plate IV.) The arch, however, and the cross-vault are Roman. The gloomy defiance which frowns from every stone is Teuton. The pillars, with their capitals of Acanthus-leaves, arranged in a rather stiff and realistic manner, are carved in a mediæval spirit aspiring to Greek conventional beauty (see detail of Plate IV.) We trace in the building the conflict between the old world that was beginning to die away, and the spirit of modern times that manifested itself in Italy in art, and in the North of Europe in theology. This victorious spirit of the Antique may be seen especially in the sculptures of the "Loggia" (see Plates IV. and V.) The drapery loses the regular parallel stiffness, the limbs gain in beauty and roundness what they lose in saintlike ecstasy, and are no longer carved in a spirit of utter contempt for the flesh. Hope, Charity, and Faith are lovely women, and though Hope and Faith are winged, the Assyrian patterns, have given way to faint symbolic wings, expressing the gentle soaring of the spirit towards a better future. The rebellion against the Gothic system, and its strict geometrical rules, is gaining ground. That the artists of the dawn of the Italian Renaissance were eclectics, cannot be doubted, for we can trace in their works the patterns of the Goths, Normans, Arabs, Moors, Greeks, and Romans. They were, however, original, for they knew how to combine these different styles into one imposing total. It is entirely erroneous to speak of their buildings as Gothic. The Italian mind never understood the "*maniera tedesca*," as they called Gothic art, which was fostered by Teuton architects in Spain and Italy, and worked out to perfection in France. The products of Gothic architecture were even generally called "*opera francigena*" in Germany. The pointed arch was, strictly speaking, an

unnatural outgrowth of a bent triangle, and was never much cherished by the Italians. The arch, the square, and the pure angle, as the true and natural crystallisations of forms, always predominated in Italian art. Even when artists were induced to adopt the pointed arch, they did so reluctantly, and often placed it as a mere ornamentation over a clearly defined square window or door. The Italian mind never could comprehend the Gothic profusion in statuary and ornamentation; its realism in stone and brick-work, and its endeavour to be, both in architecture and sculpture, geological, botanical, and metaphysical. The "Loggia" at Florence was to be built in the Gothic spirit, but the artists endowed it with the Classic forms of Greece and Rome. The figures Faith, Hope, and Charity (see Plate IV.), of which the two former were on the spandrels and the latter on the frieze, were sculptured by Jacopo di Piero (1384-1389). Force and Temperance were the works of Giovanni di Fetto. The drawings according to which the figures were sculptured, were taken by the painter, Angiolo Gaddi, from Orgagna's sketches. A free stream of secular beauty circulates in these works. The forms are colossal. We can trace some symbolism in the composition. The stones are living and proclaim the spirit of the age. Politics and religion, art and poetry began to go hand in hand. The "Loggia" erected as a memorial of the popular triumphs over tyranny, was to be at the same time a record of the most Christian duties. The figures representing the seven cardinal virtues of a free people were women surrounded by emblems expressive of prudence, justice, force, charity, hope, faith, and temperance; but they were also ideal conceptions brought into form in a Greek spirit. The artists found corresponding concrete forms for their abstract moral ideas, and these ideas were in the highest degree poetical. That polychromy was used in these ornamental works cannot be doubted. Lorenzo Biccio, who received ninety gold florins for the colouring of Faith and Hope, was one of the most celebrated artists of his time. Purple, azure, and gold were principally used to give brightness to the sculptures and to detach them from the ground, which was worked in glass mosaic, like the Niches of "Or-San-Michele." The exterior having been so lavishly decorated by sculpture and colour, the interior cross-vaults could not have been less ornamented. Down to the latter end of the fifteenth century, the loggia still existed in all its original beauty. According to a document found by M. Cavallucci, the archaeologist, it was united to the palace by a passage in 1491, and steps were constructed on both sides, as means of communication. The civic pride of the Florentines may be studied in the lions' heads of the pilasters (see Plate V.), and the shields (see Plate II.) forming the tryglyphs of the frieze, and bearing the arms of the Pope, of the city, of the "Ten of the Liberty" and others. The arabesques on these shields are worked in an excellent style, with great correctness and sharpness. The god of war, Mars, was the first protector of Florence, but was exchanged for John the Baptist. Dante expected no good from the change, and thought that the offended god would "for ever with his art make poor Florence sad." Happily, Apollo, the god of the muses settled at Florence, and thence spread the dazzling light of modern art all over Europe. In studying the products of the fourteenth century, we find here and there powerful Guelph influences, but the Ghibelline spirit of freer action, of more correct and Classic forms, of broader lines and greater universality, is always perceptible in Italy, even in those products which were better adapted for the Gothic style, namely, ecclesiastical furniture and sacrificial vessels, such as lamps, candlesticks, censers, goblets, tabernacles, and shrines. The element of Northern art was naturalistic realism, whilst that of the sunny South was naturalistic idealism, or rather, ideal naturalism. The Roman consoles (see Plate IV.), the distinctness of the Gothic patterns in the balustrade (see Plate IV.), the Saracenic shields and harmonious combination of balustrade, cornice, frieze, spandrels, and arches (see Plate III.); and the well-sculptured tail-piece of the lamp under the "Loggia" (see Plate III.), convince us that artists may eclectically use the patterns and forms of all times and nations, and that they may be, in spite of this, thoroughly original. Incongruities in art are to be as carefully avoided as discords in music, and above all, the frightful tendency to over-ornamentation, which threatens

to become a perfect mania with us, should be repressed. Wherever money is to be obtained, architects and decorators vie with one another in filling space with odd corners, arches of all shapes, windows and doors, without any regard to general outlines. Some of our monumental constructions become in consequence mere heaps of interrupted outlines, conveying no general idea. This is also the case with our decorations, which leave no space to give repose to the eye. To attain the correct balance between the static—the quiet and passive—and the dynamic, the ornamental and active elements in architecture, is the great aim of genuine art. The Greeks and the Italians of the Cinque Cento period knew this; the Germans try to emulate them in modern times, and the French partly succeeded, but many of our architects and ornamentists have not yet even brought themselves to understand it. A diligent study of good Italian architectural products would soon refine the public taste; and this once improved, our artists would have to follow out the rules which made Classic art immortal, and gave such power to the Renaissance, the commencement of which we see in the "Loggia" at Florence.

G. G. Z.

OAKWOOD, CHISLEHURST.

This house, of which we give an illustration, stands on a well-wooded site, at the angle formed by the intersection of the Yester and Walden Roads. The general arrangement and dimensions of the ground-floor rooms is sufficiently indicated in the plan. On the first floor are nine large bed-rooms, a dressing-room and two bath-rooms, &c., and on the upper floor over the kitchen block are four large bed-rooms and a linen-room.

The principal staircase is constructed entirely of wainscot, with handsome turned and moulded balusters and newels. The floor of drawing-room has a border of parquetry, and the dining-room and library borders of oak. The lobby, hall, and staircase are paved with ornamental tiles. In all the principal rooms a somewhat novel and apparently successful system of ventilation has been applied, which consists of an iron pipe built in the brickwork in the re-entering angle of the chimney breast, the upper end of which opens under the cornice, while the lower is carried through the brickwork of the chimney jamb and terminates under the stove. It is found that a strong downward draught is created by the action of the fire, thus extracting the heated and vitiated air from the upper part of the room, and passing it away by the chimney. The outside of the building is faced with red Fareham bricks, with moulded strings, &c., and stop-played jambs; the heads and cills of the windows are of Bath stone, and the roof is covered with plain tiles. The stable buildings contain stalls and boxes for four horses, a double coach-house, harness-room, large loft, three rooms for coachman, and also a large laundry and drying-room. The entrance lodge, which is in the Yester-road, consists of three rooms, scullery, and proper conveniences. The architects are Messrs. Tarring and Son, and Messrs. Perry and Co., are the contractors.

NEW RAILWAY IN BUENOS AYRES.—The new Rosario Railway has been opened. The main line and its branches will embrace a total length of 426 miles. Mr. J. W. Barry is the Chief Engineer; Mr. J. Robinson the Chief Resident Engineer; and Messrs. Lucas and Waring Brothers the contractors.

NEW GRAVING DOCK AT GREENOCK.—On Monday the new Garvel Park Graving Dock was inspected, preparatory to its being opened. The dock near completion at Greenock is certainly the largest work of the kind in Scotland, if not in the entire kingdom. The length of floor of the new dock is 500ft.; width at bottom, 70ft.; and at coping 80ft.; the entrance is 60ft wide at the coping, with a depth of 20ft. of water at high tide. The dock is formed on an improved principle compared with the present docks of Greenock, and the caisson for the entrance, which is the patent of Mr. Kinipple, is a novelty, and renders unnecessary the heavy swing bridges and expensive opening and closing machinery, and has increased facilities, only one man being needed, instead of fifteen or twenty as at Leith, to set the machinery in motion. The whole works will cost over £60,000; Mr. Kirk, Woolwich, was contractor; Mr. W. R. Kinipple, Westminster, engineer; and Messrs. J. & H. Gwynne, of London, machinery makers. The caisson was constructed by Messrs. Hanna, Donald and Wilson, Paisley.

Civil Engineering.

SUSPENSION BRIDGES.*

UNTIL the completion of Hammersmith Bridge in 1824, there existed no example of this method of construction in the vicinity of London. Their history is, however, of very ancient origin, and they are adopted chiefly for spans too great to be crossed by girders or arches at a reasonable cost, or where a foot-bridge only of small span is desired. Humboldt informs us that numerous early examples exist in South America made from ropes 3in. or 4in. in diameter, formed from the fibrous portions of the roots of the American aloe. Such structures are asserted to have existed in America prior to the arrival of Europeans. Bridges composed of more durable materials also are found to have existed in these remote districts. An iron suspension bridge of fabulous origin is known to have existed in China. Numerous bridges on this principle are spoken by various travellers in China, which are said to vibrate to and fro so much that persons crossing them are affected with sensations of fear lest they should come to grief while passing over. We have no record of the adoption of such structures to cross a river or valley by the Greeks, the Romans, or the Egyptians. The engineer, it is reasonable to suppose, has therefore obtained his first ideas for the construction of suspension bridges from the barbarians of America. Seamozi mentions the existence of suspension bridges in Europe at the beginning of the seventeenth century, but as the mathematical knowledge requisite to determine their properties was not arrived at till the middle of the following century, it is doubtful whether such were constructed upon true principles. They were probably of short duration, as other writers are totally silent on the subject. The oldest suspension bridge in the United States was erected at the close of the eighteenth century. The old Winch chain-bridge, over the Tees, between Durham and York, chiefly for the use of miners, is said to be the oldest example in England.† Wire suspension bridges were also made, though to no considerable extent, in Scotland at the commencement of the present century. Experiments were made by Telford when the bridge of Runcorn was under consideration, accounts of which are to be met with in various works, and their results applied to the consideration of suspended girders. Telford designed the magnificent bridge over the Menai Straits, separating the Isle of Anglesey from Carnarvonshire, and employed four sets of main chains, each consisting of four, making sixteen chains altogether, the tension in each of which was similar and uniform. Each chain was formed of five links 10ft. long, $3\frac{1}{4}$ in. wide, and lin. in thickness, with chain plates to connect them at each end lin. thick. Vertical rods supporting the framework for the platform are suspended from these chains at equal distances of 5ft. apart. In Mr. Drewry's excellent treatise on suspension bridges we are informed that the plan of operation in putting up the chainwork of this bridge was as follows:—"The chains were first put together in the tunnels, working up from the fastenings to the mouths of the tunnels by bringing down one link of each chain at a time, and bolting it to the one brought down before. Next, the chains were put together from the mouths of the tunnels up to the main piers, upon a scaffolding erected on the masonry between the pier and the shore, with the proper inclination for the backstays. The chains were then continued over the Carnarvon pier, hanging down loose nearly to the level of high water. This was done by suspending a cradle large enough for two men to sit in, from a crane arm set up on the top of the pyramid. The cradle was suspended by tackle, so that the men could slack it down or haul it up, to raise or lower themselves at pleasure. The links of the chain that were to be joined on to the ends of the chain hanging over the top of the pier were brought successively along the road to the front, or sea-face of the pyramid, through the arched roadway opening. Thence the link was taken up by a tackle from a pair of shears placed

on the top of the pyramid, and lifted up to the height of the link it was to be fixed to, where the men in the cradle got hold of it and brought the two links together, and put the coupling bolts through them. On the Anglesey side of the Strait the chains were carried just over their saddles on the top of the pier, and their ends were retained by tackle made fast to them, and descending thence to capstans on the shore. The remaining piece or length of chain, which was to unite the two ends of the chains brought up from each shore, was laid on a raft 400ft. long and 6ft. wide, made of whole deal balks bolted together. One end of the piece of chain was first fastened to the end that hung over down to the water from the Carnarvon pier, and then the raft was floated across to the Anglesey pier, and the loose end of the chain upon it was fastened to the tackle that hung down from the pier. The tackle was then hauled up by the capstans fixed on the shore, and the chain raised gradually off the raft until the end of it was brought in contact with the end of the chain that hung over the top of the pier. The two loose ends were then bolted together, and the operation completed." The Conway Bridge is built on the same principle as that over the Menai Straits. It is 327ft. in span, with a versed sine of curvature of main chains = 22ft. 6in. There are eight chains, which were erected by means of strong rope cables reaching from top to top of towers, supporting a temporary platform. On this the chains were carried and fixed in position; afterwards the platforms of wood were taken away, the rope cables slackened, and the chain lowered to its proper curvature. The Union Bridge, across the Tweed, was the first bar-chain bridge of considerable size erected in this country. It was designed and executed by Captain Brown. Distance between points of suspension, 449ft.; deflection, 30ft. The roadway, 18ft. wide, is supported by vertical lin. rods, 5ft. apart, suspended from twelve main chains, arranged in couples, and forming three sets on each side of the bridge, one underneath the other. The Newhaven Suspension Pier, Brighton Chain Pier, Montrose Suspension Bridge, and other structures, were also executed by the same engineer. The Newhaven suspension pier, 700ft. long and 4ft. wide, is divided into three spans, each supported by longitudinal girders, held up by vertical rods suspended from two main chains, passing over cast-iron saddles. The old Brighton pier consists of four main chains on each side, from which the platform is suspended by vertical rods, lin. diameter, 5ft. apart. In 1838 it suffered much damage during a storm, the roadway being carried partly away, and the suspension-rods broken. In the Montrose suspension bridge, scarcely second in point of construction to the Menai, the roadway is 412ft. long, and 12ft. wide, and was suspended by $1\frac{1}{2}$ in. vertical rods, without joints, 5ft. apart, from two main chains, each composed of bars 10ft. by 5in. by lin., the versed sine of the catenary being 42ft. About ten years after its completion, about one-third of the platform gave way, in consequence of the failure of one of the suspension-rods, when rods of $1\frac{1}{2}$ in. diameter, with flexible joints at the level of the platform (to avoid any twisting that the undulatory motion might cause) were substituted for the old rods. A system of vertical diagonal trussing, 10ft. deep, placed half above and half below the platform, was also adopted, to prevent undulation, as well as consequent oscillation arising from one side being raised by the wind at one end, while the lower side at the other end was depressed. In the following year (1839), the bridge over the Menai Straits was severely injured by a storm, the carriage-ways being rendered impassable, and a portion of the suspension-rods torn away. The motion was stated to have been greatest about midway between the points of suspension and the centre of the bridge. The Hammersmith suspension bridge was executed by Mr. Tierney Clark. The large span is 422ft. 3in., the versed sine of the catenarian chain being about 29ft. The platform is divided into a carriage-way 20ft. wide, with footpaths on either side 5ft. wide. Two of the eight main chains on each side of the carriage-way have links consisting of six wrought-iron bars 8ft. 10in. long from centre to centre of the eyes, 5in. wide, and lin. thick. The other chains on the outside of each footpath have only three lines of bars of the same dimensions in each link. The total length of the bridge from abutment to abutment is 822ft. 8in. The links are fastened to holding-down plates embedded in brickwork in abutments, passing through tunnels 3ft. wide for the large chain and 2ft. wide for the

* Abstract of paper read before the Civil and Mechanical Engineers' Society, May 3, 1873, by Mr. A. T. WALMSLEY.

† Hutchinson, in his "Antiquities of Durham," describes this structure as "suspended on iron chains, stretching from rock to rock, over a chasm 60ft. deep; its width 2ft., with a handrail on one side, and planked in such a manner that the traveller experiences all the tremulous motion of the chains."

small side chains, which pass down at the same angle as the chains of the central opening. In February, 1869, questions were asked in Parliament as to the stability of Hammersmith Bridge under the extraordinary strain brought to bear upon it on occasions such as the University Boat-races, when not only is every available standing room occupied, but hanging on the chains and climbing the suspension-rods are indulged in, regardless of the certainty which Tierney Clark never foresaw, namely, the uncommon and unusual load brought to bear upon his bridge. To test the condition of the bridge, then, Captain Tyler on the part of the Government, with Mr. R. M. Ordish on the part of the Hammersmith Bridge Company, were respectively appointed to investigate in a thorough and practical manner its actual efficiency. This was done by removing at random some of the suspension-rods, as also taking a spare cross-girder which (cast at the same time—probably 1820—as the others) had been lying as a superfluous one in the dampness of alluvial soil ever since. The quality of the iron was carefully tested by Mr. Kirkaldy, and the results were satisfactory. The suspension-rods, lin. square, withstood a strain up to 18 tons. The cross-girders are of substantial $1\frac{1}{4}$ in. metal in the web, 3ft. 6in. between outside suspension points, 17in. deep at centre, tapering outwardly to 8 $\frac{1}{2}$ in. at those supports. The inside suspension-rods are keyed 5ft. nearer centre of girder, where the girder is 12in. deep. These measurements were accurately taken. Owing to the misfortune which happened to the spare girder whilst being conveyed, owing to the carelessness of the carter, the girder being laid on its side, the jolting and jerking caused it to break of its own weight; hence only the quality of the metal was ascertained, upon which deductions and calculations were based, and a knowledge of its strength arrived at satisfactorily. In regard to the saddles and rollers of the chains, it might be asked if rollers are of any practical service whatever? Would not the friction of the rollers be so great as to require the tower itself to ease before the rollers revolved? It is noticeable that the Hammersmith Bridge rollers appeared rusted into their saddles or bearings, there being, notwithstanding, evidence of the chains having rubbed their under surface upon the rollers. A bridge of similar construction by the same engineer, consisting of four main chains composed of flat bars, was erected at Marlow some years ago. The total length is 426ft., and the deflection of the chains 18ft. 6in. In the Norfolk Bridge, of 284ft. span, there are three lines of chain each side, the deflection being 20ft. 2in. Here the backstays are not placed in the same angle as chains in the centre span. In the Broughton Suspension Bridge, near Manchester, of 145ft. 6in. span, with a deflection of 12ft. 6in., the platform is held up by two chains on both sides of the structure, resting on cast-iron suspension frames, in which due allowance is made for expansion and contraction.* The Tiverton Suspension Bridge, over the Avon, near Bath, is supported by suspending bars averaging 2in. by 1in., placed 2ft. 6in. apart, and keyed into a cast-iron plate fastened to the towers. The bridge of Micklewood has its platform supported, not suspended; its span is 103ft. The cross girders are secured together by cross bracing, and rest upon iron frames, which are supported by chains on each side. The widest suspension bridge ever attempted in England is at Clifton. It is 702ft. 3in. in span, and 31ft. wide. The versed sine of the curved chain is 70ft. There are three chains supporting wrought-iron main girders, with cross girders of open work. The chains were carried upon the piers by saddles of wrought iron resting on cast-iron bed-plates fixed on cast-steel rollers. A girder bridge for the Charing Cross Railway being decided to be erected, in place of the old Hungerford Suspension Bridge, the chains were purchased for a moderate amount, and adapted for use at Clifton. Mr. Barlow, in his account of the Clifton Bridge, says, "The links were arranged in the old Hungerford Bridge so that the joints of the links in the upper chain were opposite to the middle of the links of the under chains, and the suspension-rods were carried by a jointed link in such manner that half the weight was borne at the point of the one chain, and the other half by the middle of the links and the other chain. In this mode of hanging the suspension-rods a transverse

strain of considerable amount was brought upon the middle of the links of the chains. In the Clifton Bridge this was avoided. The suspension rods transmit their strain to the chains only at the joints. The result is that the links of the chain have no other strain upon them than that of the direct tensile strain in the direction of their length. The duty of maintaining an equal action upon all three chains in supporting the roadway is performed by the strength and stiffness of the longitudinal girders. The suspension-rods are attached to the longitudinal girders, each rod being furnished with a double adjusting screw at the lower extremity." The links were tested both in the Hungerford and Clifton bridges to a strain of 10 tons per square inch. The temporary staying necessary for their erection consisted of eight ropes of iron wire, each rope calculated to sustain 35 tons. Six of these supported a platform staging upon which the links were supported by packing pieces until the connection in the centre of the chain was made, when it was allowed to take its own bearing. The remaining two ropes were placed above the links to serve as a handrail on either side and were attached to the platform below by strong hoop-iron. Another rope was also fixed to carry a travelling framework supported on wheels, by means of which the links, tools, &c., could be conveyed from any one part of the work to any other part. The weight of the chain between piers was 550 tons. The Chelsea Suspension Bridge, 704ft. long, is divided into a central span of 333ft. and two side spans of 166ft. 6in. Its width is 47ft. The chains are four in number, two on each side, consisting of links 8in. wide, in lengths of about 16ft. from centre to centre of pinhole. The deflection of the central portion is 29ft. The chains are carried over saddles resting on fixed massive cast-iron cradles, supported on cast-iron columns cased with ornamental cast-iron work, and weighs altogether 340 tons. At the abutments the chains are diverted to their moorings through tunnels placed at an angle of 155deg. with a horizontal line. Four temporary chains of 2in. wrought-iron rods, placed on each side of the permanent chain, were thrown across for their erection, by means of which the bridge-links were hoisted and fixed. In addition, four similar chains placed below these were thrown over to support a timber platform for the workmen. The suspension-rods are each divided into two at the chains by means of a crosshead or short bar fixed to the centre of the suspension-rod, and at the ends to two short rods, one of which is connected with the upper chain, and the other with the lower. By this means each chain is made to take an equal strain, since the leverage is the same on either side. We see, then, that in most suspension bridges the platform is suspended by vertical rods hanging from chains stretching across from tower to tower, by means of which the whole weight of the roadway and the moving load, generally estimated at from 70lb. to 90lb. per square foot, is transmitted through the chains to the piers. Mr. Dredge, of Bath, some years ago invented the taper-chain suspension bridge, with the object of rendering the roadway free from the effects of undulation and vibration. The invention consisted in supporting a great portion of the roadway directly from the standards on each side, thus leaving a diminished tension due to the chain, and in having the chains of such strength and size at the points of suspension as would suffice to support the maximum fixed or moving load to which they are at any time likely to be subjected, and from thence gradually tapering to the centre of the bridge, where the strain would necessarily be small compared with that at the piers. The roadway is suspended by rods inclined at angles varying in magnitude from the abutments to the middle of the bridge, where the inclination and strain upon the rods attain their lowest value, instead of, as in the old system, hanging vertically from the main suspending chains. The Victoria Bridge at Bath, erected in 1836, 150ft. in span, was the first constructed on this principle, and several specimens can be seen in Regent's Park at the present time. The largest suspension bridge in the world is that at Fribourg, which is asserted to be 880ft. in span. The Niagara Railway Bridge is 820ft. from centre to centre of towers. To render a suspension bridge as stiff and rigid as a girder bridge, has for some time engaged the attention of the profession. Various improvements have been suggested to maintain the true catenary or curve of a strain and thus reduce the undulation arising

from flexibility. Longitudinally a bridge is flexible in regard to the chain and roadway, and becomes slightly altered in its outline whenever a heavier moving load is passing over one end than at the other, or the same may arise from excessive pressure of wind above or below. In the bridge over the Thames at Lambeth, the wire-rope curved chain is braced down to the platform by diagonal ties and vertical struts. This structure has been much condemned by architects, but it is the cheapest bridge built across the Thames. It is, however, to be regretted that the material in the towers was not disposed of and arranged in a more artistic manner. A similar arrangement has been carried out in a foot bridge over the Main at Frankfort, where the girder is hinged at centre of span. Another plan, adopted in a railway bridge at Vienna, has been to employ two chains placed one over the other, and braced together by diagonal bracing, or to connect the two points of the curved chain most likely to effect any alteration in form by short straight chains with the base of towers. The latest improvement in this direction is Mr. Ordish's rigid suspension principle, consisting of a combination of inclined straight chains retained in position by curved chains, and forming as inflexible a system as possible for maintaining the platform and moving loads. The load on the curved chain being always the same, the curve is retained under all circumstances of loading without variation. The fixed load is supported by inclined straight chains, which are maintained in straight lines by vertical rods suspended from the curved chain. These chains also sustain the moving load, and being thus arranged require nothing extra, such as bracing, to prevent any kind of deformation in the event of the structure being unequally loaded. Direct tensile strains only are induced by the distributed loads, and conveyed by these straight chains to the abutments without disturbing the stable equilibrium of the structure. Deflection is common to all bridges, of whatever construction, and arises from the elasticity of the material employed. With the exception of deflection, Mr. Ordish's rigid suspension-bridge has been found to be theoretically and practically rigid. The main or parapet girders are continuous in the centre span. The principle may well be adapted for sites where a single span only is required, or where two river-piers, as in the case of the Francis Joseph Suspension Bridge (opened in 1868), over the river Moldau, at Prague, the ratio of the length of the centre opening to the side spans being such that, in the event of one or both side-spans being loaded while the centre span is unloaded, the weight of the structure in the centre opening shall balance the total weight of the structure and load on the adjoining spans. The proportion will of necessity vary with the total length and weight of the requirements of any bridge. In the case of the Prague Bridge the proportion is about 3:1 to satisfy the conditions of unequal loading. The bridge is 820ft. long by 31ft. wide. The centre span between centre of towers is 492ft. The wrought-iron parapet-girders are continuous from end to end, due allowance being made for expansion and contraction, and are supported by means of straight inclined steel chains at distances of 82ft. apart, which are retained in position by a light curved chain. The only deflection arises from the elasticity of the material, and is independent of any unequal loading, as in former suspension bridges. The inclined chains are a fixed unchangeable load, and can have no tendency to alter the form of the curved chain when once suspended in their proper positions. The cost of bridges on this principle does not exceed that of ordinary suspension bridges, which embraces the principle of longitudinal stiffening-girders, combined with curved chains, and possesses the advantage of being more adapted to railway traffic, and capable of sustaining the greater partial loadings at various speeds to which a railway bridge is subject. Roebing has obtained a similar effect in his large American bridges by straight inclined chains connected with the girder at the most dangerous points, and extending to the saddle at the top of towers; many of these structures are employed for railway traffic. In 1862 Mr. Ordish designed a bridge of 821ft. span for a proposed railway over the Thames near the Tower. The design met with the approbation of Mr. W. H. Barlow, who considered the principle applicable to spans of 1,100ft. In 1863 the new Albert Bridge was designed upon the same

* In 1831 this bridge sustained severe injury by the vibration produced by a company of sixty soldiers marching over it.

principle, and this is now in course of construction. Shortly after the passing of the Act, the works were commenced, but remained in abeyance for some time, until the line of the new Chelsea Embankment had been arranged, so that a better connection with the shore might be made than exists on the Surrey side of Lambeth Bridge.* In the meantime designs were submitted by a few other engineers upon different principles, among which was an exceedingly novel one by Captain Roberts, who proposed to abandon the suspension principle, and span the river by ropes composed of strands of wire (covered over with a selvege of $\frac{1}{4}$ in., enveloping each rope, to prevent oxidation) passing over two pairs of cylinders between the abutments. It is not difficult to prove that a cord or rope stretched straight between two fixed points would bear no very great transverse strain without breaking, supposing the cord to be inextensible, and not to have an infinite longitudinal resistance, and that it would be impossible to draw the rope into a horizontal position, since every material cord or wire, being composed of particles, possesses weight, and would be acted on by the natural force of gravity. Our contemporary, *Engineering*, recommended Captain Roberts to study the involuntary verse in Dr. Whewell's "Mechanics":—

"There is no power, however great,
Can stretch a cord, however fine,
Into a horizontal line,
That shall be accurately straight."

SUDDEN DEATH OF MR. JONES, OF WHITEHALL.

WE have to record with regret the sudden death of the above-named gentleman, a member of the firm of Messrs. Jones and Solomon, architects, Whitehall-place. The deceased gentleman, who was widely known, called upon a professional friend on last Sunday afternoon, and, whilst conversing with him, was observed to suddenly drop his head upon one side and close his eyes. As he did not move for a second or so, medical assistance was at once sent for, but, upon the doctor's arrival, life was found to be extinct. It appears, from the statement which was made at the inquest on Tuesday last, that he had been for some time suffering, more or less, from disease of the heart, and a verdict based upon that evidence was accordingly returned. He was with several professional friends up to 7 o'clock on Saturday evening, and showed no indication whatever of being in any way unwell; his sudden demise has, consequently, most painfully affected a large circle of acquaintances. He was in his forty-third year, and leaves a wife and four children to mourn his unexpected loss. We understand that he was engaged in completing the working drawings of the well-known Mr. Holloway's intended asylum, a building which that gentleman proposes to erect at an outlay of £70,000. The deceased gentleman's remains will be interred in the Brompton cemetery to-morrow (Saturday).

COMPETITIONS.

GREENOCK.—On Friday last the Greenock Parochial Board discussed the five competing architects' plans for a large new parourhouse and asylum at Smithston, and it was agreed that the plan of Mr. Starforth, architect, Edinburgh, be fixed upon, at a cost of £44,700.

DEAF AND DUMB ASYLUM, MARGATE.—The premiums offered in this competition have been awarded as follows:—First premium (100 guineas) to Messrs. Drew & Bower, of Margate. Second premium (50 guineas), to Mr. Thomas Henry Watson, of 9, Nottingham-place, Marylebone.

BOOKS RECEIVED.

The Art of Grafting and Budding, by Charles Baltet (London: W. Robinson) is a translation. The French gardeners are, it is well known, foremost in the branch of horticulture on which it treats, and the publisher (the translator also we imagine), who is well known from his previous works on gardening and kindred subjects, and his connection with one of the principal journals devoted thereto, will be thanked by all interested for the introduction into this country of

M. Baltet's work.—*Record of Draught of Water of Seagoing Ships leaving Ports in the United Kingdom, Reported to the Board of Trade, from May 8, 1872, to February 26, 1873*, can only claim mention here as another of Mr. Samuel Plimsoll's efforts in behalf of the cause he has so well made his own. Though his bill has been talked out of the House of Commons for this session, the good influence of coming legislation is already apparent, in spite of the opposition of those at whom it is aimed, and the tardy assistance of the Government department supposed to control and detect the abuses Mr. Plimsoll seeks to abolish.—*Weale's Elementary Series*, 88 and 89—*Geometry: Euclid, Books I. to XII.* (London: Lockwood and Co.), is a new arrangement of the old text-book. The text of Dr. Simson has been principally followed, but occasionally preference has been given to that of Ellrington. The whole has been, however, entirely rewritten, and in the explanatory notes many additional propositions have been embodied. A classified index has been appended, and thus theorems relating to any particular subject may be at once found.—*India and Indian Engineering*, by J. G. Medley, Lieut.-Col. R.E. (London: E. and F. N. Spon), is a reprint of three lectures delivered at the Royal Engineers' Institute, Chatham, last year, and contains some interesting information on the duties and achievements of civil engineers in a country where much work has been accomplished with, in many cases, but little help from the modern appliances which so facilitate the execution of similar projects in this country.—*The Strains upon Bridge Girders and Roof Trusses*, by Thomas Cargill, C.E. (London: E. and F. N. Spon) is an expansion of a series of articles contributed by the author to the *Engineer* during the years 1870-71. The author has chosen the more practical and useful method of determining the strains upon a structure by the aid of graphic diagrams, by means of which each successive strain is shown so that the manner in which the total strain is produced may be thoroughly followed. His work may therefore be consulted with benefit by those who, to use his own words, "having either a natural distaste for intricate mathematical investigations, or from imperfect education or other cause, are unable to follow them with any degree of satisfaction to themselves." *A Course of Water-Colour Painting*, with twenty-four coloured plates, from designs by R. P. Leitch (London: Cassell, Petter, and Galpin) is an attempt to teach the art in twenty-four lessons, each illustrated by a chromo-lithograph.

Building Intelligence.

CHURCHES AND CHAPELS.

FENTON.—The new Wesleyan chapel, Fenton, was opened for divine service on Tuesday. The style of the building is Italian. It is of red brick, with bricks of other colours sparingly introduced for relief, and Hollington stone dressings. The accommodation is for about 700 persons. The building has been erected by Mr. Newbon, of Longton, from the design of Mr. G. B. Ford, architect, Burslem. The cost of the building has been £2,185. 14s., including lighting and heating apparatus.

HUNTINGTON.—The parish church of Huntington, Yorkshire, is undergoing restoration. The church was in existence at the Norman Survey, and was the property of the Abbey of Evesham, Worcestershire; afterwards it came into the possession of Whitby Abbey; and finally, in the fourteenth century, into the hands of the Sub-Chanter and Vicars Choral of York Minster. Last year the edifice consisted of chancel, nave, with a wooden bell-turret on the roof, south porch, and a brick vestry, recently added. The restoration comprises rebuilding the nave, a new north aisle, the rebuilding of a side chapel on the north of the chancel, of the former existence of which evidence was found on taking down the nave, which will provide an organ-chamber as well as a vestry; and building the basement portion of a new tower and spire, which forms the south porch and entrance to the church. The chancel, which is fifteenth century work, grafted upon thirteenth century work, as shown by the sedilia in its south wall and arcade of the former chapel which was discovered, is retained, but lengthened.

MORNINGSIDE.—On Saturday afternoon, the foundation-stone of a New Free Church was laid

at Morningside. Plans for the new edifice have been prepared by Mr. Ross, architect. They show a structure in the Early Gothic style, with a tower and spire at the south-east corner, rising to a height of 130ft. Accommodation is made for seating about 500, and provision is made for the addition of a gallery if it be found necessary. On the south side will be erected a hall for a prayer-meeting, to hold about 50. The building is to cost over £3,000.

WOLVERHAMPTON.—A new Congregational chapel was opened on Tuesday at Wolverhampton. The style is of the Geometric period. The walls and dressings are of Codrall stone, the former rock-faced, the latter tooled. The internal dimensions of the chapel are 66ft. long by 38ft. wide, and of a height sufficient for galleries, though the end gallery will only at present be erected. The roof is in a simple span, and ceiled at a level with the collar beams. The main timbers are exposed, and are stained and varnished, the spandrels being picked out in colour. The principal front is gabled, having a central entrance, and over are two double-light tracery-headed windows, with rose-window in the centre. At the north-east angle is a turret carried up to a height of 70ft., the upper stage of which has double-grouped arched openings on the four sides, springing from stone shafts with carved foliated capitals, surmounted by a cornice from which springs the spire. The accommodation, when completed, will be for about 550 worshippers. The architects are Messrs. Bidlake and Fleeming, and the builder Mr. Cockerill, all of Wolverhampton.

BUILDINGS.

SKIPTON.—A Temperance Hall has just been erected in Skipton, at a cost of about £1,500. The public hall, in which meetings will be held, is about 63ft. long and 42ft. wide, with a platform recess. Behind the platform there is a good room 31ft. by 25ft., where the Band of Hope and Good Templars will hold their meetings. Mr. Varley, of Skipton, is the architect. Mr. James Simpson has done the masons' work; Messrs. John Windle, the joiners'; Mr. Horner, the plumbing, painting, and glazing; Mr. R. Thornton, the slating, &c.; and Mr. Thomas Shuttleworth, the plastering work.

SCHOOLS.

SITTINGBOURNE.—On Wednesday week, the memorial-stone of the new Wesleyan schools was laid. The schools are being built by Mr. Lewis Shrubsole, of Faversham, from plans by Mr. Charles Pillow, of Milton. The new building in the rear comprises on the ground floor an infants' schoolroom, 28ft. by 19ft., and a male bible classroom, 28ft. by 17ft.; the upper part is divided into five rooms.

HUDDERSFIELD.—On Saturday afternoon the Vice-Chairman of the Huddersfield School Board laid the foundation-stone of another School Board school; the second of the series of schools that are to be erected in the School Board district of Huddersfield. The new school will be in the Gothic style of architecture; it will be rock-faced; and the walls on the interior will be lined with bricks, and will consist of two rooms 90ft. by 22ft. for the boys and girls respectively, and a room for the infants 50ft. by 24ft. The total accommodation is for 800—300 boys, 300 girls, and 200 mixed; and the average cost per head will be £8. 10s.

FIRES IN LONDON.—Mr. W. R. Morris, engineer to the Kent Waterworks, writes to *The Times* that there are now over 900 miles of water mains in the metropolis constantly charged, which could be made at all times instantaneously available in cases of fire upon the line of such pipes, if the Metropolitan Board of Works would exercise their legal powers in putting hydrants thereon. Mr. Morris adds:—"Hitherto no attention has been paid by that body to the representations made to them by metropolitan water companies upon this fact." This statement should provoke some inquiry, when the yearly complaints made by Captain Shaw, of the insufficient water-supply, are borne in mind. If it is correct, it would seem that the Board of Works have the remedy in their own hands.

The London School Board has adopted a report from the School Management Committee respecting the fitting up of Board schools. It provides, *inter alia*, for a supply of desks for 50,000 children, to be made during the next six months.

* Further particulars of the Albert Bridge were given in the BUILDING NEWS a fortnight ago, p. 644.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—C. S.—W. Y.—Double Villa.—E. J. H.—E. W. P.—W. H. R.—W. B. P.—G. F. L.—Petro.—E. W. G.—J. H.—J. N.

E. J.—An illustration of Bolton Town Hall will appear next week.

JOHN SMITH.—In a week or two.

E. F. CLARKE.—The drawings to hand.

W. G. PRESTON (Boston, U.S.) and J. WILSON (Montreal).

—We cannot forward you the back numbers: they are out of print. Foreign subscribers should renew their subscriptions before the expiration of the current term. The increase in the circulation of the BUILDING NEWS at the commencement of the present volume caused a greater demand than usual for the back numbers. Under ordinary circumstances, owing to the postal regulations, we can only send back numbers when remitted for at the rate of 7d. each.

ERRATUM.—In our account last week, on p. 616, of the new monastery and church, Downside, Bath, the late Dr. Morris is spoken of as the Bishop of Trebisonde, instead of Bishop of Troy.

Correspondence.

THE "CHIMNEY-POT HAT."

To the Editor of the BUILDING NEWS.

SIR,—Although among those who long for the time when our sombre and illshaped manner of dress shall have become more picturesque, both in form as well as colour, I am perfectly aware of the futility of attempting a crusade at present against that acme of ugliness named at the head of this letter. A more inconvenient or ugly covering for the head could not well be conceived. All will acknowledge this, although there are but few who would care to appear in our streets with any other hat on their heads. Indeed, so fettered are we by the trammels of modern propriety, that no gentleman would be so sacrilegious as to go to church without his "chimney-pot." Such being the feeling existing amongst us, it were better to acknowledge the expediency of wearing these hats, and to provide for them accordingly. Now, Sir, the question I would ask is, Where to put one's "chimney-pot hat" at church? I have never been fortunate enough yet to find a suitable place for mine. If put under the seat you either kick it yourself or some one behind does for you; if an end sitter and you place it outside the bench in the passage way, some fair worshipper whirls it up the aisle or nave, which to say the least, does not improve your "Christy's Best." You cannot put it on the seat beside you, or, like an obese relative of mine a short time since, you will sit on it. The chairs now used in some of our churches offer no more convenience. True, you can put your hat on the crossbars of the chair, but then where are your legs to go to? What seems to me to be wanted is an arrangement of webbing or otherwise on the underside of the seat, by which the hat could be easily fixed out of the way. Probably there are cases in which such a convenience is provided. Will some one describe

any such arrangements which are worthy of imitation, and adapted to "free and open churches?" I think, Sir, a discussion in your journal on this subject might be started with much advantage and to the comfort of those who wear "chimney-pot hats."—I am, Sir, &c.,

DADDY LONG LEGS.

Burgess Hill, Whit-Monday.

WOODEN DWELLINGS.

SIR,—You would oblige (at some opportunity) by giving some drawings and description of wooden dwellings suitable for a colony, in hot or cold climates, and information what writers treat on this subject.

If we look at photographs from Australian gold-fields, California, British Columbia, &c., we are struck with their miserable dwellings—mere tents of bark or calico, although abundance of wood and labour near. No person there knows a good method of constructing a wooden dwelling for the squatter or the bush, &c., although there is a good supply of wood suitable to shelter them.

In the West Indies many of the best dwellings are of wood, with wood shingles up to top of roof—but their construction is so bad, that I was told that at the Government house water came in through the roof after a storm.

At the settlements of the Hudson's Bay Company, the Government trading forts and factories are of massive wood logs, suitable for a cold rigorous climate; but with these exceptions no one in those extensive territories knows how to construct a proper dwelling, suitable for a man or family, although so much wood and so much labour near.—I am, Sir, &c.

GEO. TAYLOR.

Intercommunication.

QUESTIONS.

[2872.]—Efflorescence on Tiles.—Would any of your readers suggest a remedy for what is commonly known as "salting" in ordinary unglazed floor tiles, and also say if there are any effectual means of removing the stains in the tiles caused by the white efflorescence from the cement?—TILE.

[2873.]—Slating.—I have occasionally seen the slating at hips finished with the slates alone, without either lead rolls or tiles. Would Mr. B. F. or any other correspondent be kind enough to explain how this should be worded in quantities or specification, and if any lead is required?—A. J. W.

[2874.]—Enamelling Deal Black.—Can any reader, in your "Intercommunication" column, inform me how to enamel deal black so as to resemble ebony, and how to ebonyise mahogany?—JACK PLANE.

[2875.]—A Legal Question.—If a priced schedule is given in for works amounting to £500, and an agreement made that the works shall be paid for at the rate of £75 per cent. upon approval, and the whole of the work having been done and paid for, and a bill of extras, not included in the above schedule sent in, and payment claimed in County Court for extras only—has the defendant the power to open up the whole of the contract, and dispute the way in which the work has been done, after its being paid for, and, as I supposed, all settled? And if he (the defendant) has that power, would the non-payment as per agreement set aside and break the contract?—AN INEXPERIENCED HAND.

[2876.]—Flats.—Can any one inform me if the flats in Victoria-street have ever been illustrated in any of the building journals? I should like to obtain plans of them, but do not know where they may be had. Can any one tell me of any other buildings on the flat system in London?—JUPITER.

[2877.]—Gas-Burners.—In the use of batwing burners, does the size of the flame—which, of course, diminishes with the amount of gas consumed—also diminish in equal ratio? and if not—as would seem from some imperfect experiments I have made—what is the reason? Which is the most economical, the use of cylindrical glass chimneys with argand and other round jets, or the use of flat jets and chimneys?—J. M., Wilmington.

[2878.]—Schools on the Brighton Line.—Will you kindly tell me who are the architects of the two picturesque schools seen on the return line from Brighton—the first on the left hand close to Selhurst station, the other on the right just before arriving at Streatham Common?—R. R. R.

[2879.]—Triangular Proportion of Gothic Windows.—Being among those who were unable to follow Mr. Wm. White as he described his "System of Triangles" on the blackboard at the Architectural Association last Friday, on account of our position in the room, we shall be greatly obliged to him if he will kindly repeat in your pages what he said then, giving the diagram. With an apology for troubling him, we are, Sir, yours, &c.,—SEVERAL MEMBERS OF THE ARCHITECTURAL ASSOCIATION.

[2880.]—Dilapidations of Small Houses.—What repairs can a ground-landlord compel me to do to some small houses? Can he make me take walls and flooring down, supposing the house is not upright, owing to a settlement eighty years ago, when it was built? The house is strong and firm. Is there any cheap book on the subject?—RHUS. TOX.

[2881.]—Terra-Cotta, Cements, Concrete, &c.—Will some reader inform me of the name of any book, or books, treating fully on the manufacture and applications of the above building materials?—L. G. HINTON, Exhibition, Vienna.

[2882.]—Water-Waste Preventers.—At page 634 we are told that eight additional water-waste preventers

had been erected in the Whitechapel district. May I ask what sort of things these water-waste preventers are?—A PROVINCIAL READER.

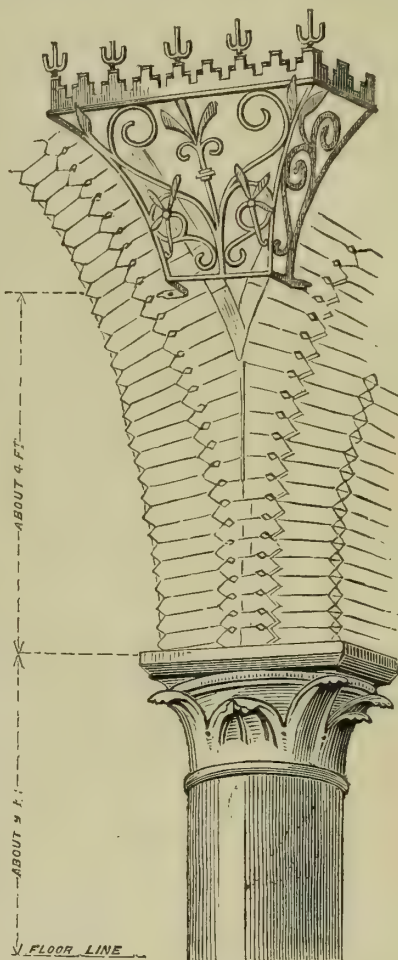
[2883.]—Waterworks' Pressure in London.—Will any of the readers of the BUILDING NEWS who are able beseech kind as to tell me the highest pressure (say in feet) at which the various water companies in London supply their water?—INQUIRER.

REPLIES.

[2861.]—Organ Construction.—The keyboard would be best at the end in some respects, the action being simpler. Height is of no consequence.—Q.E.D.

[2865.]—Arsenic in Green Colour.—The use of the arsenic green would undoubtedly be injurious. If you must colour the walls of a bedroom green, use chrome green, which is perfectly inoffensive, and quite as fine a colour. A series of papers by Dr. Draper, in Vol. XXVI. of the *Chemical News*, on the "Evil Effects of the Use of Arsenic in Certain Green Colours," contain much valuable information on the subject.—KAPPA.

[2866.]—Gas-Fittings in Churches.—"Kappa" has done well in starting a correspondence on this subject. Every architect has felt the difficulty of treatment suitable for gas-fittings, and the want of hints on the matter. In reply, I inclose a slight sketch of the arrangement adopted by Mr. Street in the nave, Church of S. James



the Less, Westminster. Rough as the drawing is, it gives a better idea than the written description "Kappa" asked for. Mr. Goldie has carried out a very good idea in his Church of S. Wilfrid, York (just illustrated in your journal). It is in the form of a bracket fixed in the east side of the nave piers. I regret being unable to send you a sketch of it; probably he will oblige.—LITTLE JIMMY

STATUES, MEMORIALS, &c.

ANTIQUE STATUE OF DIADUMENOS.—For some time Mr. J. D. Crittenden has been engaged at the British Museum in the restoration of a fine marble statue of an athlete, the copy of a work by Polykletus, made by Stephanos, an artist who flourished at the time of Augustus Cæsar. The statue is a free copy of the famous bronze figure of Diadumenos, by Polykletus, a celebrated sculptor of Sicily, now Basilio, a town of Peloponnesus, who lived about 232 years B.C. A companion statue, known as The Doryphoros, or spear-bearer, by Polykletus, was regarded in antiquity as a figure in which the proportions of an athlete were presented in a form to serve as a canon for all succeeding sculptors. Stephanos lived about the time of Augustus, and appears to have been employed by that monarch in making copies of celebrated works of the great masters. The statue was found about ten years ago in the ruins of an ancient theatre at Vaison, in France—the ancient Vasio—and was purchased by the Museum in 1870. When found it was in several pieces, which were put together on the spot, and the lost

portions restored, but in a manner so unsatisfactory that on its arrival at the Museum all the parts were separated and a new restoration was placed in the hands of Mr. Crittenden. The new portions are the left thigh, part of the left leg under the knee, left foot, right hand, and nose. Difficulties were felt in the execution of the new thigh, in making the outlines accurately continuous with the outlines of the original above and below the new portions, and in making the anatomical development agree with the rest of the statue. The foot required three separate new pieces. The difficulty here was to express the exact degree of weight on the foot and pressure on the toes, the heel being raised from the ground. The thumb and all the fingers of the hand are new, with the exception of the tips of the two middle fingers, which were broken quite away, but showed their position by the fracture on the ball of the thumb where they originally touched. It was, of course, requisite that every new portion should be executed in the same style as the antique, and that in the fitting and finishing not the slightest damage should be done to the original surface of the statue. Its restoration is universally acknowledged to be a marked success.

HUDDERSFIELD.—A statue of the late Sir Robert Peel was unveiled on Whit-Tuesday, at Huddersfield, by Lord Houghton. The statue has been provided by public subscription, and stands in S. George's-square, the principal open space in the town. The figure is of white Sicilian marble, and, including the pedestal, is 20ft. in height. Mr. Theed is the sculptor, and the cost of the pedestal and figure is £1,000.

LAND AND BUILDING SOCIETIES.

HEREFORD CITY AND COUNTY FREEHOLD LAND SOCIETY.—The annual meeting of the above Society was held on Wednesday week. From the report it was seen that the joint balance in favour of the Society amounted to £227. 6s. 6d., which will pay a bonus of 9d. in the pound to the unallotted shareholders, and leave the sum of £80 in favour of the Society (being rather less than the balance left after paying the bonus of last year), and this bonus has been declared. During the year 55 shares have been withdrawn and redeemed, and 29 shares have been taken, the number of shares now on the register being 355, of which number 103 are allotted and 252 are unallotted.

Our Office Table.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The members of this Society paid a visit on Saturday last, to the works of the Albert Bridge, Chelsea, and in the unavoidable absence of Mr. F. Bryant, the characteristic features of the work, method of suspension, anchorage, &c., were fully explained by Mr. A. T. Walmisley, the author of the paper on Suspension Bridges of which an abstract appears on p. 658 of this number of the BUILDING NEWS.

PROPOSED ART EXHIBITION AT ABERDEEN.—An Art Exhibition is shortly to be held at Aberdeen, to consist of works of art, divided into the following classes:—1. Paintings in oil or water-colours, miniatures. 2. Sculpture (in marble or the clay model), bronzes. 3. Gold and silver work, jewellery, gems, medals, carved work in wood, ivory, &c., decorative work in metal generally. 4. Porcelain, glass, and pottery, fine old watches, fans. 5. Illuminated MSS., engravings, etchings, and lithographs. 6. Photographic representations of works of art not themselves obtainable. 7. Tapestry, fine stuffs of artistic character and design, lace, embroidery. 8. Furniture of artistic design, antique. The articles must be the property of the persons handing them over, and must not be for sale. The exhibition will be opened about the middle of July.

REDCAR PIER.—A new pier was opened at Redcar on Whit-Monday. The pier is constructed at the east end of the town. It runs in an east-north-east direction, along the edge of the East Sear Rocks for a distance of 1,300ft. The sea-wall end of the structure has access to the beach by a flight of stone steps, and the entrance gates are flanked by toll-collectors' offices, ladies' and gentlemen's rooms, a shop, &c. At the south end it is twenty feet wide, but the pier expands at its seaward extremity to a width of 114ft., and is furnished with seats for 700 persons. Since the original contract was let, various improvements have been made, such as the introduction of wind screens and roofs, increasing the total cost to over £7,000. The foundation of the pier consists of iron piles 9in. in diameter, which are driven into the rock; to these are attached iron columns, placed in pairs, 30ft. apart, and battering inwards, additional stability being afforded by strong wrought-iron bracing upon the tops of the columns. Ornamental cast-iron spandrels connect the tops of the

columns, being fastened together transversely by flooring joists of timber, upon which the planking of the pier is fixed. Messrs. J. E. and A. Dowson, of Westminster, are the engineers for the structure.

THE NEW LAW COURTS.—In his elaborate reply to Mr. Gregory's speech on the New Courts of Justice, Mr. Ayrton declared that he was "fully alive to the fact that there had been very considerable delay" in the matter. It is so satisfactory, observes the *Solicitors' Journal*, to find that the First Commissioner of Works has at length become aware of this fact, that it is perhaps unreasonable to inquire too narrowly into the question of who is to blame for the delay. Still there are one or two little facts which seem to require some further explanation than Mr. Ayrton vouchsafed to afford. On the 27th of July, 1870, the Royal Commissioners signed the report approving the plans prepared by Mr. Street, and thereupon the Government were enabled to proceed with the construction of the building. The contract with Mr. Street was signed about two months afterwards, and that gentleman was allowed from the 23rd of September, 1870, until the 1st of January, 1871, to prepare his sketch plans for approval by the Office of Works. The first point on which information is desirable is, as to how it happened that these sketch plans, which were duly delivered in January, 1871, were not approved by the Office of Works until the 5th of August following. Mr. Ayrton says that modifications were made in the plans; but seven months appears to be a considerable time to spend over the examination and discussion of a series of sketch plans. By his contract with the office, Mr. Street had six months from the approval of his sketch plans for the preparation of his contract plans and drawings. That period would expire on the 5th of February, 1872; yet tenders were not invited for the works for a whole year from that date. It is this latter delay which we should especially like to have explained. Mr. Ayrton's mysterious remark, that "the details were of such a kind that it was not until the 27th of February, 1873, that the Office of Works was put into a position to invite tenders for the construction of the building," seems intended to throw the blame on to Mr. Street; yet it is to be observed that Mr. Ayrton does not say that Mr. Street failed to keep his contract as to sending in the plans and drawings by the 5th of February, 1872; and if, as Mr. Ayrton was careful to explain, Mr. Street was "the servant of the Office of Works, and was bound to obey the orders he received," why was not the "servant" ordered to push forward the preparation of the plans? The responsibility for the delay must clearly rest, not with the "servant," but with his employers.

CHIPS.

The closing meeting of the present session of the Royal Institute of British Architects takes place on Monday evening next, when the Royal Gold Medal and the other medals and prizes of the Institute will be presented, and a paper will be read by Dr. J. W. Hayward, of Liverpool, "On Health and Comfort in House Building."

A new free library is to be erected at Cardiff, at a cost of £17,000.

At the last meeting of the Leeds School Board, Mr. W. H. Thorp was appointed assistant to the architect to the Board. Tenders were accepted for the new Burley-road School.

Mr. Smales, architect, of Kendal, has been instructed to prepare plans for a new Board school, to be erected by the Glaisdale School Board on a site presented by Viscount Downe.

The foundation-stone of a new Primitive Methodist chapel was laid at Hyde, near Manchester, on Saturday afternoon. The estimated cost of the new building is £2,000.

On Monday week the foundation-stone of a new Wesleyan chapel was laid at Leeswood. The Rev. T. Thomas, of Landore, is the architect, and Mr. E. Peters the builder.

The new infirmary at Wigan was opened on Tuesday by the Prince of Wales. Mr. T. Worthington, of Manchester, is the architect, and the cost of the building has been about £30,000. A perspective illustration, plan, and description of the building appeared in the BUILDING NEWS of March 4, 1870, p. 176, Vol. XVIII.

The Engineer's report on the Dover breakwater, or western arm of the harbour of refuge, a work which he describes as begun a quarter of a century ago, shows that at the end of March, 1873, the expenditure had reached £671,434. There had also been £14,646 expended upon the substructure of the fort for the War Department.

The Theatre Royal, Valetta, Malta, has been destroyed by fire.

In the announced sale of the Manor House Estate, will be included the mural Druidical mound, known as Silbury Hill (Wiltshire), described as a "large artificial mound, about 170ft. in height, and covering an area of five acres."

The restorations on the west front of Wells Cathedral are progressing satisfactorily. The south-west side, up to the small north-west door, may be said to be finished, and the new contract includes the remaining portion of the west front, and the whole of the sculptured work (except the figures), with the small lias columns on the north and eastern sides of the base of the north-west tower, and the tower itself. The next contract will include the Chapter-house.

NEW PATENTED INVENTIONS CONNECTED WITH THE BUILDING TRADES.

3182. G. DAVEY, London, "Manufacture of 'Pom-pian' and 'Marezzo' artificial marble."—Dated 26th October, 1872.

Making artificial marble from pulverised stones. Treating them with vitreous substances. Colouring and veining them by machinery. Reproducing designs by machinery in fac simile. Petrifying and otherwise hardening cements.

3183. C. W. CORPE, London, "Concrete buildings."—Dated 26th October, 1872.

This invention has for its object improvements in apparatus employed in the construction of concrete buildings whereby such apparatus is much simplified and reduced in cost, affording facility in working or applying the same, together with the capability of alteration, so as to adapt it to different parts of a building without the necessity of returning the apparatus to the manufacturer for alteration from time to time as may be required.

3185. J. J. BATEMAN, Birmingham, "Fire-grates."—Dated 26th October, 1872.

The invention consists in applying to the underside of the frame of bars constituting the bottom of the grate a hinged register or damper-plate, which, when raised into a horizontal position, covers the underside of the grate bottom, and converts it into a solid grate bottom, and when depressed allows free access of air through the grate bottom to the fire. A slow or rapid combustion of the fuel may thus be obtained at pleasure. The damper-plate may be raised by a counterbalance weight, or kept in its raised position by a spring-catch fastening. In the former case the damper-plate is maintained in its lowered position by a weight placed or hung on an arm at its front end, and in the latter case by the weight of the damper-plate itself. Instead of hinging the damper-plate to the grate as described, it may be made to close the bottom of the grate by a sliding motion, or by rising vertically.

3187. W. PAYTON, London, "Raising blocks of stone, &c."—Dated 26th October, 1872.

The said apparatus is constructed as follows:—Two arms or bars with steel centre points are attached to levers, which are operated by rods connected at one of their ends by a pin joint or swivel, and having their other ends connected to a swivelling eye or loop, by means of which the apparatus may be suspended. The aforesaid arms or bars extend down from the fulcrums of the levers, which are connected by a rod or chain, and the levers extend therefrom toward the centre of the apparatus. The stone block to be adjusted is placed between the said centre points, holes being formed in it for their reception. On pressure being applied to the levers, or on lifting the apparatus, the levers will cause the steel points to grip the stone block or other body between them.

3215. J. L. F. TARGET, London, "Effecting the separation of solid excrement and urine in closets."—Dated 30th October, 1872.

The inventor uses double containers or receivers, that is to say two containers of different dimensions, one placed within the other, but eccentric to each other, the smaller one being hung on the rim of the larger by a hoop, hooks, or other devices, which may also serve as a handle. When they are placed in a closet or privy the point of contact of the two containers must always be at the back of the latrine, so that the faeces will fall into the smaller and the urine into the larger container. They are removed and emptied at intervals of a week, more or less.

3246. A. CLARK, London, "Revolving shutters, &c."—Dated 1st November, 1872.

This invention relates to improvements in the manufacture of corrugated metal revolving shutters for which letters patent were granted to the inventor bearing date May 2nd, 1872, No. 1322, according to which the shutter is so corrugated that when coiled up the corrugations will fit one on another, whereby the shutter is caused to occupy less space and to work with less noise than hitherto. The main feature consists in corrugating the sheet of metal on a corrugate cylinder by the aid of dies operated in various ways the sheet being either coiled on said cylinder as the work progresses, or first coiled up and then placed round it, and several thicknesses of metal-corrugate at one operation. By this invention he also checks the movement of the shutter for preventing the noise caused when it is raised or lowered too rapidly, by means of one or more "flys" like those used in clock, set in motion by the shutter itself for checking the same by the resistance of the air to the motion of the fly. This invention also relates to means of lowering or raising these shutters with the same object.

Trade News.

WAGES MOVEMENT.

BRISTOL.—The labourers employed in the building trade in Bristol, to the number of 2,800, having recently asked for an advance of 1d. per hour, instead of which the masters offered ½d., the decision was left to the Rev. J. Percival, head master of Clifton College, who, on Monday, awarded the men ½d. per hour advance, the wages to remain at that figure for twelve months.

BRISTOL.—At a meeting of the operative wood sawyers of Bristol, held on Monday, the advance offered by their employers was taken into consideration, and wishing to meet the masters in a friendly spirit, they resolved unanimously to adopt the following list of prices. Taking into consideration the increased price of all the necessities of life, and the advance which has been made in the wages of all other trades during the last 30 years whilst theirs remain at nearly the same rate, they decided that, in justice to themselves, they could not accept anything less, viz. 1.—English elm and larch board under 30in., 4s. 2d. per 100ft.; 30in. and under 36in., 4s. 10d.; 36in. and over, 7s.; ditto plank under 30in., 5s.; 30in. and under 36in., 6s.; 36in. and over, 8s.; American and Wych elm, 6s.; English walnut butts, 8s. 4d.; tops, 6s.; Italian walnut, 8s. 4d.; under 24in. to rise 1s. every 3in.; Riga oak, English ash, and cedar, 6s.; American oak, ditto ash, Stettin, Memel, English oak, pitch pine, plain wood, chestnut, sycamore, and lime tree under 30in., 5s. 6d.; 30in. and over, 6s.; baywood under 24in., 5s. 6d.; 24in., 6s.; 27in. 6s. 6d.; to rise 1s. every 3in. after; Cuba and Spanish wood under 24in., 6s. 6d.; to rise 1s. every 3in. after; yellow pine under 20in., 3s.; 24in., 3s. 3d.; 27in., 3s. 9d.; all over, 5s.; red pine and Swede, 3s. 6d.; Memel, Dantzic, and Stettin, 4s. A pitting cut on all round timber; a pitting cut on all square timber with five cuts or less, with the exception of mahogany and cedar. Sawing, per hour, 1s. 1½d.; labouring, 1s. per hour.

LONDON.—A few weeks since the delegates of the London carpenters and joiners sent in a memorial to the Master Builders' Association, requesting an advance in the rate of wages from 8½d. to 9d. per hour, on account of the increased and increasing price of provisions and other necessities of life. To this memorial the committee of the Masters' Association declined to accede, but said if the men required more money they were at full liberty to work longer hours in the summer. This reply was unsatisfactory to the committee of the men, and negotiations have been in progress for the last fortnight with a view to an amicable settlement, the men suggesting that a meeting of the two committees should be held to discuss the question. These negotiations have terminated in the committee of the masters offering to pay the advance of ½d. per hour on and after the 1st March, 1874, with the proviso that the present regulation for extra payment for overtime be set aside, and that payment for overtime be left as a matter of arrangement between each employer and his men, on the basis of the price now paid. A meeting of the delegates was held on Monday night, at the "Brown Bear," Bloomsbury, to consider the above offer of the employers, and, after some discussion, it was decided that the offer be rejected. A resolution was then moved and seconded that two of the large firms be at once struck, and the men called out. After considerable discussion the resolution was negatived, as it was felt the question was one of such importance that the opinion of an aggregate meeting of the trade should be taken upon it in order to insure effective support for the men who might be called out. A resolution to this effect was agreed to, and the committee were instructed to convene the meeting as early as possible. The meeting will probably be held next week, and, judging by the prevailing feeling amongst the men, it is almost certain that the resolution for calling out the men from two or more of the large firms will be adopted. The trade is exceedingly good at the present time, there being very few men out of employ.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green. Blue Portmade and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

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 24 by 12 22 by 12 20 by 10 18 by 10 18 by 9
 377s. 6d. 332s. 6d. 257s. 6d. 215s. 192s. 6d.
 16 by 10 16 by 8 14 by 10 14 by 8 12 by 8
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 For m of 1,200 Slates, Marble and Enamelled Slate Chimney Pipes, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, St. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

ANERLEY.—For house at Anerley, for Mr. A. W. Chaner. Mr. W. G. Bartlett, architect. Quantities by Messrs. Stoner and Ashby.

Pritchard	£1,767 0 0
Wood	1,688 0 0
Downs	1,596 0 0
Blake and Ramplen	1,540 0 0
Adcock and Rees	1,452 0 0

BANBURY.—For alterations and additions at Mr. Corke's, The Mount, Oxford-road. Plans prepared by Mr. Orchard.

Kimberley	£375 0 0
T. and S. Orchard	370 0 0

BARNET.—For additions, &c., to premises in High-street, Barnet, for Mr. Schlencker.

Paterson	£285 0 0
Miller	277 0 0
Baughan	280 0 0

ENFIELD.—For lodge to "The Cedars," Enfield.

Patman	£375 0 0
Bayes and Ramage	363 0 0
Fairhead	363 0 0

KENT.—For the erection of a house at Orpington, for Mr. G. Allen. Messrs. T. and W. Stone, architects. No quantities.

Lathey Bros.	£1,220 0 0
Goodman	1,220 0 0
Kiddle and Sons	1,180 0 0
Payne and Balding (too late)	—

ISLE OF WIGHT.—For new drawing-room, clock-tower, and other work at Appleby Towers, near Ryde, Isle of Wight, for the Right Hon. Sir Wm. Hunt, K.C.B., M.P. Mr. Thos. Hellyer, architect. Quantities by Mr. H. P. Foster.

Meader	£5,500 0 0
Light Bros.	3,990 0 0
Langdon	3,824 0 0
Sibley	3,350 0 0
Cutler	2,860 0 0
Barton (accepted)	2,330 0 0

LONDON.—For sundry repairs and painting to the Great Synagogue, S. James's-place, Aldgate. Mr. N. S. Joseph, architect.

Vernell	£725 0 0
Hurn	646 0 0
Kinymont	523 6 0
Hopkins	497 0 0
Heeps (accepted)	480 0 0

LONDON.—For alterations at the "Tollington Arms," Hornsey-road. Mr. Waghorn, architect.

Estimate		
No. 1.	No. 2.	Total.
Steed	£370	£20
Carter	330	390
Tarrey	320	345
Chapman	320	342

LONDON.—For repairs at the "Duke of Abercorn," High-street, Kensington. Mr. H. J. Newton, surveyor.

Brindle	£150 0 0
Shurmer	149 0 0
Taylor (accepted)	147 0 0

LONDON.—For new infant school and dormitory, Stockwell Orphanage. Mr. Jas. Oubitt, architect.

Keyes and Head	£1,272 0 0
Thompson	1,147 0 0
Rider and Son	1,053 0 0
Tarrant	1,050 0 0
Colls and Sons	1,036 0 0
Hart	1,028 0 0
Cullum (accepted)	998 0 0

LONDON.—For new buildings at King-street, Covent Garden, for Mr. Henry Butler. Mr. Alfred Cross, architect.

Patman and Fotheringham	£6,748 0 0
Candler	6,670 0 0
Newman and Mann	6,516 0 0
Perry and Co.	6,300 0 0
MacLachlan	6,297 0 0
Clemence and Sons	6,200 0 0
Howard and Co.	6,175 0 0
Henry Hart and Co.	6,077 0 0
Wilson Bros.	5,979 0 0

SYDENHAM.—For additions to Mrs. Kennedy's house at Sydenham-hill. Mr. Charles Barry, architect. Quantities by Mr. Strudwick.

Colls and Son	£2,430 0 0
Bowyer and Son	2,425 0 10
Browne and Robinson	2,309 0 0
Perry and Co.	2,245 0 0
Downs and Co.	2,216 0 0
Mitchell	1,994 0 0

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Quarrymen and Stone Merchants.

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GREEN ROOFING-SLATES.

As supplied to H.R.H. The Prince of Wales at Sandringham The Penmoyne Sea-green Slates are specially adapted for Churches, Public Buildings, &c., &c. (Less costly than ordinary Gothic Tiling.)

These durable and non-absorbent slates can be obtained in sizes suitable for Gothic Architecture, at prices as under, on Railway Trucks, Docks, Gloucester:—

Per		Equivalent to
1,200 Slates		per square
Best Green Slates 14 by 7	2 17 6	16s. 6d.
Do. do. 13 by 8	2 17 6	16s. 6d.
Do. do. 13 by 7	2 5 0	14s.
Do. do. 12 by 7	1 18 6	13s.
Do. do. 12 by 6	1 7 6	11s.

Prices of large Sizes, Cost of Transit, Reference to estimations, and Sample Specimens may be obtained on application to

MESSRS. RANDELL & CO., Corsham, Wilts.
Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tufton-street, Westminster.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Presentation of Royal Gold Medal and the Institute Medals and Prizes, and Paper "On Health and Comfort in House Building." By Dr. J. W. Hayward, of Liverpool. 8 p.m.
SOCIETY OF ENGINEERS.—"On Communication between Passengers, Guards, and Drivers in Railway Trains." By Mr. S. Alfred Varley. 7.30 p.m.

FRIDAY.—ARCHITECTURAL ASSOCIATION.—Nomination of Officers, and Paper "On the Popular Estimate of Architecture." By Mr. F. Chambers, F.R.I.B.A. 7.30 p.m.

COMPETITIONS OPEN.

BASSENTHWAITE, CUMBERLAND, June 30.—For plans, &c., for the erection of a chapel. A premium of £25 is offered for the best design. Mr. Jos. M. Richardson, Hut-ton House, Penrith.

DEVON COUNTY ASYLUM, June 24.—For plans, specifications, and estimates for additional buildings at the Asylum at Exminster. The architect whose plans may be adopted will be employed to superintend the works, on the usual terms of commission, provided it be found that they can be executed within the estimated amount. The sum of £25 will be given for the second best design, namely, £10 for that of the chapel, and £15 for that of the other buildings. T. E. Drake, Clerk to the Committee, Exeter.

MADRAS TRAMWAYS COMPANY, July 31.—The Directors offer a premium for the most approved system of checking the receipts of the conductors of cars. W. Davison, Secretary, 17, Cornhill, E.C.

MANCHESTER, September 1.—For designs for the erection of a new fruit market and other buildings. First premium £200, to merge in the commission if the architect be selected to superintend the erection of the market; premium of £150 for the second, £100 for the third, and £50 for the fourth design. City Surveyor, Town-hall, Manchester.

NORFOLK AGRICULTURAL ASSOCIATION.—For a design for Norfolk labourers' double cottage. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NORFOLK AGRICULTURAL ASSOCIATION.—For designs for farm buildings for a Norfolk farm of about 300 acres. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NOTTINGHAM, July 15.—For designs for a new Gothic church. Premiums of £75, £50, and £25 will be awarded to the second, third, and fourth designs. The one accepted will be adopted by the Committee, should it fulfil all the necessary requirements. Mr. Wm. Clarke, The Park, Nottingham.

SHREWSBURY, June 21.—For design for a memorial drinking fountain. A premium of £5 will be given for the selected design. Mr. Kent, 33, High-street, Shrewsbury.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tiles, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING
ESTIMATES.

ADMIRALTY, June 16.—For the erection of a Coastguard station at Bacton, Norfolk. Director of Works, Admiralty, Spring Gardens-terrace, S.W.

ARMY CONTRACTS, June 14.—For the supply of 250 loads of English oak, 150 loads of English elm, and 6,500 oak spokes. T. Howell, Director of Contracts, War Office, 5, New-street, Spring Gardens, S.W.

BLACKFRIARS.—For the erection of a range of warehouses in Tudor-street. Messrs. Smith and Seymour, architects, 1, Gresham Buildings, E.C.

BOARD OF WORKS, WESTMINSTER DISTRICT, June 10.—For the execution of general works and repairs to sewers, &c. J. Harris, Clerk to the Board, 25, Great Smith-street, Westminster.

CHET VALLEY IMPROVEMENT, May 17.—For the completion of the works left unfinished by the contractor. J. C. Copeman, Clerk to the Improvement Commissioners, Loddon, Norfolk.

EASTINGTON, June 13.—For the erection of a new hearse house and dead-house, and a day-room for girls, and for enlarging and altering the vagrant wards, at the Wheatenhurst Union Workhouse. Mr. George Spire Clerk to the Guardians, Stroud.

GREAT WESTERN AND MIDLAND RAILWAYS, June 11.—For the construction of a passenger station at Church-down. Engineer, Great Western Railway, Paddington Station.

HANLEY, STAFFORDSHIRE, June 10.—For the execution of sewerage works in Cannon-street, Trinity-street, and New Hall-street districts, and for the supply of manhole covers, gully grids, and other ironwork. Mr. C. E. Chailinor, Corporation Offices, Hanley.

HANTS, June 20.—For the erection of a new church at Edge End, near Batley. Mr. J. Colson, architect, S. Swinithin-street, Winchester.

HARTSMERE RAILWAY DISTRICT, June 14.—For the cartage of materials from Bidwell Pits to Bacton, Cotton, Finnerham, and Mendlesham. Mr. George Fincham, District Surveyor, Braiseworth.

HIGH AND LOW BISHOPSD SCHOOL BOARD, June 16.—For the erection of schools, master's house, outbuildings, and fence walls, at Pateley Bridge. George Corson, architect, 25, Cookridge-street, Leeds.

HORBURY LOCAL BOARD, June 23.—For the construction of about 8,000 yds. of brick and earthenware pipe sewers. G. H. Holt, Clerk to the Board, Horbury, near Wakefield.

HORBURY LOCAL BOARD, June 23.—For the construction of about 8,000 yards of brick and earthenware pipe sewers. Mr. J. Lumley, C.E., 14, Kirkgate, Bradford.

LANCASHIRE AND YORKSHIRE RAILWAY, June 10.—For the construction of the Ripponden Branch Railway. Mr. W. S. Lawn, Secretary, Manchester.

LEEDS, June 10.—For the construction of a road, about 450 yds. long, on the Roundhay Park Estate. Mr. J. Eddison, 25 Park-square, Leeds.

LEEDS, June 23.—For the erection of extensive premises in George and Dragon Yard, Briggate. Messrs. Wilson and Bailey, architects, Central Market Buildings, Leeds.

MANCHESTER, June 9.—For the upper portions of the towers, and for the joinery and other works required for the completion of the new Town-hall. Mr. A. Waterhouse, 20, New Cavendish-street, W.

NOTTING-HILL, June 14.—For the construction of sewers beneath the Portobello estate. Mr. Hukins, architect, 21, Archer-street, Bayswater.

READING SCHOOL.—For the erection of head-master's house, to accommodate fifty boys. C. Smith, architect, 164, Friar-street, Reading.

REIGATE, June 9.—For additional buildings to a house near Reigate. J. F. Matthews, Surveyor, London-road, Reigate, Surrey.

SHAWFORTH, NEAR BACUP, June 29.—For the erection of a new Wesleyan chapel and schools. W. Waddington, architect, Burnley.

ST. PANCRAS, June 9.—Contract No. 1.—For paving York-road. Contract No. 2.—For repaving part of Tottenham Court-road, Percy-street, &c. Mr. W. B. Scott, C.E., 10, Edward-street, N.W.

THE TRUSTEES OF THE RIVER WELLAND OUTFALL ACT, June 23.—For the erection of a new outfall sluice from the Lords Drain into the Welland. Messrs. Bonner and Cathrop, Clerks to the Trustees, Spalding.

TILNEY S. LAWRENCE SCHOOL BOARD, NORFOLK, June 16.—For the erection of schools and teacher's residence. Adams and Son, architects, Bridge-street, Lynn.

TORQUAY, June 10.—For the erection of a police-station. Mr. Henry Ford, Clerk of the Peace, Exeter Castle.

WALSALL, June 16.—For the erection of S. George's Church. Mr. Robt. Griffiths, architect, Greengate-street, Stafford.

WATLINGTON, OXON, June 18.—For the erection of schools to accommodate 262 children. Mr. W. Wiggins, Watcomb Manor, Watlington.

WEST HAM LOCAL BOARD OF HEALTH, June 9.—For the supply of granite kerb. C. Wilson, Clerk, Town-hall, Stratford.

WISBEACH, June 20.—For the erection of villas in Clarkson-road, Messrs. Adams and Son, architects, Wisbeach.

WRAYSBURY SCHOOL BOARD, June 19.—For the erection of new schools at Wraybury. J. Doulton, Vine House, Wraybury, Staines.

BANKRUPTS.

SITTINGS FOR PUBLIC EXAMINATION.

J. C. Ekens, Stockwell-green, builder, June 5.—E. Duly, late of Northampton, iron and brass founder, now of Floore, July 9.—E. Jameson, Jarrow, builder, June 23.

PARTNERSHIPS DISSOLVED.

Bragg and Dyer, Paignton, builders.—R. and J. B. Creighton, Carlisle, timber merchants.—Robert Ely and Co., South Crosland, Yorkshire, stone merchants.—S. C. Ridley and Co., Hemel Hempstead, railway contractors.—W. H. Still and Co., Winchester, ironfounders.—Brine and Brine, Old Montague-street, Whitechapel, engineers.—P. B. Jackson and Co., Salford, engineers.—Atkinson and Spears, Castleford, Yorkshire, joiners.—Brookes and Merriman, Etlingshall, ironmasters.—Hedley and Wilson, Newcastle-upon-Tyne, iron and metal merchants.—Cottrell and Owen, Garston, stonemasons.

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(From the Public Ledger.)

LEAD.			
Pig Foreign	per ton	£23 0 0	£23 5 0
" English W.B.	"	25 0 0	0 0 0
" Lead Co.	"	24 15 0	0 0 0
" Other brands	"	23 15 0	23 17 6
Sheet Milled	"	24 10 0	24 15 0
Shot, Patent	"	26 10 0	26 15 0
Red or minium	"	25 0 0	0 0 0
White Dry	"	23 10 0	0 0 0
" ground in oil	"	0 0 0	0 0 0
TIMBER.			
Teak	load	£14 0 0	£14 10 0
Quebec, red pine	"	3 10 0	5 10 0
" yellow pine	"	3 5 0	6 0 0
" pitch pine	"	4 0 0	4 10 0
Quebec oak, white	"	7 0 0	9 0 0
" birch	"	5 0 0	6 0 0
" elm	"	4 15 0	6 0 0
" ash	"	4 10 0	5 0 0
Dantzic oak	"	5 0 0	6 10 0
" fir	"	3 10 0	6 0 0
" undersized	"	2 15 0	3 5 0
Riga	"	4 0 0	4 5 0
Swedish	"	2 12 6	3 0 0
Wainsoot, Riga	"	4 10 0	6 15 0
Masts, Quebec red pine	"	4 10 0	6 0 0
" yellow pine	"	4 0 0	6 10 0
Oregon	"	9 0 0	12 0 0

Lathwood, Dantzic fm.	"	8 10 0	10 0 0
" St. Petersburg	"	11 0 0	12 10 0
Deals per C., 12ft. by 3	"		
by 9in	"		
Quebec Pine, 1st qual.	"	20 0 0	21 0 0
" 2nd do.	"	14 10 0	16 0 0
" 3rd do.	"	10 0 0	10 10 0
Canada Spruce, 1st	"	11 10 0	12 0 0
" 2nd & 3rd	"	10 0 0	11 5 0
New Brunswick	"	10 10 0	11 0 0
Archangel, yellow	"	14 10 0	15 10 0
St. Petersburg yellow	"	12 10 0	14 10 0
Finland	"	9 0 0	13 0 0
Memel and Dantzic	"	0 0 0	0 0 0
Gothenburg, yellow	"	10 10 0	13 0 0
" white	"	10 0 0	10 10 0
Gefle yellow	"	12 0 0	13 10 0
Christiania	"	10 0 0	13 10 0
Battons, all sorts	"	7 5 0	10 0 0
Other Norway	"	9 10 0	10 10 0
Flooring boards per square	"		
of lin., first yellow	"	0 12 6	0 13 6
First white	"	0 10 6	0 11 6
Second qualities	"	0 8 6	0 10 6

COPPER.

British—Coke & Ingot	per ton	£90 0 0	£98 0 0
Best selected	"	92 0 0	100 0 0
Sheet	"	96 0 0	104 0 0
Bottoms	"	100 0 0	107 0 0
Australian cake	"	90 10 0	91 0 0
Spanish cake	"	90 0 0	0 0 0
Chili Bars, cash	"	81 10 0	86 0 0
" Refined ingot	"	91 0 0	92 0 0
Yellow metal	per lb.	0 0 9	0 0 9½

IRON.

Pig in Scotland, cash	per ton	£13 9	£0 0 0
Welsh Bar, in London.	"	13 10 0	0 0 0
" Wales	"	12 10 0	13 0 0
Staffordshire	"	14 0 0	15 0 0
Rail, in Wales	"	12 0 0	13 0 0
Sheets, single in London	"	18 0 0	20 0 0
Hoops, first quality	"	15 0 0	16 0 0
Nail Rod	"	14 0 0	15 0 0
Swedish	"	19 0 0	20 0 0

OILS, &c.

Seal, pale	per tun.	£38 0 0	£0 0 0
Sperm body	"	95 0 0	96 0 0
Cod	"	41 0 0	0 0 0
Whale, South Sea, pale	"	38 0 0	0 0 0
Olive Gallipoli	"	43 0 0	43 0 0
Cocconut, Cochin	"	39 0 0	39 10 0
Palm, fine	"	39 0 0	39 10 0
Linseed	"	33 0 0	0 0 0
Rapeseed, English pale	"	39 0 0	39 10 0
Cottonseed	"	29 0 0	29 10 0

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THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 13, 1873.

SILCHESTER.

THE existence in busy, bustling England, within fifty miles of the metropolis, of remains which might in any degree be compared with Pompeii and Herculaneum, would be in itself remarkable, even if they did not throw some light on the civilisation which existed in this island prior to the fifth century of our era, and show the progress of the arts amongst the colonists of Rome in this distant province. When we find traces of Roman occupation in England, they are frequently obliterated by subsequent occupation, and it becomes difficult to identify the original form and uses of the buildings and objects laid bare. London, Leicester, and Chester are familiar instances of these re-occupied sites, but when the foundations of their mansions and temples are exposed, they can, from the necessity of the case, be only examined for a brief period; they are measured, figured, and recorded, and then they are covered up and forgotten. In the ancient Itineraries there are many stations—some of them of great size—the locality of which are unknown. There are others which are conspicuous marks on the country side, and are perfect museums, full of treasures of art and archæological lore, to reward the patient explorer.

The ancient traveller, leaving London by the great Western road, would pass by Brentford and Staines, near which he would cross a bridge over the Thames at Pontes, 22 miles from London. He would pass a town called Bibracte, the site of which is unknown, and at a distance of 22 miles from Pontes, he would come to the grey walls of a large and imposing city—Calleva Atrebatum, known to our Saxon ancestors as Silchester—the great castrum or camp. He would pass into the city through an imposing gateway, with guard-rooms on either hand, and before him would stretch the great Western way, leading to Aquæ Solis, the modern bath; or, by turning in a northerly direction, at the next station to Calleva, he would reach Corinium (Cirencester), en route to Glevum (Gloucester). It requires no effort of imagination to realise this journey, for on the summit of a gentle rising ground, some six miles from Basingstoke, and ten from Reading, the grey walls of Silchester yet salute the eyes of the wanderer, and on Saturday, the 7th of June, they were the object of a pilgrimage by the members of the Oxford Architectural and Historical Society, who were accompanied by Messrs. J. H. Parker, C.B., F.S.A.; E. A. Freeman, M.A.; W. H. Bloxam, F.S.A.; James Parker, and many friends of note in the architectural and archæological world. The party, after inspecting the Abbey and other archæological remains at Reading, went by special train to a railway-crossing some distance beyond Mortimer-station, where the train stopped specially for them, and from thence walked through pleasant green lanes to the eastern gate of this city of the past. It was strangely desolate. A lone farmhouse, and two or three labourers' cottages farther down the slope to the north, were the only signs of the living present. The past was mournfully suggested by a mouldy church, with some interesting fourteenth century monuments, green and moss-laden, in the graveyard. Outside the city walls, to the north-east, lay the amphitheatre. Two shapeless mounds encompass, on the west and east, an egg-shaped inclosure of 150 by 120ft. The widest opening is on the southern side nearest the city walls. Here the Society were joined by the Rev. J. G. Joyce, F.S.A., rector of Strath-

fieldsaye, under whose care the explorations at Silchester have been carried out. He became at once the guide of the party and expositor of the ancient city. He explained that all that was known of the amphitheatre was derived from a Captain Ward, who, in the latter part of the last century, states that the circuitous mound was 60ft. thick at the bottom and 12ft. thick at the top; that there were five ranges of seats within it. He seems to have confounded yards with feet in the area. It had, however, been recently and most accurately surveyed by the Board of Ordnance and found to be 200 Roman feet across the top of the mound.

The city itself demanded attention, and the party were brought to the north wall, which they traversed from end to end. The wall, which rises from 12 to 14ft. above the level of the fosse, incloses an area of 102 acres, and is nearly as far round as Chester. It is larger than Colchester, while at Kenchester the walls inclosed only 21 acres, and at Lymne only 12 acres. The mode of construction and composition of the wall was carefully examined—the absence of the usual bonding courses of tiles and the substitution of long, flat stones. These were not placed in an uniform manner throughout the wall. The distances between the bonding courses varied, and occasionally they were laid as herring-bone work like the intervening courses of large flints; at others there were two courses of this flat oolitic stone, which Sir Roderick Murchison states was brought from Oxfordshire. This absence of tiles from Roman masonry has been noticed at Reculver, Chester, at Hadrian's Wall, and other places. At first sight it seemed as if pounded tile was absent from the mortar, but closer inspection revealed its existence, though it did not exhibit that peculiar appearance known as "lobster sauce." The question as to whether the walls had been faced with ashlar work was the subject of much discussion. It was obvious that the present was not the original facing of the wall. Mr. J. H. Parker said that, where possible, the Romans always used facing stones, though there were instances where the contrary practice prevailed. In the course of his excavations he frequently found remains of ashlar work below the surface, and near the "footings" of the walls. It was obvious that the walls at Silchester were built by different masons, who had a different style of working, if they belonged to the same period of time. The absence of towers, buttresses, or any projection, was most singular, and may possibly be accounted for by the width of the fosse, 100ft., and its great depth, which is now 14ft. or 15ft., and was probably the same as the trickling water-course which now represents it, 20ft. The construction of the gateways was peculiar. Instead of the circular towers projecting to defend the entrance, the walls returned inwards with a circular sweep, and within the recess thus formed the gates were placed. Within the thickness of the walls at the east gate, guard-chambers, 6ft. by 5ft., have been uncovered on either side. This method of returning the outer defence is not uncommon in British and other early earthworks. On Saturday the southern gateway was cleared and exposed for the first time. It was the entrance from Winchester, and from the city side must have had an imposing appearance, as it was flanked by two lofty columns with moulded caps and bases, supporting a pediment, beneath which the chariots and horsemen would pass, the road for the pedestrians being on either side. There were no traces of wheel tracks, but the original facing of the wall could be seen, composed of two courses of dressed stone between courses of flints, presenting that rib-band appearance so characteristic of Roman masonry. Above this gateway a portion of what appeared to be the original parapet was seen, but as the inner face of the wall has been removed, and only a sheep-mound covered with trees represents the wall in the

interior, it could not be so carefully examined as it will soon be.

The road from the south gate passed the west side of the Forum, and on the right-hand of the way thither stood a circular temple of some 60ft. in diameter. The foundations of this temple are now uncovered. The walls are polygonal, having sixteen small faces. There is an ambulatory between the outer walls and the inner. No traces of the peristyle have been discovered, nor of anything that would suggest a dome or roof. That it was a heathen temple all the authorities agreed, for there was no recess or chance to be found. Mr. Joyce read a few interesting memoranda on circular temples, and compared them with early circular churches which had a mausoleum character attached to them. He instanced the Pantheon and a circular temple which stood in the Campus Martius, where now the Roman democrats meet to utter their opinions. Had he found the Roman Eagle amongst the *débris*, the purpose of the temple might have been easily accounted for. The coins found were a worn copper coin of Vespasian, and two new silver coins of Septimius Severus, and to this period Mr. Joyce was inclined to assign the date of its erection.

The Forum stood at the south-eastern angle of the streets which crossed from east to west, and from north to south. On climbing the tall mounds of *débris* which have been removed from the foundations, and now occupy the site of the streets, the whole plan of the structure is seen at a glance. It occupies an area of 313 feet by 275, and is nearly surrounded by an ambulatory or porticoed piazza. The entrance was from the east, and here the remains of a sewer or mine beneath the gateway was found. The shops were on either side of the gateway, and along the northern end of the court-yard towards the Basilica. The alternate arrangements of square with apsidal ends to the rooms on the south has suggested that they were the offices of the city functionaries, and following Vitruvius, Mr. Joyce has named them, the offices of the Decemviri, the *Ædiles*, the *Conlegium*, the *Sacerdotium*, and *Quæstor*. In one of the shops a large number of oyster-shells were found; in another a number of hooks belonging to steelyards, and thus suggesting a butcher's shop; in another the spurs of game cocks, and in some instances encased in steel spurs; in another a small bar of silver, showing a money-changer or jeweller. The Basilica was a noble building, with a well-defined apsidal end on the south, but that on the north appears to have been altered somewhat. The wall supporting the Tribunal on the south still exists, and the sub-structure of a row of tall and handsome columns, which had foliated caps approaching the Corinthian order, extends along the eastern side. On the west there are a series of rooms, the upper one of which Mr. Joyce has ascribed to the *curiæ*. In the next a legionary eagle of bronze was found beneath 10 inches of burnt wood, and the floor was marked with black stripes, showing the position of the beams. This is called the *Aerarium*, or public treasury. In the next room was found a leaden bulla or seal of one of the early Emperors, and hence called the *Tabularium* or Record Office. The next room has a raised floor covered with tesserae, and on it were found fragments of Italian marble, and this and other circumstances left no doubt that it was the council-chamber. Beyond this, the Hall of Merchants probably stood. The coins found in the walls were those of Titus and Vespasian, and there were some reasons for supposing that the building was altered in the time of Carausius, and that it suffered after the defeat of Alectus by Constantius Chlorus, for great masses of burnt stuff were found along the walls. The basilica doubtless had galleries, and was probably divided in the centre so as to form a court at each end; but no trace of this division has been found. The roof is estimated to have been at least

50ft. high. The coinage begins with Caligula A.D. 37, and ends in A.D. 410. They had found coins of every intermediate reign, and on them no less than 64 of the Imperial family of Rome were figured. The height of the floor of the basilica was 306ft. above the level of the sea. Mr. Joyce, in describing the tribunal, said that without being sensational he might say that the building they saw was in existence before the time of Diocletian, and at that tribunal the Early Christians of Britain may have been required to make sacrifices to the Roman gods.

The domestic buildings now open include a large house, probably belonging to one of the Decemvirs of the city, which shows many traces of successive alterations. The hypocausts are of peculiar construction, and one showing how the triclinium was warmed and how the warm air escaped through square pipes up the walls, was subjected to a minute examination. A vapour-bath is

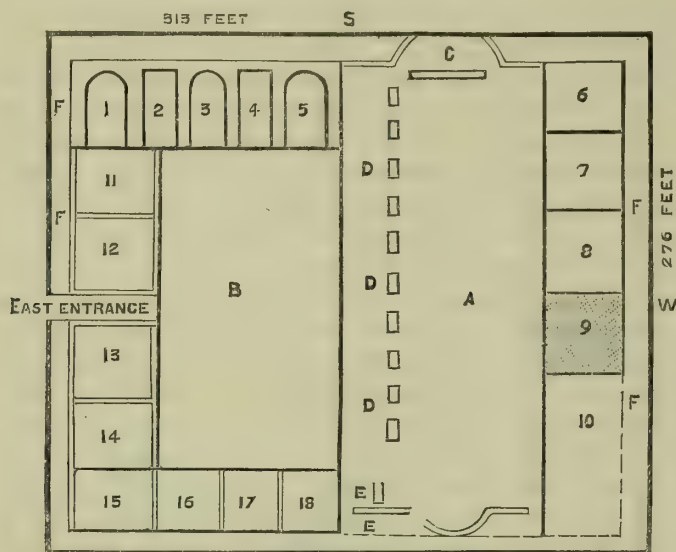
placed under cover, and the Duke of Wellington has ordered another hypocaust to be similarly protected from the weather. In the museum were every kind of tiles, logs, colanders, jewellery, door-fittings, roofing-slabs, together with a journal of discoveries, and drawings of the position of the objects discovered. The most accurate measurements are taken by the officers of the Ordnance Survey, and the lesser buildings are covered up when the plans are taken. There is much yet to be done. No trace has yet been found of interments. The solidity of the masonry, the ingenious domestic contrivances, spring catches, knives, bring back vividly the people who once inhabited this great city of the Atrebatas. As the party left, Mr. Freeman proposed a vote of thanks to the Duke of Wellington, the owner, and to the Rev. Mr. Joyce, the curator and explorer of the buried city of Calleva.

vestments, orphreys, chalice-veils, &c., there are forty-two specimens—some of a very high order—the dates ranging from the thirteenth century to the eighteenth. Of the former there is a chasuble, with orphrey of Italian work. One of the finest things in the whole series is No. 3, an orphrey recently mounted on a church vestment, belonging to the Marquis of Bute. It is certainly English, of the middle of the fourteenth century, bearing great resemblance in style and superiority of execution with the finest illuminations of the period. It is doubly valuable in having the arms of the great Bishop of Exeter, John Grandison, who died in 1369. But, alas! it has been cut about and mawled, partly restored, and remounted for modern use! Surely this is an extraordinary piece of Vandalism, doing little credit to the taste of its noble possessor, or his advisers, if it was done with their sanction. We have a right, one would think, to expect that so precious a specimen of English art, enhanced in value by its having armorial bearings to fix its date, ought never to have been tampered with in any way. The bare idea of wearing out a treasure of this kind by actual use is simply barbarous. A good copy of it would look much fresher, and more appropriate for the church service. It is a most charming fragment; the delicacy of work and perfect harmony of colour leave nothing to be desired.

No. 6 is another English specimen, exhibited by the same nobleman, and in the same foolish state of mutilation. This, happily, is not nearly so interesting or fine; and, again, No. 16—an orphrey, enriched with precious stones. There are two other magnificent pieces in this section—viz., Nos. 11 and 12—the former a gorgeous set of dalmatic, tunic, and chasuble, of the finest double-pile Genoa velvet, with golden orphrey, of late fifteenth century work. These, both for preservation and execution, are matchless. The others are only the orphreys taken from vestments, done on gold lama. They are certainly German, of the end of the fifteenth or beginning of the sixteenth century. The management of the figure work is well worth study and imitation. Mons. Spitzer shows a fine dalmatic of red Genoese velvet (31), to which we should assign a somewhat earlier date than the end of the sixteenth century. Madame Castellani shows two curious sixteenth century vestments for figures of the "Madonna and Child" ("Mantellini di Madonna"), and Mons. Spitzer one of the most beautiful things in the collection—a cover of a cloister desk, embroidered in arabesque with gold thread and pearls. On the border is a mystical bird, with the Holy Trinity worked on its breast, and the inscription, "In principio erat verbum," no doubt representing the symbol of S. John the Evangelist. This was said to have been a present from Charles V. Monseigneur Virtue's chalice-veil is a nice specimen of later English embroidery, and was formerly in the chapel at Chippinghill.

We must, in the last place, notice one of the gems of the collection, an Italian altarcloth on fine linen (26), worked in many stitches in white, edged with yellow, the figures being delicately coloured. It is said to have been executed about 1500, and is well described as a very remarkable specimen.

The next class contains work of all kinds having historical interest. It begins with a fragment of the ninth century, lent by Mons. Henry Eslinger. Mons. Achille de Jubinal, whose extensive collection is one of the chief glories of the place, sends a small piece, of the eleventh century, which formerly belonged to the Abbaye de S. Martin de Canigon. Then comes the beautiful and wonderfully preserved Walworth funeral pall, belonging to the Fishmongers' Company, A.D. 1381. All the rest are of the sixteenth to the eighteenth century, mostly less remarkable as specimens of fine art than for their associations. Several are either by or connected with Mary Queen



THE FORUM AT SILCHESTER.

A.—Basilica.
B.—Court.
C.—Seat of the Tribune.

D, D, D.—Substructure of columns.
E.—Entrance to Basilica.
F, F.—Ambulatory or Piazza.

Supposed Offices:—

- 1.—Decemviri.
- 2.—Ædiles.
- 3.—Conlegium.
- 4.—Sacerdotium.
- 5.—Quæstor.
- 6.—Curia.
- 7.—Ærarium, Treasury (where the eagle was found).
- 8.—Tabularum, or Record Office (where the Bulla was found).
- 9.—Council Chamber.

- 10.—Merchants' Hall.
- 11.—Fishmonger's Shop.
- 12.—Butcher's Shop.
- 13.—Game Shop.
- 14.
- 15.
- 16.—Shops—Jewellers or Money Changers.
- 17.
- 18.

SPECIAL LOAN COLLECTION OF DECORATIVE ART NEEDLE WORK AT SOUTH KENSINGTON MUS.

UNDER the patronage of H.R.H. the Princess Christian, a collection of needle work has been brought together in the north court of the South Kensington Museum, which every one who takes any interest in the divine work of Pallas should go to see. It is in every way a most successful gathering. The originator of the idea must be highly gratified at the very liberal response that the possessors of ancient embroidery have made to their appeal.

The reason given, in the letter addressed to the Lord President of the Council of Education, for suggesting the exhibition, was that it would conduce to the interests of art education, especially as bearing upon the employment of women.

We think that this object will be attained. There can be no question of the beauty of design and skill of execution in a very considerable number of examples. Even those who do not understand the subject of needlework will be interested with the many curious and historical pieces, as well as by seeing so many veritable specimens of different parts of the dress of bygone times, which can now usually only be seen in pictures or engravings.

As by far the greatest part of the collection consists of work done in the sixteenth, seven-

teenth, and eighteenth centuries, a technical classification by stitches was proved to be impracticable, and so all but the first five classes are arranged according to the material used. Some idea may be gathered of the extent of the collection, from the fact that there are no less than 691 items in the catalogue, some representing whole sets.

These have been divided into nineteen classes. There is besides this a chronological sub-division of each class. As is usually done in the loan collections generally, the description of each piece is that given by the lender. This perhaps is, as a rule, an inevitable arrangement, but still one that robs these exhibitions of some of their value. It has always seemed to us that the lenders might be invited to allow the skilled advisers of the Executive Committee to make such alterations of description as would, in their opinion, more correctly explain the specimens. It would then rest with the owner whether they would retain a wrong account of their possessions or not. Most people of sense would be glad of having these corrections made. In the present instance, the matter is of less consequence than in some former exhibitions, and, with the exception of the Oriental specimens, the catalogue appears to be fairly accurate.

In Class I., ecclesiastical work, including

of Scots—54 to 57, No. 55 being the baby-basket of James VI., about 1565, lent by her Majesty. In No. 60 we have eighteen pieces of baby-linen made by Princess Elizabeth for her sister Queen Mary, when she thought she was to be a mother. Countess Brownlow exhibits a number of things which were worn or used by Queen Bess. Some of the articles in this class are more than historical, especially some very fine badges (59) dated 1584, and many riche pouches, of which (74) belonging to Mons. A Jubinal, is one of the finest. We may also notice a pair of curtains worked with crewels (a coarse worsted) on twilled cotton, by Amy Robsart; the star said to be from the mantle of Charles I., and given by him to Captain Basil Wood, and lent by a descendant of his; a curious drawing prepared on white satin, for a book-cover, representing Charles I. as Hope, and Henrietta Maria as Faith. It was probably framed after the king's death, and kept as a memento of him. We must not omit to notice an excellent specimen of leathern embroidery, in beautiful and elaborate patterns in white and red thread—No. 68, a box which belonged to Charles II. The gloves of former times, of which there are several, were rather easier to get on than what our fashionable people of the present day would approve. A pair (91) which belonged to Cardinal Richelieu are good specimens. No 95, an embroidered shirt of Charles I., is well worth looking at; the ornament is very nice. In the eighteenth century curiosities the collection is most abundant, foremost among which (104) is an apron trimmed with white linen and thread embroidery, which is said to have belonged to Marie Antoinette, lent by Mr. Aked. No. 107, is a fine piece of work, embroidered on both sides alike, in silks and gold and silver thread, given to the Countess d'Alton, a lady in waiting to the Empress Maria Theresa, by the Turkish Ambassador at the Court of Vienna. A gauze sachel (No. 113) of Louis XV., and which is said to have belonged to Marie Antoinette, is most delicately and chastely worked. No. 110, a pair of screens, show the latest style of the art of embroidery; they were done by Madame Vestris, the pictures in the centre being stippled on satin by Bartolozzi himself. In this section there are also reminiscences of James I. (100 to 104), Sarah, Duchess of Marlboro (116), and Queen Charlotte (105).

We intend to return to this interesting collection in a future number.

SCHOOLS.—No. V.

LIVERPOOL.

THE Liverpool School Board have prepared minute rules on school-planning and furnishing, for the guidance of their architects, following in the wake of the London Board to some extent. In their graded schools they consider "the best width for the general room" to be from 18 to 22ft. This room to be provided with sliding partitions for sub-division, and to contain a floor area of not less than four superficial feet per child for the whole number contained in a department. In the larger schools they require, when practicable, two double classrooms for sixty, seventy, or eighty children, allowing floor area equal to eight or nine superficial feet per child; when these cannot be provided, the general room has to contain a greater number of partitions for subdividing the scholars into classes. Five rows in depth of benches and desks form the furnishing for class-rooms, allowing 20in. for the seating. The original intention of the Board was to procure long benches and desks, but an opinion now prevails that short desks for two scholars, on the American principle, will be adopted, similar in character to those selected for the London schools. They will be provided for all the children of each department, except for one

class occupying a gallery, and will be placed on slightly raised platforms.

Their infant-schools, always upon the ground floor, are not restricted to the width of graded schools, and afford accommodation for not less than 120 nor more than 300 in one department. Rooms for babies and the more advanced infants, arranged for about 30 each, and capable of being converted into classrooms for twice that number, complete the teaching space provided in this class of school, eight superficial feet being allowed in floor area for each infant. The fittings consist of two galleries of unequal size, restricted to a maximum seating for eighty or ninety, allowing 14in. for each scholar. A small group of benches and desks, and a cupboard for books 6ft. in height, are supplied for the more advanced infants.

Residences for masters and mistresses, containing parlour 14ft. by 12ft., kitchens 14ft. by 10ft., and four bedrooms, severally, are in some cases provided; and also rooms for resident janitors. Cap and bonnet-rooms, with separate doors for ingress and egress; masters' rooms, available for committee-rooms; lavatories, with not less than four basins for every one hundred; water-closets, approached by a covered way, each self-contained, with a separate door and light, in number not less than two for one hundred children; separate covered and other playgrounds laid with tar, asphalte, or other pavement; porches and separate entrances, complete the provisions in each group. In extreme cases, buildings of three stories in height are admitted, two stories only being the rule. Staircases are always required to be fireproof, and stone, contrary to experience, is mentioned as one of the materials with which they may be constructed. Upper floors, and floors over covered playgrounds or other hollow areas, are not required to be pugged. (It is said that pugged floors in Liverpool become destroyed by dry-rot, in consequence of the timber for joists being usually cut up and inserted while wet from the docks.) Windows exposed to streets or to "stone-throwing" were, in the first instance, to have strong wire protections; this almost needless precaution has been abandoned, and cast-iron casements, divided into small squares for glazing, have been substituted. The Board have not made any rule for heating, and the only stipulation in regard to ventilation is that large portions of each window should be made to open at the top. For lighting, the rules laid down are that window-cills shall not be less than four feet from the floor, and window-heads as near the ceiling line as practicable; glazing to be with clear glass, windows in classrooms to be "chiefly on the side," in the drawing-classroom to be on the top or placed high; "the precise amount of window surface and distribution to be governed in some degree by the aspect."

Some "preliminary remarks" on the system of teaching contemplated by the "New Code," 1872; on the desirability of the lessons under the six standards of the code being taught in isolated or separate rooms; and statistics of the proportions belonging to infants', junior, and senior schools (somewhat negated by the remark that special circumstances of population may alter them), constitute, with the rules for building, the circumstantial instructions and points of information laid before local architects who have been invited to submit plans in competition for certain schools. The first competition included designs for schoolhouses for 1,000, and others for 700 children, and for these, again, other specific instructions were given. The schoolhouses for 1,000 children were to be designed to provide—1. Two infant schools for 200 each, comprising a large room with two galleries for 80 and 50 infants respectively, one classroom fitted with desks and benches for 30 advanced infants, and a classroom with a low gallery and separate entrance for 40 babies. 2. Two junior departments for 180 each, to be used either as mixed or

separate schools for boys and girls, each containing a schoolroom for 100, arranged for subdivision into two rooms, and two classrooms for 40 each, arranged to be thrown into one. 3. Two senior departments for 120 boys and 120 girls; the only division in these being a schoolroom for 80 and a classroom for 40 scholars. 4. A single room for drawing-classes, containing not less than 360 superficial feet, so placed in planning as to make it available for use by junior and senior boys, or girls, alternately; and 5. Masters' and janitors' rooms, but no residence.

The requirements in the schoolhouses for 700 children were upon the same basis, the numbers in each department being relatively reduced. Mr. Thomas Cook, in conjunction with Mr. John E. Reeve, submitted a design submitted by the Board for the larger schools, and Mr. G. E. Grayson and Messrs. Reade & Goodison were the successful competitors for the smaller buildings. Money premiums were not awarded, the designers being commissioned to carry out their plans. Mr. E. R. Robson acted as consulting architect to the Board in making their selection.

The schools designed by Messrs. Cook & Reeve are now in course of erection on a site in Queen's-road, by Mr. Joshua Henshaw, builder, of Liverpool, with Mr. S. Webster, of Booth, as co-contractor for the joiners' work. Their tender for the works, amounted to £7,430, exclusive of fittings. The cost, inclusive, per head will be about £8. 10s. The site, of pentagonal shape, contains about 2,000 square yards in superficial area, and has a frontage towards the principal road of 186ft. entirely covered by the new building. The plan of the combined group forms a T-shaped block, all the rooms being parallelograms. The plan commences on the left with an entrance-passage for girls and infants, followed by rooms upon the line of frontage in the following order:—A babies' room, 29ft. by 18ft.; infants' school, 55ft. by 22ft.; senior infants' classroom, 22ft. by 15ft. 3in.; senior boys' school, 39ft. by 22ft.; boys' classroom, 18ft. by 14ft., temporarily divided from another to the rear of the same dimensions. Next comes the entrance-passage for boys; an entrance for the Board and visitors, and a keeper's residence, completing the line of frontage. To the rear of the infants' department, completing the T-shape of the block, are staircases to the upper story, with lavatories, and the second department for infants' comprising a classroom 22ft. by 15ft.; a schoolroom for 95 juniors, 39ft. by 22ft.; and a babies' room, 29ft. by 18ft. On the upper floor, the senior and junior girls are placed over the two departments for infants; and the junior boys are located over the senior. A board-room is provided over the keeper's residence. By an ingenious arrangement in the position and construction of the several staircases, access from each department is gained to a room for the drawing-classes centrally placed at the top of the building. The bulk of the walls are in brick; the front is stone, with Yorkshire parapet facing, and red Runcorn stone dressings. The front elevation has square-headed windows with transoms to the ground-floor rooms, and flat pointed-headed windows above, placed under a series of gables rising to the line of ridge. The windows throughout have casements above the transoms, fitted with apparatus for being simultaneously opened in a similar manner to that (previously described in these articles) in use in the board schools at Sunderland. Chambers for the admission of fresh air to the rooms at the floor level are so constructed in the external walls as to bring the air down through gratings placed about four feet above the floor, under the window-cills. All the rooms have windows on, at least, two sides, and no other means of ventilation beyond the windows have been considered necessary, except the open fire-places. These have flush jambs and arches, in gauged, stop-chamfered brickwork, of

original character, and are fitted with dog or Leamington bars. The principal heating is by hot water. All the floors in this school are pugged, and the flooring is pitch-pine. Stone's sliding partitions, and Macfarlane's lavatories and closet-troughs, with slate divisions, occupy their accustomed places among the fittings.

The schools designed by Mr. G. E. Grayson, to accommodate 700 children, are being erected upon a site containing 1,304 superficial yards, in Roscommon-street, by Mr. Thomas Ray, builder, of Liverpool. In these schools two departments for infants are arranged in a building of one story in height on the front of the site. The boys and girls are located in a building of two stories at the back, junior girls and junior boys on the ground floor, with the seniors above. The two blocks are connected in the centre from front to back, by means of a covered playground, a master's room, and a range of lavatories, whereby the general form of the letter **H** is given to the group. The walls are brick, with stone dressings. The fittings and general provisions do not materially differ from those in the Queen's-road schools, but in these additional means of ventilation are provided by the construction of ventiducts in the centre of the smoke-flues from the open fireplaces. The rooms are planned to receive short desks. The cost of the buildings, including fittings, amounts to £5,797; approaching £9 per head, inclusive of superintendence.

Messrs. Reade and Goodison have a third Board School in hand; and a second competition for three schools has resulted in the selection of designs by Mr. G. E. Grayson and Messrs. H. and A. Fry; two other firms, who submitted designs of equal merit, being requested to compete again for the third group.

QUANTITIES.—XVIII.

PAINTER.

ADOPT the same systematic method in taking off the Painter's work as recommended to the other trades. Take firstly the outside work, and in proceeding with the inside, complete one floor before commencing a second, and take the staircase last. Many of the dimensions will be found with the Joiner. In some cases where the surveyor is hurried, he neglects to measure the painting at all, but takes the superficial quantity of work to be painted from the Joiner's bill, and adds thereto one-seventh of the total as an allowance for the edges. In small matters, where the work executed is very ordinary, the difference between this course and the correct way would be slight, owing to the price per yard for painting being inconsiderable, but in first-class work, or where there is a large quantity of painting required, it is not to be tolerated. Measure the entire surface covered by the brush; that is, including all rebates, sinkings, and taking the girth of the mouldings as shown in Fig. 21, page 206, *ante*. Where the work has to be "cut in on both edges," that is, worked to a line as in the case of skirtings, &c., additional labour is thereby involved, and the customary rule is to measure this description of work by the foot run as extra. Paintwork in general is measured by the foot superficial, which is afterwards reduced to the yard super., and billed accordingly. Lineal dimensions are billed at per foot. The following is the customary method of measuring the various items for painting, and the order recommended for taking them:—

Sash frames and Sashes (outside) are numbered, and the sash squares are afterwards reduced and billed at per dozen, as shown in the table, stating whether large or small squares. Casement frames are also numbered, and it will be necessary to state the number of lights, whether two, three, four, or six-light casement, or as the case may be; also,

if large it must be so specified, and this will apply equally to sash frames. By "large," is meant anything beyond the ordinary sizes. Stone cills are numbered, and the reveals and soffits to the windows would be measured by the foot run. Measure plinths, string courses, cornices, copings, &c., by the foot run, and where done from ladders or scaffolding, it should be kept separate from the general item for painting in the bill, and described according to the manner in which it is executed. Eaves guttering is measured by the foot run, and the stopped ends, clips, outlet pipes, swannecks, &c., numbered. Rainwater pipes are also measured by the foot run, numbering the heads, stating whether ornamental or otherwise; also the shoes, ears, &c., &c. Iron-cresting is measured by the foot run, and all finials numbered, and iron railings are measured by the yard; as are also gates, ornamental railings, balconies, balconettes, &c. Door-knockers, knobs, scrapers, and other items of a similar nature are numbered.

Having completed the outside, proceed to the inside. It is advisable to observe the following rule in measuring framed and other work—namely, to measure all projections for panels, mouldings, &c., in the dimension for the height only, and all returns in that for the width. Bearing this in mind, the work is tolerably easy. Measure firstly the windows, taking the width from out to out, and add the two returns against the wall; for the height take from the underside of window board to the top of architrave. If, however, there is a window back, take the dimension from the floor. It will be necessary to add to this dimension the allowances for projections and mouldings in panels, &c., whatever the girth exceeds the flat, but not the returns. In ordinary square framed panels the allowance for each panel is one inch.

Boxing Shutters are measured the width by the height. For the width take the width across the window, and add to this 2ft. 6in., to allow for the edges and the inside of boxings, &c. The height would be obtained in the way already mentioned. The lengths for back linings should be collected on waste and taken in one dimension; this by the width will give the area. The elbows are measured the width by the height, adding to the latter for any panels, &c., as before. These remarks will also apply to back flaps and sliding shutters, which are all measured in the same way. In the latter case do not omit the flap. The sash squares are numbered as described to outside, and shutter bars are also numbered.

Skirtings are measured by the foot run, the length by the girth from floor line to wall line.

The dado is measured by the yard superficial, the length by the height, adding to the latter for the projections and whatever the girth of the mouldings exceeds the flat surface of the same.

In measuring doors take the width of the door, including grounds and architrave, adding whatever the returns measure. For the height take from the floor to the top of the architrave, and add for the extra to the girth of the architrave, and also for the panels, but not the returns. The jamb linings are measured the total length, that is twice the height of the door *plus* the length of the soffit, by the width of the lining *plus* the thickness of the door and the width of the rebate.

Strings to staircases are taken as described to other work where cut in on both edges, that is, by the foot run. Balusters, handrail, and newels are taken by the foot run. Ornamental iron balusters and newels should be numbered.

I think sufficient has been written to show my readers how this description of work should be measured. Of course it will be necessary to keep the works differently treated separate, stating the number of oils in which it is to be painted, also if knotting and stopping are included, which in new work would be the case. If flatted, take the flatted coat as

extra, and where the painting is to be finished in ornamental colours, take the latter as extra; specify the tint as shown in the Table. Where mouldings are "cut in" in party colours they are measured by the foot run, as extra to the framing. By the common colours are understood the ochres, umbers, Venetian red, lamp-black, red-lead, and Spanish brown.

Grained Work is also measured as extra to the painting, by which is meant that the work having been already measured for the painting, the item is taken again for the extra price for graining. It is measured in precisely the same manner as described to paint work. State the nature of the imitation, whether wainscot, pollard oak, mahogany, bird's-eye maple, &c., and the quality and number of coats of varnish to be applied.

Staining is also measured in the same way as paintwork.

TABLE XIV.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement:—

— times in oil on }	At per yard super.
woodwork	
Ornamental railings, gates, &c., both sides }	"
Skylights	At per foot super.
Carved work	
Skirting 12in. girth and wider }	At per foot run.
Strings	"
Chair-rail	"
Handrail	"
Balusters	"
Newel	"
Rainwater pipes	"
Ornamental heads	At per number.
Ears	"
Shoes	"
Eaves gutter	At per foot run.
Stopped ends do.	At per number.
Outlets do.	"
Swan necks do.	"
Cement reveals	At per foot run.
Cornices under girth	"
Window cills	"
Coping edge	"
Stone strings	"
Stone plinths	"
Iron cresting	"
Guard bars	"
Sash squares	At per dozen.
Sash frames	At per number.
Small do.	"
Two-light casement frames	"
Four do. do	"
Brackets	"
Quatrefoils	"
Finials	"
Step-ladder	"
Dresser	"
Chimney-pieces	"
Brackets	"
Scrapers	"
Extra to flattening to chosen tint. }	At per yard super.
Four oils and extra finished French grey. }	"
GRAINER.	
Extra grain in imitation wainscot and twice varnish. }	"
Do. enrichments in panels 4in. wide. }	At per foot run.
STAINER.	
Staining to an approved tint and twice varnishing with the best copal varnish. }	At per yard super.
FRENCH POLISHER.	
French Polishing	At per foot super.
Do. to handrails, &c.	At per foot run
WRITER.	
Ordinary style, stating height. <i>Note.</i> This style includes Egyptian, Old English, and German Text. }	At per inch run.
Ornamental style, stating height as above. <i>Note.</i> This style includes Antique and all others not included in the first item. }	"

Writing is measured by the inch run, stating the height of the letters. Specify whether painted simply plain, or if shaded, double-shaded, or gilt letters, &c., &c. If

the writing is to be executed on a glazed surface, it must be so stated, the price being considerably in advance of the ordinary for that description of work. It is also necessary to state the style of writing required, whether Egyptian, Old English, Antique, &c., &c. Writing is seldom provided for in the quantities, and it is but seldom that the quantity surveyor has to measure in. Where he has, I give the foregoing as a guide, being the method of measurement generally adopted by the trade. Work other than the foregoing is charged at special prices. The table being small, is included in Table XIV.

GILDER.

The following Table will explain the method of measuring Gilder's work:—

TABLE XV.

Gilding on flat surface	At per foot super.
Do. on carved work, stating height and description.	At per foot run.
Moulded work, stating girth.	"
Beads, &c. do. . . .	"
Carved caps	At per number.
Bosses and single items of similar nature.	"

GLAZIER.

The measurement of Glazier's work is very simple. Take the extreme dimensions in every case between the rebates, and make no deductions for irregular surfaces. All fractional parts of an inch are to be taken as full inches in each of the dimensions. State the description and quality of the glass, and keep the different descriptions separate; also keep separate and state the superficial area of each of the squares where they exceed 3ft., as illustrated in the following Table, stating, firstly, that under 3ft. super. in a square, then that under 4ft., and so on. Also take the glass in the order shown therein, namely, the inferior description firstly, and so on, to the best, though this course is dependent upon circumstances. Where so taken, however, the whole of each description of glass can be abstracted in one item; and, in many cases, an abstract can be dispensed with, and the quantities billed direct from the dimensions.

Measure *semicircular sheets* as if square, taking the largest dimensions for length and height. Glass bent to a given radius, and to elliptical or other curves, or both ways of the glass, must be kept separate, and described accordingly. Coloured or embossed glass is measured by the foot superficial, the margins being taken by the foot run, and the corners enumerated, stating the size.

Take *cutting* to segmental heads by the foot run; and in the case of cuttings to small quadrant corners, it is best to number them.

I think the reader will find the Table sufficiently explicit to need no further explanation here.

I would mention, in conclusion, that glazing in lead lights must be specified separately, and fully described, stating the sizes of the squares, or the p.c. value of the whole per foot super. Number all spandrels in tracery-heads, stating the extreme dimensions, including all cutting, and stating whether trefoils, quatrefoils, &c., &c.; and, if irregular shapes, giving sketches. I have given a specimen of this description at the end of the Table.

Glass tiles and slates are numbered, and it will be necessary to state the sizes and thicknesses.

TABLE XVI.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement.

21oz. sheet glass, under 3ft. super in a square	At per foot super.
32oz. do. do. under 4ft. super. in a square	"
Do. do. do. under 6ft. super. in a square	"
16oz. obscured sheet glass, under 3ft. super. do. do.	"
Do. fluted do. do. do.	"

Hartley's patent rolled plate glass, $\frac{3}{16}$ in. thick, under 5ft. super. in a square	At per foot super.
$\frac{3}{16}$ in. rough plate glass in 6in. widths, and glazing in iron gratings	"
21oz. best patent plate glass, under 12ft. super in a square	"
Best British plate 3-16in. thick, under 10ft. super. in a square	"
Do. do. do., under 12ft. super. in a square	"
Do. do. do., bent to 3ft. radius, under 4ft. super in a square	"
Do. do. do., ground and embossed to design, under 6ft. super. in a square	"
Cutting to semicircular or segmental heads.	At per foot run.
Small quadrant cuttings.	At per number.

The following is the customary method of measuring church windows.

Cathedral glass and glazing in strong lead quarry lights, with narrow diapered margins of p.c. value of 2s. per foot super.	At per foot super.
Spandrels 8in. by 6in. extreme size, glazed as above in tracery heads.	At per number.
Do. 2ft. by 8in., do. as sketch.	"

FIG. 47



Trefoils 18in. by 12in. do., do.	"
Quatrefoils 30in. by 30in. do., do.	"

PAPERHANGER.

The measurement of paperhangers' work is fully shown in the following table. Take the lengths and heights of walls, making the several deductions for doors, windows, fireplaces, &c., and bring to the foot superficial. By dividing the product by 60, the number of superficial feet in one piece of paper, we obtain the number of pieces required for the different apartments. All portions of a piece are to be taken as full pieces; that is, the number of odd feet remaining of the various descriptions. Preparing walls for paper is measured in a similar manner to the foregoing. It may be observed that most of the dimensions for the foregoing can be obtained from those of the plastering, and that for preparing walls will be, of course, simply the addition of the total number of pieces of paper hung.

Measure all borders and hanging by the dozen yards lineal.

TABLE XVII.

This Table has a double use: it shows the order of taking this Trade, and the method of measurement.

Paper of p.c. value of 1s. per piece, and hanging same.	At per piece.
Do., do., p.c. value 2s. per piece, and do.	"
Do., do. lining paper and do.	"
Marble paper p.c., value 2s. 6d. per piece, sizing and twice varnishing in best copal varnish.	"
Preparing walls for paper.	"
Border p.c. 1s., and hanging same.	At per doz. yards run

B. F.

The late Sir James Brook, the Rajah of Sarawak, is commemorated by a memorial window in Sheepstor Church, Devonshire. The church was reopened on the 29th ult., after restoration and decoration, the new window being a conspicuous feature.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ON Monday evening last was held the closing ordinary general meeting of the Royal Institute of British Architects for session 1872-73. The chair was occupied by the newly-elected President, Sir George Gilbert Scott, R.A.

The minutes of the previous meeting having been read and confirmed, several donations to the library were announced, among them Mr. William Longman's "Three Cathedrals Dedicated to S. Paul, in London"—a work which is of considerable interest, especially at the present time, inasmuch as it contains the first design of Sir Christopher Wren which was accepted by the king. The drawings of Old S. Paul's contained in this work were those for which the Institute Silver Medal was awarded to Mr. Ferrey a few years ago.

The following gentlemen were then balloted for and declared duly elected as Associates of the Institute, viz:—Mr. W. H. Hoskins, Darlington; Mr. W. O. Milne, Great Marlborough-street, W; and Mr. R. Stark Wilkinson, Torquay.

THE ROYAL GOLD MEDAL.

The PRESIDENT (Sir G. G. Scott), in rising to present this medal to Mr. T. H. Wyatt, the late President, said: We have now come to the most interesting matter on the agenda, viz., the duty which devolves upon me of presenting the Gold Medal which is annually placed by the Queen at the disposal of this Institute, and which this year it has been decided—I am sure with the utmost satisfaction—shall be awarded to our distinguished member and highly-valued friend, Mr. Thomas Henry Wyatt—(Applause). I need hardly say that this award has been graciously, and I am sure right heartily, approved and confirmed by Her Majesty. It adds largely to my own personal pleasure, and also, I am sure, to the pleasure of every member of this Institute, that it so happens that this award takes place at the period of Mr. Wyatt's retirement from office, after having fulfilled for three years the duties of President of this Institute with consummate judgment, and therefore with great success. This coincidence, however, is merely an accident, for it does not constitute the reason for which this award is made, although it adds greatly to our pleasure that the presentation is made at the time when Mr. Wyatt retires from this chair. But the Royal Gold Medal of the Institute is awarded to Mr. Wyatt on account of his own intrinsic merits and worth as an architect. Our late President is, as is well known, a scion of a family that has supplied members to our own profession, as well as to the art of sculpture, for quite a century past. There are at least ten, to my own knowledge, and there may be more, of his family who have thus distinguished themselves, and he and his brother, Sir Digby Wyatt, have worthily maintained the reputation of their family. Another generation is now in the springtime of hope, and let us indulge the hope that their name may be handed down to future generations with, if possible, greater honour. (Hear, hear.) It is something like forty-two years ago since I first had the honour of making Mr. Wyatt's acquaintance—a reflection which must make us both feel somewhat old—and I was then struck with the high, gentlemanly bearing which has characterised him throughout his subsequent career. If one characteristic more than another distinguishes Mr. Wyatt, I consider it is the high bearing and gentlemanly feeling by which so much honour and dignity are imparted to our profession. These, however, are merely his personal and social claims upon our admiration; his actual claims are to be found in his own works, and I do not think I know any one who has carried out so many works of such a varied character, as Mr. Wyatt has, with so much success. His works comprise numerous churches and restorations of churches. Of the former class of works, I will only mention one example, viz., the magnificent church at Wilton, erected by him for Sir Sidney Herbert—a work which has the singular merit of introducing into this country the noble Early style of Lombardy, with all its richness and magnificence of material and workmanship. This is a truly magnificent work; but as we probably all know it, it is needless for me to enlarge further upon its merits. The other church I shall mention is Mr. Wyatt's restoration of the noble minster of Wimborne, which—although I have not seen the result—is, I believe, a great success. The next class of works I may mention are the numerous mansions which Mr. Wyatt has

either built or altered. He was selected by Count Veruzo to design for him a palace to be erected in Russia; but our own country and Ireland contain specimens of his skill in that department. Mr. Wyatt has also erected numerous public buildings and institutions. Firstly, and perhaps best known of all, is the magnificent Exchange at Liverpool; then there are four assize-courts, if not more, besides lunatic asylums, hospitals, and gaols—works, in fact, so numerous that, however interesting it might be to enumerate them, I should only weary you by so doing. In conclusion, Sir Gilbert Scott, addressing Mr. Wyatt, said: I assure you it gives me the greatest possible pleasure in being made the hand of the Institute in presenting to you this mark of their high regard and admiration of your personal qualifications, your talents, and worth. I am quite sure, though the members of the Council have not taken into consideration in the least the immense debt of gratitude due to you on account of your labours as President of this Institute, they cannot help mixing, as it were, their gratitude with their sense of your high character and merits, which so worthily entitle you to this medal. I only feel that the Royal Gold Medal ought to have been awarded to you long before; but the accident that it has not been so awarded is quite compensated for by the pleasing coincidence which has now occurred. Considering your merits and works, they have, I am sure, never presented a medal with greater and more enthusiastic pleasure than they do now. (Applause.)

Mr. WYATT, in reply, said: I cannot well express my feelings at receiving this crowning mark of your esteem. I am sure I feel very grateful to Sir Gilbert Scott for his kindness in speaking as he has done of my character and works, and he has very much over-rated my merits. Nobody knows how much I am indebted for whatever merit there may be in any of my works to the very valuable help I have always received from my assistants and others, and I cannot accept this medal without making this acknowledgment. I may say that I have endeavoured through life to elevate the character of that profession to which I am very much devoted, and have striven to do nothing which should derogate from the character of an honourable profession. I was at first intended for commercial pursuits; but, having no taste for them, obtained the permission of my father to devote myself to the study of architecture, and if I have, to some extent, succeeded in my profession, I feel grateful for that permission. Although undeserving of this high mark of your esteem, I considered that I had no greater right than yourselves of being a protector of my own honour; and as you have chosen to confirm the award of the Council with regard to this year's medal, I felt at liberty to accept the medal, and I shall value the honour to the end of my life. I also appreciate the kindness of Her Majesty in approving of your act. Sir Gilbert Scott has alluded to the large number of my family who have followed one branch or other of the fine arts, and I feel grateful that we have attained some measure of success. I only hope that many of their works may not be judged by a future generation quite so harshly as by the present. (Applause.)

Mr. HORACE JONES: Allow me to say that the vote with respect to the presentation of the Medal to Mr. Wyatt was as unanimous in the Council as it was here. (Hear, hear.)

THE INSTITUTE MEDALS AND PRIZES.

The Soane Medallion (with the sum of £50 under the usual condition that it be devoted to the purposes of foreign travel and study) was presented to Mr. W. Frame, 10, Young-street, Kensington-square (a pupil of Mr. Burges) for his design for a public hall.* Sir Gilbert Scott, in presenting the medallion, said he was not able to express any opinion as to the merits of the other designs sent in by competitors for this medallion, but he must say that he thought very highly of Mr. Frame's designs, and had great pleasure in handing the prize to him, as he was evidently fully entitled to it. A medal of merit was also presented to Mr. F. C. Deshon for his design for a public hall.

The Institute Silver Medal, with five guineas, for a complete set of drawings illustrative of some old building which had not been illustrated before, or only partially so, was presented to

Mr. Alexander H. Korse, of Kingswood Lodge, Lewisham, for his drawings of S. Mary's Abbey, Malton, Yorkshire. It was announced that Mr. Korse had sent in no less than seventeen mounted drawings, which were considered by the judges to be of very great merit. In the same competition medals of merit were presented to Mr. Thomas Garratt, of 15, Prince's-row, Buckingham Palace-road, for his drawings illustrating S. Mary's Abbey, Lilleshall, Shropshire; to Mr. Arthur Hill, Associate, of 22, George-street, Cork, for his set of drawings illustrating Cormac's Chapel, Cashel;† and to Mr. P. J. Marvin for his drawings of Bayham Abbey.†

Mr. EASTLAKE stated that in this competition, Mr. J. H. Eastwood, of 77, Chancery-lane, had acquitted himself so creditably with his drawings of S. Mary's Abbey, Lilleshall, Shropshire, that, although he had failed to carry off the medal, the adjudicators recommended that he should be presented with a medal of merit. This was duly presented by the President.

The Essay Prize.—A medal of merit was presented to Mr. Alfred Jowers, Associate, for his essay on "Modern Architectural-Art Criticism."

THE VOLUNTARY ARCHITECTURAL EXAMINATION.

Mr. EASTLAKE announced the results of the Architectural Examination, just concluded, which appear to be very encouraging. There were twenty candidates, five for the Class of Proficiency, and fifteen for the Preliminary Examination. The following gentlemen passed:—

Class of Proficiency (Artistic Section).—Messrs. H. G. McLachlan, F. P. Johnson, Hugh H. Stannus, and J. W. Rounthwaite.

Class of Proficiency (Scientific Section).—Messrs. Josiah Conder, F. P. Johnson, Hugh H. Stannus, and J. W. Rounthwaite.

Preliminary Examination.—The following gentlemen passed the Preliminary Examination:—Messrs. W. C. Field, H. Branch, John Cowell, C. T. Holmes, H. M. Mavor, W. W. Roberts, R. T. Conder, H. W. Moore, W. J. N. Millard, H. R. Perry, L. T. Waller, and W. S. Jackson.

Dr. J. W. HAYWARD, of Liverpool, then read a paper on

HEALTH AND COMFORT IN HOUSE-BUILDING.

This paper was essentially the same as that read by Dr. Hayward more than a year ago before the Liverpool Architectural Society, and which we published in the *BUILDING NEWS* for March 8th, 1872.‡ Dr. Hayward, in his paper read before the Institute on Monday evening last, maintained that the duties of the architectural and medical professions meet in the art of house-building, and that it is therefore advisable that architects and medical men should occasionally discuss together the requirements involved in this art. Also that they should combine to educate the people in the knowledge of the absolute necessity that every house and room should be properly and permanently ventilated. After a few remarks on the best position, aspect, and prospect of house, the size, number, and the position of the windows, doors, and fireplaces, Dr. Hayward stated that the main necessity of house-building was ventilation, and that whatever else was undone, this should be attended to; whatever else was left imperfect, this should be made perfect and complete, and it should include the whole house, and be self-acting and inexpensive. It should not be "single-room" ventilation, but must include the whole house in one harmonious scheme, and in order to do this there must be provided a permanently heated abstracting flue, in size proportioned to the size of the house, and large enough, and of sufficient abstracting power, to empty the whole house once every twenty minutes—i.e., three times in an hour. There must be a special opening into the central lobby on the ground floor for the direct admission of an equivalent quantity of fresh air, and that this opening must be protected by shutters to regulate the quantity according to the number of rooms, and with hot-water pipes to regulate the temperature, according to the season of the year, and that the fresh air in the lobbies should, if possible, be kept at a temperature ranging from 60° to 65°. Each room should have a special inlet from the warmed air lobby, large enough to admit every twenty minutes a quantity of air equal to the whole cubic contents of the room. In or near the ceiling of each room and each water-closet, and from each gaselier in

the house, there must be an opening large enough to allow the escape of the whole air of the room every twenty minutes. To these openings must be adapted a tube, which must run up an inner wall, and terminate in a drum or chamber at the top of the house. Each room, each water-closet, and each gaselier in the house must have a separate tube to this chamber, and this chamber must terminate in one common outlet or flue—a common abstraction flue—and this must be kept permanently heated, which may be done for a very small permanent cost by a gas-light, or a few coils of the warming-apparatus pipe, or for no permanent cost whatever by bringing it down to below the kitchen fire, up behind the fire, and round the smoke flue, and terminating it near the top of the chimney. In this way, and in this way only, can a house be successfully ventilated and warmed, and made healthy and comfortable. Dr. Hayward argued that the air of almost all the well-built modern houses is necessarily foul and loaded with effluvia from the drains, in winter at least, because the well-made and tightly-fitting doors and windows make it easier for the fires of the house to draw air from the water-closet window when this is open than from any other source, and even when the water-closet window is shut, it is very easy for them to draw air out of the drains, which, in fact, they do; and besides, in such houses, the opening and shutting of the doors of the rooms always pulls up air out of the drains. The only remedy for this evil is an ample opening direct from the outer air into the lobby. He stated that our present badly-constructed, ill-ventilated houses were the cause of much deterioration of health and of much absolute disease—such as neuralgia, rheumatism, bronchitis, asthma, consumption, heart-disease, typhoid fever, &c., and render many mild diseases severe and many curable diseases incurable, besides causing the increase and spread of all infectious diseases, and the deterioration of the health of all nurses and attendants on the sick. Dr. Hayward's paper, which was of great length, was illustrated by large drawings of his house in Liverpool, built in accordance with the principles advocated. The scheme, he said, had been proved to be complete, perfect, and successful by four years and a half's residence and observation, and by absolute scientific experiments with thermometers and anemometers placed in different lobbies, rooms, and flues, and the details of which have been published. Owing to the lateness of the hour, there was hardly any discussion.

Mr. T. H. WYATT proposed a vote of thanks to Dr. Hayward for his paper. While it was impossible to over-rate the importance of the subject which had been treated of, he thought that for ordinary purposes such a plan of ventilation as that advocated by Dr. Hayward was impracticable, although there was no doubt that Dr. Hayward's system was perhaps the most perfect of any in its results. Every one who, like Dr. Hayward, practically investigated this subject was a public benefactor, and this was true of Dr. Hayward, who, however, in Mr. Wyatt's opinion, had not solved this difficult problem.

Mr. E. ROBERTS having made a few remarks which were inaudible to the reporters,

Mr. A. PAYNE asked whether Dr. Hayward's system had been carried out in any other houses than the one referred to, and whether it had been applied to any public buildings, and with what success.

Dr. HAYWARD, in reply, said that the house of Dr. Drysdale, at Liverpool, who had given much attention to this subject, was built almost wholly in accordance with the principles he had laid down as necessary for complete success, and other houses had since been built in which some of the details of his plan had been adopted, and others rejected, with but partial success. The system in its entirety had not yet been applied to any public building, although, practically, the system of ventilation carried out some years since at the House of Commons was essentially the same, though wanting in what he considered some important details.

The meeting then terminated.

ARCHITECTURAL ASSOCIATION.

ON Saturday afternoon last some of the members of this Association visited the works of Messrs. Moreland and Son, engineers and iron girder manufacturers, No. 3, Old-street, S. Luke's. This firm has now in hand a large number of

* Published in the *BUILDING NEWS* for May 9 last.

† Given in *BUILDING NEWS* for May 2.

‡ Vol. XXII, pp. 191-2.

* Mr. FRAME'S design was published in the *BUILDING NEWS*, for April 11 last.

girders for De Keyser's new Royal Hotel, at the Blackfriars end of the Thames Embankment. On account of the visit the machinery was kept in motion, and the men remained at work, until five o'clock. An adequate idea of the extent to which machinery is now employed in the manufacture of wrought-iron girders is only to be obtained by a visit to such works as those of Messrs. Moreland. The machines that attracted the most attention were perhaps the riveting machines. The red-hot rivets being put through the plates and angle-irons which form the girder, are instantaneously compressed between the jaws of the machine by one stroke of the piston or "pusher," an ingenious system of gearing keeping the girder suspended in the air all the time, the height of the girder being rapidly regulated and adjusted to a nicety by a lever in connection with a steam crane, and which lever is worked by the man who presides at the machine. The girder is also readily moved in a lateral direction, as it is suspended from a small-wheeled carriage which runs on rails above, motion being easily and rapidly imparted to the carriage by means of a heavy endless chain passing over a fly-wheel, and worked by a labourer. Thus the largest wrought-iron girders are quickly riveted together, there being only two men to each machine. The punching machines excited a good deal of interest, and the visitors witnessed the punching of holes 7in. in diameter in $\frac{1}{2}$ in. iron plates, besides the punching of ordinary rivet-holes. An ingenious iron-plate bending machine was next noticed, and the visitors passed on to the smiths' shops, where several large weldings were witnessed. The various machines and processes were described by Mr. Richard Moreland, jun., Mr. Thomson, the manager, and Mr. Smith, the general foreman of works, and a most interesting and instructive afternoon was spent by the visitors.

Yesterday (Thursday) afternoon, the members visited Messrs. Powell's well-known glass-works at Whitefriars. We shall give some particulars of this visit in our next.

THE PROSPECTS OF THE TIMBER TRADE.

IT is gratifying to know that although high prices are still maintained, there is no immediate prospect of a further advance. Until more is known of the extent of the summer importations, prices will probably rule about the same as during the past three months. The dock deliveries exceed the usual average, but as it is the nature of the timber-trade to progress, there is no doubt but that the average would have been still further exceeded had not high prices checked the demand. Importers will not order from the foreign houses so freely as in ordinary times, and consumers only buy "from hand to mouth." That year by year the cost of wood abroad is enhanced, is certainly true; but there appears to be nothing to justify the enormous rise which has lately taken place abroad. It is quite a mistake to imagine that timber-merchants on this side of the water have anything to do with it; for, in olden times, when the duty on timber and deals was very heavy, and the Chancellor of the Exchequer's Budget was anxiously awaited by the Building Trade, a reduction of the duty was invariably followed by a more than corresponding rise abroad. Without denying to the foreign merchant his right to obtain the best possible price for his goods, it may be very safely assumed that he has been lately raising the price to his own detriment. In looking over the circulars published by some eminent firms, the reader is struck by such observations as these: "The higher import cost of all sawn wood had checked the usual prompt realisation of the ordinary battens and of the flooring-boards of Norway." "Very little progress in selling." "The market has been very quiet." "There has only been a moderate demand." "No sales have been reported;" and so on. No doubt, in many instances, the reverse is said of particular kinds of wood, the well-known scarcity of which and the constant demand for them here, making prices at high rates easily obtainable. Quebec pine, for instance, and S. John spruce, will command high prices for a long time to come; but the quotation of £23 to £25 for first quality bright of the former is far too high for it to be permanent, and this is quoted as the wholesale price. Then to it must be added the cost of carriage from the docks, the labour of stacking it, the interest of money during the time re-

quired for thoroughly seasoning, &c. (and much is involved in " &c."), and, after all, and what is very important to the builder, a fair profit on the outlay. If people, who grumble at their builder's bills, only practically understood the matter, they would sometimes wonder at his moderation.

No one seems to be laying in large stocks. When the rise first took place, there was indeed a tendency to panic in certain quarters, which was taken advantage of abroad. Now, buyers, simply wait or invest as little as possible, and the result it requires no prophet to predict.

Between Messrs. Churchill and Son's published prices on May 3rd and June 3rd, there is little difference, so far as building-wood is concerned, except in pitch-pine planks, which quoted at £13. 10s. to £14. 10s. in May, rise in June to £15. 10s. to £16. 10s., the pitch pine timber remaining in June as in the previous month, viz., from 80s. to 90s. per load. Pitch pine has long been sold very cheap, and there is every probability of its coming into further use.

It is fortunate for consumers of wood that freights are not rising, nor likely to rise. They are quoted as follows:—Quebec £4. 10s. per standard for deals, and £1. 19s. for timber; Dantzig, 16s.; Sweden, 50s. to 57s. 6d.; Finland, 52s. 6d. to 65s.

The last quotations of wood in common use by the building trade are as follows:—

Archangel yellow	... £14 10 0	to £15 10 0
Petersburgh "	... 12 10 0	" 14 10 0
Wyburg "	... 10 10 0	" 11 10 0
Quebec 1st bright	... 23 0 0	" 25 0 0
" 2nd floated	... 20 0 0	" 21 0 0
" 2nd bright	... 15 10 0	" 16 10 0
" floated	... 14 10 0	" 16 0 0
" 3rd bright	... 10 10 0	" 11 5 0
" floated	... 10 0 0	" 10 10 0
S. John spruce	... 10 10 0	" 11 0 0
" battens	... 9 10 0	" 10 10 0
Floating boards per square of lin.:—		
First yellow	... 0 12 6	" 0 13 6
" white	... 0 10 6	" 0 11 6
Second qualities...	0 8 6	" 0 10 6

The prices are very reassuring. They prove, in comparison with quotations three months old, that the worst is, in all probability, passed, and the result of fresh importations will excite no apprehension of a further advance. The same state of things is observable at all the principal ports, and consumers are everywhere adopting the same principle, of buying just what they want and no more. If such a wise course is persisted in, we may look for large arrivals and more reasonable prices before long.

SANITARY AND EDUCATIONAL EXHIBITION.

IN connection with the Social Science Congress, to be held at Norwich from the 1st to the 8th of October next, there will be an Exhibition of Educational, Sanitary, and Domestic Appliances, based on the experiment which proved so successful at Leeds in 1871. The large and spacious Drill Hall has been placed at the service of the Social Science Association (with the sanction of the Government), by the commanding officer. The object of the Exhibition is to bring under the notice of the public generally, and particularly those who are interested in social, sanitary, and educational questions, the latest scientific appliances for improving the public health and promoting education. Among these may be mentioned:—All matters relating to house construction, connected with which are building materials, light, warming, ventilation, and interior ornamentation; flues, fire-places, stoves, boilers, furnaces, gas apparatus; cisterns, baths, piping, filters, fountains, lavatories, and all things connected with the supply and use of water; drain-pipes, tubes, sinks, traps, troughs, closets, urinals, filters; and all plans, diagrams, sections, models, and specimens of sewage and drainage contrivances; cooking apparatus and food-manufacturing machines, culinary utensils, specimens of food adulterations, condensed fluids, preserved meats, light and cooling beverages; disinfectants, deodorants, antiseptics, and other things relating to the prevention of disease and preservation of health; hygiene in clothing and dress; plans and models of school-buildings, forms, desks, books, maps, and other articles used

in teaching; and all sorts of appliances appertaining to the advancement of sanitary science, the promotion of education, and the improvement of the health and domestic comfort of the community at large. The Exhibition will be open to exhibitors from all parts, and the management will be under the superintendence of a Committee. A merely nominal charge will be made for space and admission—just sufficient to cover the costs of preparation and defraying the working expenses.

THE DESTRUCTION OF THE ALEXANDRA PALACE.

MORE than five years ago* we recorded the completion of the Alexandra Palace, which the Princess of Wales was then expected shortly to open. The building had been commenced in 1863 by a company formed to remove to Muswell-hill the Exhibition building which Parliament declined to purchase. This company became involved in financial difficulties, and from the same reason a second company which was started to relieve the first of its liabilities and to complete the palace, failed to accomplish its object. Mr. Fuller's Tontine project also fell through, and ten years elapsed from the commencement of the building to its successful opening under the auspices of the present company.

The building was erected from the designs of Messrs. Meeson and Johnson, and the spacious park in which it stood is over 250 acres in extent. The principal features of the palace were its splendid dome, 170ft. in diameter, and 220ft. high, in the centre transept, with a couple of lofty octagonal towers at either end, one main nave over 900ft. in length, and three cross transepts the middle one 350ft. long, and the two end ones each 300ft. long. The orchestra was seated for 1,000 singers, exclusive of space for instrumentalists. The size of the organ may be conceived from the fact that two steam-engines of 12-horse power each were necessary to blow the bellows, and the central and largest pipe was 40ft. long by 2ft. in diameter. The concert-hall in the north-west transept, had an auditorium which could seat 3,000 people, while the theatre in the south-east transept could seat 9,000 to 10,000, and its stage was the largest and about the finest appointed in the kingdom.

Thanks to the carelessness of some plumbers engaged in the repair of the leadwork of the roof of the great dome, preparatory to its being gilt externally, the building was, in a few hours, destroyed by fire on Monday. The utter inefficiency of the means at hand to stay the progress of the flames rendered all chance of saving the building hopeless. Within twenty minutes from its commencement, the fire had reached the interior of the building, and shortly after the great dome fell, with a crash, into the nave. Fortunately, the valuable collection of pictures was saved, and the loss of life is small in comparison with that which might well have taken place. It is to be hoped that the inquiry which is to be instituted into the cause of the fire will result in the avoidance, in the reconstruction of the building, of several objectionable features which appear to have facilitated its rapid destruction; notably the large quantity of woodwork in the interior, and the inflammable nature of the papier-mâché and canvas lining of the dome. As regards the cause of the fire, nothing we suppose that can be said will ever prevent the recurrence of acts of stupidity similar to that which nine months since nearly resulted in the destruction of Canterbury Cathedral. Notwithstanding the ease with which such accidents may be prevented by the adoption of a simple wire-gauze guard for the protection of any firepot used on the roofs of buildings, we must, until it is made a penal offence to burn down a church or palace, be content to anticipate the constant repetition of such instances of foolhardiness which more than three hundred years ago destroyed the unrivalled spire of St. Paul's Cathedral; which in 1840 partially burnt down York Minster, and the last of which has now robbed the people of the metropolis of a magnificent holiday resort, where, in spite of many difficulties, everything appeared to have been thought of except the most ordinary precautions against the enemy whose attack was most to be expected.

* BUILDING NEWS, Nov. 1, 1867, p. 791.

† See BUILDING NEWS, Sept. 6, 1872, p. 191

OUR LITHOGRAPHIC ILLUSTRATIONS.

HALL AND STAIRCASE AT SOLNA.

We give view of the hall and staircase at Solna, near Roshampton, the residence of Thorsten Nordenfält, Esq., one of the Commissioners for Sweden to the Annual International Exhibition. The whole of the staircase and paneling of hall is executed in pine, stained a dark, rich brown colour, and varnished. The chimney-piece is of American walnut, with fossil marble jambs and fender, the fire-place having tile sides and hearth. The floor of hall is of oak, stained dark, with parquet border. The work was executed by Messrs. Bayes and Ramage, builders, of Mayfair, and the staircase window is filled with stained-glass painted by Mr. Cook, all under the superintendence of Mr. J. M. Brydon, of 39, Great Marlborough-street, from whose drawing (exhibited in the Royal Academy of 1872) the view is taken. This house is an indication of the revival of art as applied to household taste, the whole of the internal fittings, furniture, and decoration having been most carefully worked out from drawings by the architect, designed in the style of old English work, and adapted to suit the requirements of a modern country residence.

NATIONAL HOSPITAL FOR INCURABLES, COWLEY S. JOHN, NEAR OXFORD.

The foundation-stone of this hospital was laid by H.R.H. Prince Leopold, on the 6th of last month, and is intended to offer a well-regulated home to such persons as, being afflicted with incurable disease, are unable to find elsewhere the comforts which they require, and especially when their relations can contribute some small payment, to assist in providing for them the necessary attendance which could not otherwise be obtained without much expense. While equal attention will be paid to sufferers of every denomination or creed, the character of the Institution will be strictly that of the Church of England. The chapel of the Institution will also be a Chapel-of-Ease to the district. The advantage to the patients accruing from this arrangement will be very great, as it will afford them the cheerful consciousness of worshipping along with others who are not afflicted as themselves, and of hearing instruction from the pulpit without the feeling that they are being preached at as a special class, whose circumstances being well known to the clergyman, suggest to him a different line of teaching from what would be given to a parochial congregation. Any patient who is not a member of the Church of England will be allowed to receive, at stated times, the visits of a minister of his own denomination, if he express a wish to that effect. Several of the eminent medical men of Oxford have volunteered their services to the Institution.

One half of the building is intended for male patients, and the other half for female; the small wards, numbered 2 on plan, will be so arranged that by the opening of shutters the patients will be able to see and hear the services without leaving their rooms; there will be similar wards on the first-floor, immediately over them.

The buildings will not be placed due east and west, as the introduction of the church on the ground plan implies, but will be so placed that none of the living-rooms will have a northern aspect, but that all shall have the sun on them some time during the day.

Probably not less than £50,000 will be required for the completion of the building, but it will be carried on gradually as the funds may allow. The contract for the first portion, now being erected, has been taken by Messrs. Honor and Castle, of Oxford, Mr. C. Buckeridge, of 20, Prince's-street, Cavendish-square, London, being the architect.

References to Ground Plan.—1, church; 2, wards looking into church; 3, house-surgeon; 4, waiting-room; 5, dispensary; 6, stores; 7, patients' rooms; 8, common-rooms; 9, lady warden; 10, waiting-room; 11, lady warden's servant; 12, nurses' rooms; 13, ward sculleries; 14, w.c.; 15, dining-halls; 16, kitchen; 17, pantries; 18, plate-rooms; 19, sculleries; 20, larder; 21, china; 22, stores; 23, servants' hall; 24, staircases; 25, bath-rooms.

NEW TOWN HALL, BOLTON.

Last week we gave a general account of the opening of this important building. This week we give an illustration of the building, with ground and first-floor plans. The following de-

scription has been kindly forwarded by the architects, namely, Mr. Wm. Hill, of Leeds, and Mr. George Woodhouse, of Bolton.

The site of this hall is admirably adapted for giving effect to the proportions of the structure, having on one side the old market-square, and a large open space also at each end. The building covers an area of 3,322 square yards, exclusive of that occupied by the steps to the portico. The block of the building is a parallelogram, almost square, with a portico on the east front, or the side towards the square, and similar projections on each of the other fronts. The net length of the east front is 174ft. and the net depth 144ft.; the extreme dimensions, including portico and other projections, being 204ft. long, by 177ft. wide.

The style adopted is the Corinthian, based upon Grecian models; and as from the nature of the site each of the four fronts are of public importance, the order is continued with varied treatment round the whole building, the intercolumniations, except portico, having two ranges of windows, and the entablature is surmounted by a balustrade, with vases on pedestals over each column and pilaster.

The east or principal front has in the centre a handsome portico, approached by a bold flight of steps, with pedestal to upper portion at each end, on which lions, sculptured in stone, are to be placed. The portico is surmounted by a pediment, which is filled by sculpture executed by Calder Marshall, Esq., R.A. The figures are full relief statues, on a scale of 8ft. The central figure represents Bolton, with a mural crown, holding a shield bearing the borough arms. On her right hand is Manufacture, with a distaff, and leaning on a bale of goods; near her is a cylinder and wheel; and in the angle is the Earth, pouring out her gifts from a cornucopia, and a Negro boy bearing a basket of cotton. On the left hand of the central figure is Commerce with the Caduceus and a helm, and in the angle is the Ocean, and a boy holding a boat by the bows. The portico is flanked on each side by a loggia. The projecting portion in the centre of the north front has three-quarter columns, and that on the south front similar pilasters.

The total height of the fronts, to the top of the balustrade, is 63ft.; but the great hall rises out of the centre to the height of 81ft., and has at the four angles a ventilating turret 10ft. square, and 22ft. additional in height.

The tower, which stands over the entrance vestibule, and rises to a total height of 500ft., is a conspicuous object for miles around, and contains a clock, with four illuminated dials, 11ft. diameter, also bells to strike the hour and chime the quarters.

The basement story is faced with stone from the Horwich quarries, also the tower above the roof; the columns and pilasters for the east front are from Darley Dale, the remainder of this front is of Halifax stone; the north and south fronts are of Huddersfield, and the west front of Longridge stone.

The principal entrance is by the portico in the east front, and gives access to a vestibule 21ft. square, communicating directly with corridors 10ft. wide, on each side and end of the great hall, giving continuous communication round the latter and ready access to the borough court, council-chamber, and offices generally. In connection with these are four principal staircases, placed one at each angle, having outer entrances in the basement story and continued thence up to the first-floor. In the centre of the north and south fronts there are also separate entrances and staircases, the latter extending only to the principal floor.

The great hall occupies the centre of the principal floor, and is placed parallel with the east front; it is 112ft. in length, 56ft. wide, and 56ft. in height. At the south end there is a recess of apsidal form, 33ft. by 20ft., with a semi-domed ceiling, in which the organ, now being constructed by Messrs. Gray and Davison, of London, will be placed. There is a gallery on each side and one end of the hall, approached from the corridors on the first floor, and having semi-groined soffits, supported by pilasters. The principal ceiling is flat, divided into bays by bold moulded ribs, but having large coves at the sides and ends, arcaded for the semi-circular lights above the entablature, the latter being supported by Corinthian pilasters, resting on a dado of parquetry. Including the gallery, the great hall will accommodate 1,800 persons seated, for the ingress and egress of whom there is ample provision by ten doors from the principal floor, and eight from the gallery, all opening direct

into the spacious corridors. Two retiring-rooms are provided under the platform.

The borough court is also on the principal floor, on the west side of and parallel with the great hall; it is 51ft. in length, 41ft. wide, and 37ft. in height. At the south end is a recess for the bench, and at the other end a gallery for the public, entered from the first floor corridor, and having underneath waiting and retiring-rooms for jurors.

On the south of the court is the magistrates' room, having doorway direct to the bench. In succession along the west front are a room for the magistrates' clerk and one for the clerk of the peace and borough prosecutor conjointly. On the south front are two rooms for barristers and solicitors, communicating by a balcony over the central entrance in south. On the north of the court are two rooms for witnesses. In the centre of the north front are general ante-room, gentlemen's and ladies' retiring-rooms, with communicating balcony between the two first named.

North of the entrance vestibule are two offices for the borough treasurer, with strong-room attached. South of the same are three offices for the borough surveyor. Connected with both these suites of offices are private staircases communicating with the basement story. On the first floor, and immediately over the entrance vestibule, is the mayor's reception-room, 21ft. square, and 34ft. high. In each angle detached columns and pilasters support the entablature, which is surmounted by boldly panelled arcades, from which spring a richly panelled ceiling.

On the south side, and in communication with the last-named room, is the mayor's dining-room, 68ft. by 24ft., and 24ft. high. At each end a recess is formed by columns and pilasters on each side, greatly improving the proportions of the room, which otherwise might appear elongated. This room has also a continuous entablature, with coved and panelled ceiling.

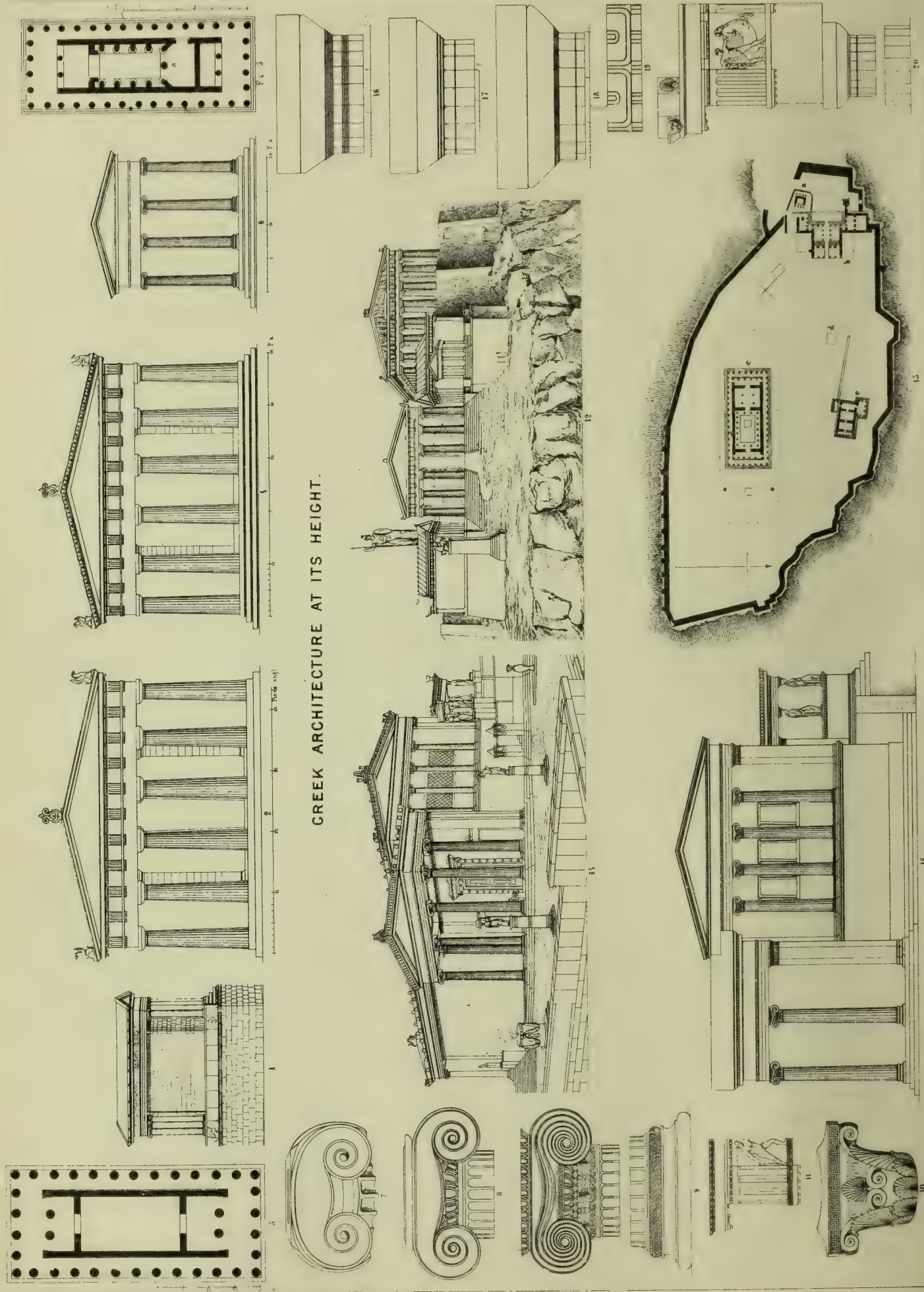
On the north side of the reception-room are three offices for the town clerk, with strong-room attached. In connection with this suite of offices there is also a large strong-room over the reception-room with private staircase to same.

The council-chamber is in the centre of the north front, and is 47ft. by 32ft., and 22ft. high. At the west end of the room is the Mayor's entrance, by an arched porch, flanked by coupled pilasters. At the opposite end there is a raised stage or gallery for the public. Round the room there is a dado of parquetry; the side windows have moulded arches, the opposite wall being arcaded to match. Over the whole is an entablature, boldly coved, which, with the numerous panels into which the ceiling is divided, produce a rich effect.

The Mayor's parlour is at the west end, and communicating with the chamber by the porch before described.

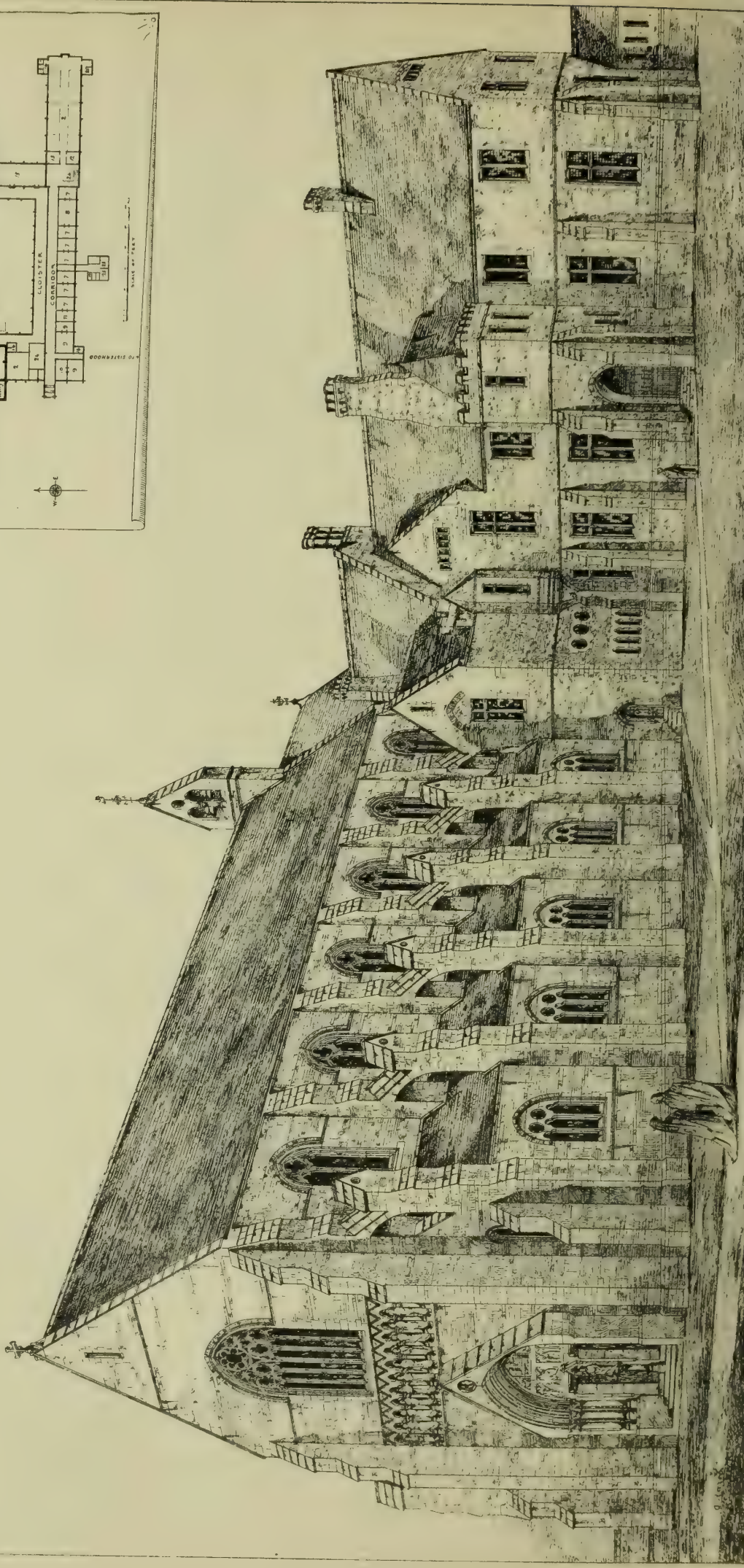
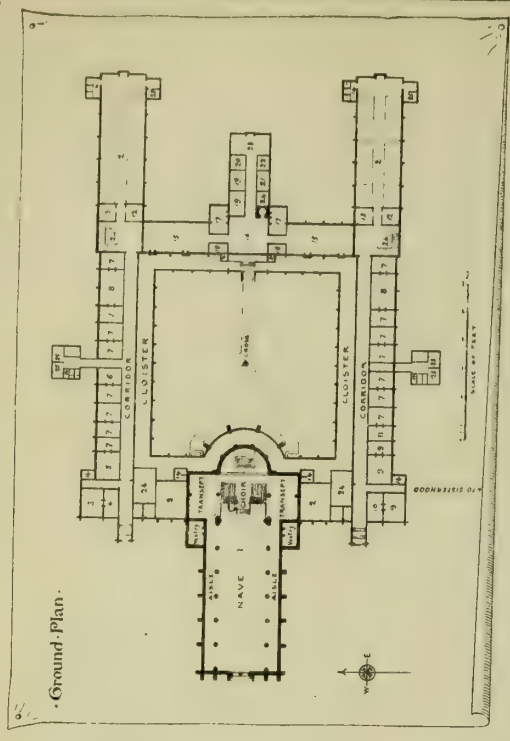
Further west is a committee-room, and on the west front, separated from the last named by one of the principal staircases, is another committee-room. Proceeding southwards along the west corridor, there is the upper portion of the Borough Court, and immediately adjoining, the grand jury-room, communicating with a small gallery or balcony on each side of the court. Beyond this is another committee-room and a refreshment-room. In the centre of the south front are two spare rooms, which have not yet been appropriated.

In the basement story most of the minor offices are arranged, those for the waterworks being on the southern portion of the east front, with strong-room and store under the entrance vestibule and portico. The northern portion of the east front contains the Rate Office and Pay Office in connection with Borough Treasurers' department. In the centre of the north end are two offices—one for the Nuisance Inspectors, the other for the Medical Officer of Health and Borough Analyst. In the north-west angle are dayroom and bedroom for the porter; also an office for the Inspector of Weights, &c. On the west side there are under the Borough Court twelve cells, and separate yards for male and female prisoners; also staircase leading up to the dock in the court-room. Southwards of these are office for police clerks, receiving office, and general and private offices for Chief Constable. In the centre of the south end are two rooms—one for the detective department, the other for the Inspector of Lighting. Under the great hall is a large room for police parade, with waiting-room for police at one end; also room for heating-apparatus and cooking-kitchen.



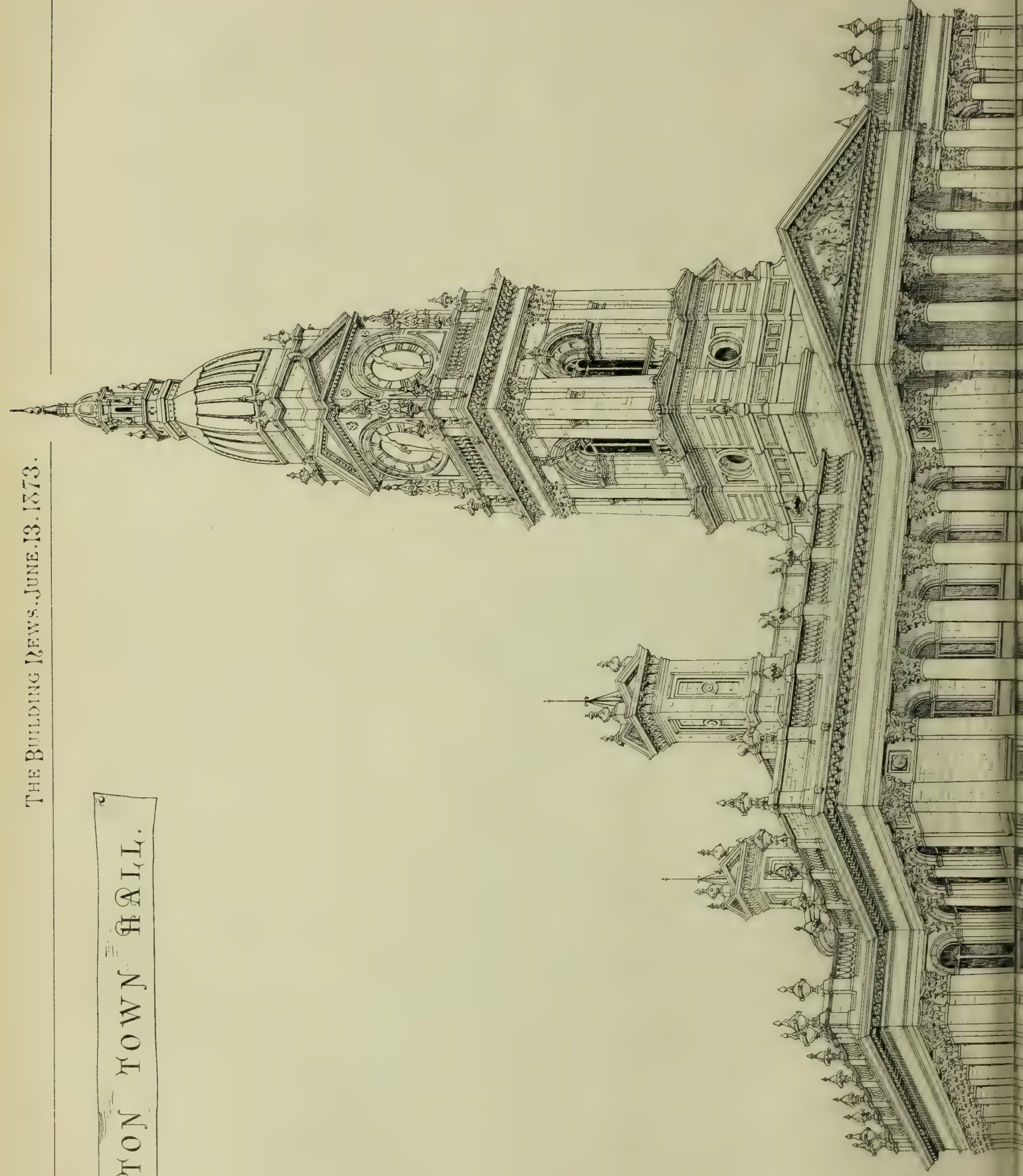
GREEK ARCHITECTURE AT ITS HEIGHT.

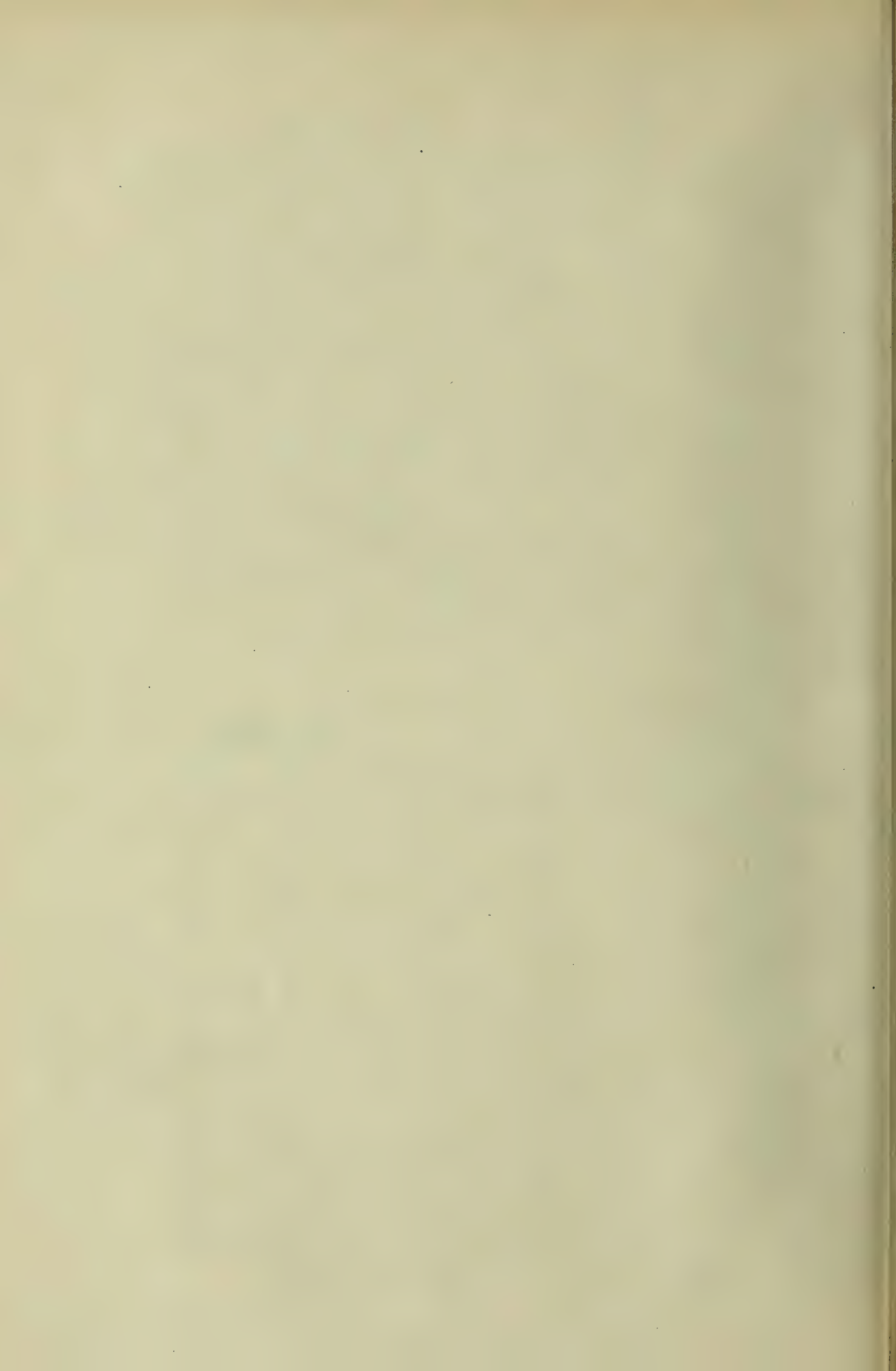
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with District Church of S. Mary the Virgin & COWLEY ST. JOHN.
OXFORD. Charles Buckenidge Architect PRINCES STREET LONDON W.



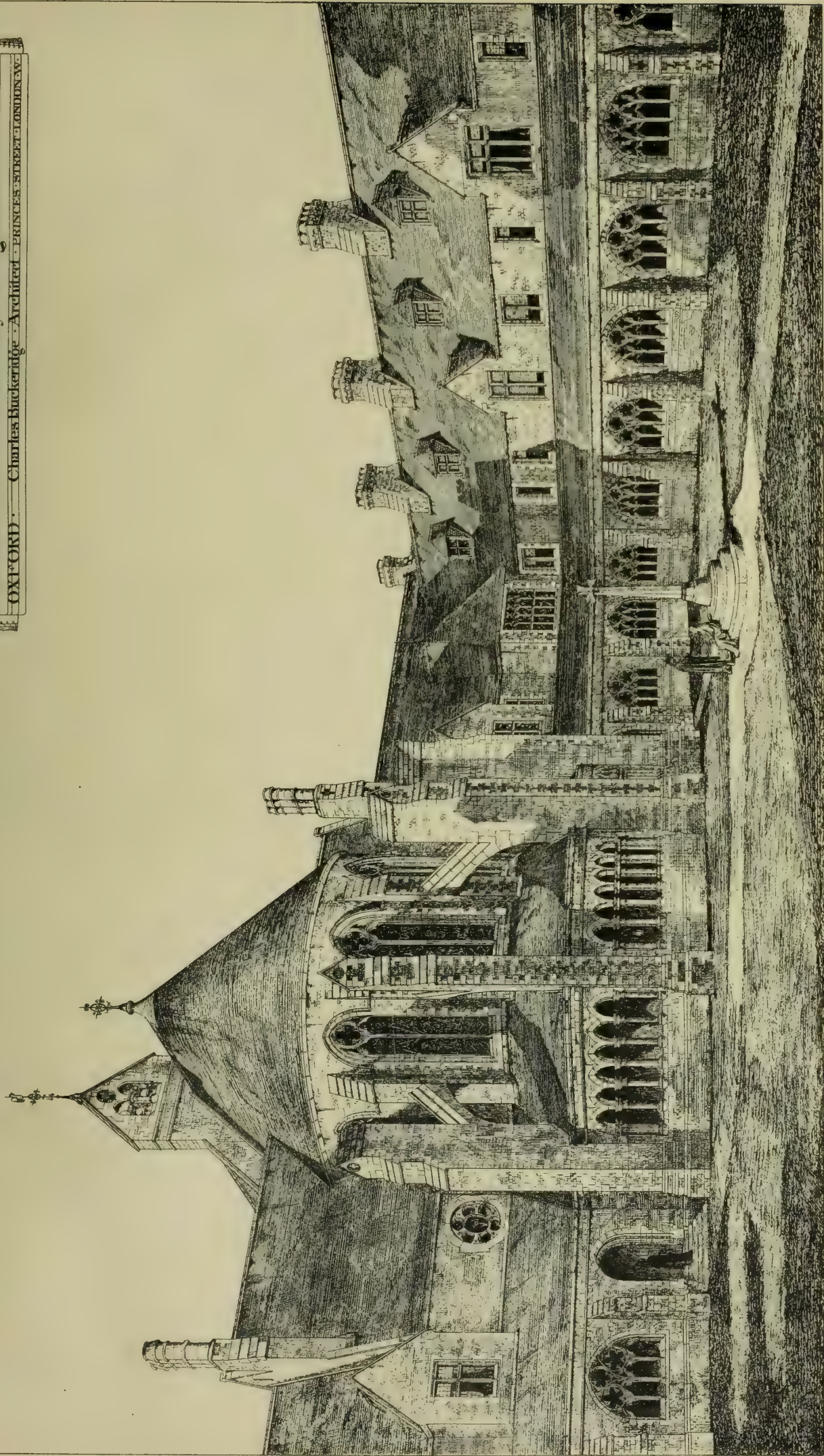
THE BUILDING NEWS, JUNE 13. 1873.

BOLTON TOWN HALL.





National Hospital for Incurables of St John the Evangelist &
with District Church of St Mary the Virgin & Cowley St JOHN
OXFORD. Charles Buckridge Architect PRINCE STREET LONDON W.C.



"Solna" Roehampton, Surrey.



The Hall and Staircase.

J. M. Brydon Arch^t

HISTORIC ART STUDIES.

By DR. G. G. ZERFFI.

GREEK ARCHITECTURE AT ITS HEIGHT.

(With Illustrations.)

THE principal characteristics of Classic Greek architecture were the following:—1. The constructing element was free, independent, and master of its own form. 2. The temple served to enclose some divine conception petrified in human form, and was neither the symbol of an astronomical nor of a metaphysical mystery. 3. Architecture, freed from all secondary motives, became its own purpose. Fettered by no hierarchical influences, the two conflicting elements, the static and dynamic forces in nature, were never better and more intelligibly expressed than in Greek architecture. Whatever tends towards the centre of the globe can only be opposed in lines radiating from that centre. This principle is most distinctly brought out in the horizontal architrave and the vertical supporting columns. The sustained and sustaining elements are separated, and yet united by the capitals of the columns, which at the same time mark the conflict between them with clear simplicity.

In all other architectures the wall is made the principal element of support; but this is incorrect, for the wall has not only to sustain but also to enclose and to fill the spaces between burden and support. That the column should be free from any secondary element is essential to its beauty; this we unconsciously feel, but only learn to understand through the study of Greek Classic works. The simplicity of Greek architecture has led to a severe, and at the same time correct, appreciation of symmetry and proportion. There must be a relation between burden and support, for it is impossible that a thin, thread-like column should sustain a colossal block two or three tons in weight. The column had, therefore, to be in harmony with the architrave, and the architrave and pediment had to be constructed in accordance with the supporting capacity of the column. Burden and support could only be related according to the laws of gravitation, if placed at right angles, as the simplest expression of the two conflicting forms in nature. The frieze was formed by the projecting beams of the roof, which, with the alternating squares, the metopes, produced eurhythmia. The frieze again terminated in the projecting corona, which harmoniously finished the edifice. The columns and the roof alone could not form a perfect enclosure, and, therefore, walls were also used by the Greeks. These walls were placed in straight lines at right angles; because, if raised at an acute or obtuse angle, a feeling of insecurity would have been produced. Columns and walls were never placed at random in Greek Classic architecture. The column was never deprived of its isolated position, and was never used as superfluous ornament of a wall. We can study the genial and youthful life of the Greeks in their temples. Under the prostyles and amphiprostyles—the single and double rows of columns—men could not have been otherwise than free and happy. The people were only partly confined in their temples; they were always in close union with nature. Wherever the Greek turned he saw the bright sun, the undulating wooded hills, or the distant sea; and the blue ether surrounded his temples with a halo of ideal brightness and beauty.

When Athens was raised to the supreme rule, the Athenians commenced rebuilding their sanctuaries which had been pillaged by the Persians. After Themistokles had fortified the Akropolis and the harbour with powerful walls, Kimon directed his attention to beautifying the abode of art, science, and philosophy. The small but elegantly finished temple of Niké Apteros (see Fig. 1) was probably erected in commemoration of the double victory on the Eurymedon, in the year 469 B.C. (see Fig. 12, and *a* in Fig. 13, for the position). This beautiful temple was destroyed

by the Turks in the 17th century, and a battery erected in its place; but it has recently been restored. It formed the artistic apex of the southern side of the Akropolis. The temple, which was only 27ft. long by 18ft. broad, was dedicated to the wingless goddess of victory, and stood on a high sub-structure, an exquisite model of a tetrastylus amphiprostylos in the Ionic-Attic style. The forms were rather heavy and compressed, and the Entasis very marked. Of the excellent sculptures ornamenting the frieze we gave a specimen in Fig. 12 of the illustrations to the BUILDING NEWS of the 16th May, 1873, and assigned them to a period when the Periklean spirit of peace had already fled, and other feelings inspired the artists. The temple of Theseus (see Figs.—2, elevation; 3, ground-plan; 11, frieze and corona; 18, capital; and 19, details) which was commenced under the administration of Kimon, is one of the best preserved monuments of Greek antiquity. It was, as may be seen in the ground-plan, a peripteros consisting of six columns in front and back and 13 at the sides, and was undoubtedly one of the noblest works in the Doric-Attic style. An harmonious symmetry pervades the whole of this temple. The dimensions are moderate—45ft. broad by 104ft. long. It is provided with a pronaos and posticum. The average distance between the columns was $1\frac{2}{3}$, and their height $5\frac{1}{2}$ modules, taking the diameter as unit. The Echinus (see Fig. 18) is sharp, yet moderate in its projection, and powerfully connects burden and support. The temple of Apollo Epikurios at Bassæ, near Phigalia in Arkadia, erected from the plans of Iktinos, the architect of the Parthenon, shows the predominance of the Attic style on the Peloponnesus (see Figs.—4, front elevation; 5, ground-plan; 7, capitals of interior columns; 10, capital in a primitive Corinthian style; and 16, column of Peristyle). The front elevation greatly resembles that of the temple of Theseus, but the ground-plan varies considerably in its dimensions. Provided with a pronaos and posticum, and a Doric peristyle, it is elongated, has 15 columns on the sides, 6 in front, and is 125ft. long, whilst the breadth is only 47ft. The most remarkable feature in the building is the *Hypæthron*. Five pillars with Ionic capitals (see Fig. 7) served to support the roof in the interior of the Cella. The capital (Fig. 10) is undoubtedly of Assyro-Egyptian pattern, and is said to have adorned only the one column marked *a* in our ground-plan. The distances between the columns were one module and two-fifths, and their heights five modules and three-sevenths. The Abacus (see Fig. 16) does not, as was usual, project over the Echinus, and this must have produced a rather clumsy and unpleasant effect. Whilst the two preceding temples were constructed of pure Pentelic marble, this was of greyish calcareous stone, with the exception of the roof and the sculptures. The temple on the Ilissos at Athens (see Figs. 6 and 8) resembles the temple of Niké Apteros in its treatment and details; it still existed in the last century, but is now only known by sketches taken from it. Whether it was dedicated to Artemis Agrotera and Demeter, or to Panops or Triptolemos, is undecided. It was a Tetrastylus Amphiprostylos, 19½ft. broad and 41½ft. long, and was placed on three steps. The capitals of the columns show (see Fig. 8) the temple to have been of the Ionic order, with strong Attic influences. The bases of the columns have a deep fluting between two ovolos, and express on a small scale the tapering of the shaft of the pillars, as the lower ovolo projects further and is more strongly formed than the upper. The columns are more slender, being eight and two-thirds, and the distances between them two modules, giving the building a less compressed aspect. It was probably of a later date than the temple of Niké.

The Akropolis of Athens, with the Parthenon and the Propylæa (see Figs. 12 and 13),

was the site of the most revered sanctuaries and chiefest art treasures of Athens. Simplicity and magnificence vied with one another, and neither Classic nor modern art has produced anything to surpass in taste, harmony, or beauty of style, these productions of Greek art. The legend of the Phoenix became truth in the Parthenon, for a new temple consecrated to the Maiden Goddess rose from the ruins of the old, and far outshone it in richness and grandeur. This temple received the name Hekatompedon (the "hundred-footed") and its ruins are even now the most glorious relics of Classic art. We give in Fig. 12 a sketch of the western side, with a view of the Propylæa. To the left we see the colossal statue of Athené; to the right the splendid structure of the Parthenon, and in front of the right wing of the Propylæa the small temple of Niké Apteros. Sixteen years sufficed for the completion of this masterpiece of architecture (438 B.C.). It was planned by Iktinos and Kallikrates; and was of the purest Pentelic marble, 228ft. in length, 101ft. broad, and rose to a height of about 59ft. at the point of the pediment. It was a hypæthral Perypteros in the Doric style (see *c*, Fig. 13, ground plan). Eight columns by seventeen, 6ft. in diameter, rising to a height of 34ft., surrounded it. The Doric style in the Parthenon reached the very perfection of delicate elegance. A string of ornamental beads above the triglyphs, giving greater richness to the corona, reminds us of Ionic influences. The entrance was, as usual, in the east. The cella measured 98ft. by 63ft., and was divided by two rows of pillars into three naves. The Posticum led to a special Opisthodom, in which the state treasures were probably preserved. The severe but, at the same time, charming treatment of the details, may be seen in Fig. 20, representing part of the corona, the frieze, the architrave, and the capital and part of a column. The sima terminated in lions' heads, and the corona was decorated with antefixæ in the form of palmettes on Ionic volutes of a decidedly Assyrian character.

The Propylæa, the gates leading to the Akropolis (see Fig. 12) were constructed immediately after the completion of the Parthenon, and were finished in five years (431 B.C.). They were the work of the architect Mnesikles, and combined the rich softness of the Ionic with the severe simplicity of the Doric style. The central building was about 68ft. in breadth, and 54ft. in height at the point of the pediment, and was constructed in the form of a deep porch, with five openings (see Fig. 12). On either side stood buildings with Doric colonnades opening into the court, and serving as a means of defence and as ornaments to the gate. The ceiling of this porch was the pride of the Athenians. A central road, flanked by steps, led to the porch, in which grandeur and elegance were admirably combined. In Fig. 17 we have an evidence of the fact that this temple was constructed in the Doric style.

Fig. 14 gives the general view, and Fig. 15 the elevation, of the western side of the Erechtheion. In addition to the temple dedicated to Athené; the old sanctuary consecrated to Athené Polias and to Erechtheios, the Attic Adam, the first man, the Autochthon, stood on the Akropolis. This place of worship had also been destroyed by the Persians, and was rebuilt about 409 B.C., after the death of Perikles. It was a small building on the northern declivity of the Akropolis (see Plan—*e* in Fig. 13). It contained the holy olive-tree, planted by Minerva, the salt-spring of Poseidon, and many other relics. Irregular and complicated in plan and construction, this temple was an exception to all others. It was used in later times as a Christian church, then as a Turkish harem, and lastly as a powder-magazine. It has been an object of the most animated contention to archaeologists. The style—a mixture of Ionic and Attic elements—was as peculiar as the

plan. The entrance to the sanctuary itself was in the east. The pediment rested on a prothesis of six columns. On the opposite western side, the elevation of which we reproduce in Fig. 15, the building was closed by a wall, ornamented with four half-columns in harmony with the front hall. Between these pillars windows were inserted, to provide light for the interior. The principal body of the building measured from east to west 72ft., and was 37ft. broad without the side-hall. On the northern side was a pretty deep porch, the roof of which rested on six columns—four in front and two on the sides (see Fig. 14), from which a magnificent door, the framework and corona of which are still in existence, led into the interior. Passing through, in a diagonal direction, a smaller porch on the south side was attained, similar in design to that on the north. Here the architect used the stately forms of maidens on a high parapet as Karyatidæ to support the beautiful Ionic ceiling of the porch. (See Fig. 13 of the illustrations in the BUILDING NEWS of May 16, 1873.) Some archaeologists, with a turn for dogmatism, have pronounced a rash and unfounded judgment on the Erechtheion. They consider it to be without symmetry, proportion, or harmony of plan—in fact, a kind of checkered plaything, constructed as a mere architectural curiosity. If, however, we suppose, as we are certainly justified in doing, that the walls have been destroyed, and that the war-cry resounding through the Peloponnesus caused the temple to be left unfinished, the unintelligible quaintness would disappear. Some remains of the details, which are still extant, afford tangible proofs of graceful treatment in the decoration. An Asiatic element of voluptuousness is apparent in the richly decorated Ionic capitals (see Fig. 9). The volutes are full of life. Between the volutes and the echinus decorated with the egg-ornament, is a strong cushion decorated with guilloches; under the echinus the elongated neck is adorned with flowers and palmettes, and finished off with a pearl staff. The ceilings of both the porches were richly decorated in colours, especially with gilt bronze rosettes, placed in elegantly-sculptured and decorated cassettes. In the Temple of Athénè Polias, the celebrated golden lamp of Kallimachos, which only required filling once a year, was preserved. We shall observe that gradually the stern and severe elements of Classic simplicity became rarer. The architects wished to surpass one another in originality; the decorator appeared in the foreground, while the architect only constructed spaces for the ornamentist to work upon. The simplicity of forms gave way to soft richness and over-decoration, and finally buried Greek taste, chastity of design, and elegance of composition in the ruins of Greek freedom and national independence. Art became a hard-working handmaid in the service of despots, or vulgar but rich private individuals, and sank, step by step, lower and lower. A diligent study, however, of the few remains of Greek Classic art will work wonders, even in our times; for through their influence we may acquire two most important elements of architecture—simplicity, and clearness of design.

SOME OF THE REMAINS OF OUR REMOTE ANCESTORS IN WESTERN BRITAIN.

ON Thursday, the 5th inst., Mr. R. Burchett, of the Science and Art Department, Head Master of the National Art Training School, South Kensington, delivered a lecture on the above subject before the members of the Society, for the Encouragement of the Fine Arts, 9, Conduit-street. The lecturer said that the common and popular opinion on the state and habits of our ancestors, at the time when, by the invasion of Julius Cæsar, they first took a generally recognised place in the European family of nations, had been formed by their conquerors, and had left a general be-

lief that they were a mere horde of naked and tattooed savages, without arts or culture. Modern historical and antiquarian research had done much to alter the opinion upon this subject; but unfortunately, those who took an interest in these studies were too few. Many here would probably remember the fable of "the Lion and the Man," which told us that a man who had a great admiration for lions in general, and who had contracted a friendly intimacy with one particular lion, invited him to visit and inspect a fine house he had built and richly painted. The lion came, inspected the house and pictures, which related to man's connection and struggles with the race of lions, and in which man was uniformly represented as victor. After viewing the pictures, the lion remarked that they were very well, but he thought they would have been somewhat different if the lions had painted them. Probably our ancestors would have fared better had they written the history of their struggles with the Roman conquerors. When we remembered how many races had passed over the settlement of our first ancestors in this island, we might wonder that the vast earthworks of "Old Sarum" still existed. He (the lecturer) proposed to bring to the notice of his hearers some remains, still existing, of our remote forefathers that were to be found at the high-water-mark of the early colonisation of the British islands, from which, watching the setting sun, no land intervened between us and America. Believing in a close kinship of the families that in remote ages peopled the British islands, he held that the first influx of settlers came from the opposite coast of Gaul, that the south and south-east of Britain or Albion first received them, and that wave after wave they had spread over the land until the farthest northern and western limits had been reached. To prove this the lecturer adduced the 3rd book of Livy, with reference to Ambigatus a king of the Kelts, who sent away his sister's sons Sigovesus and Bellovesus, of whom the first went to the Hyrkian Forest, whilst the latter turned to Italy. This leader had taken with him seven of the neighbouring tribes, and arrived with an immense body of horse and foot at the Alps, which were crossed. This migration extended in point of time over 213 years. The extent of the Kelts or Gauls was hereby clearly shown, and Professor Huxley also assumed that the whole population of the British islands, so far as their language was concerned, had been Keltic. All the accounts which had been handed down to us by the Romans and the Greeks of the people whom they called Gauls or Kelts agreed that they were of tall stature, had fair hair of a reddish or yellow tinge, blue eyes, and fair skins. Such were the descriptions also given by the old Irish bards of their heroes in the poems which handed down to us the traditions and stories of their heroic age. Thus, in a poem said to have been composed by Fergus Mac Roy, at or before the beginning of the Christian era—the subject of which was a great raid of the warriors of Connaught upon the inhabitants of Ulster, in which Fergus had been a principal actor—the Queen of Connaught was thus described: "a great, modest, white-faced, long-cheeked woman, with yellow hair on her, flowing over both her shoulders." The prophetess was said to have had bright yellow hair like gold; three tresses were banded over her head, and her other tresses hung down to her waist behind her. The King of Ulster, Conor Mac Nessa, was of fresh appearance; and his yellow brown hair hung down before him and behind his shoulders to the small of his back. He had an undefiled, rosy, clear countenance; and his dark blue eyes lay shaded under their lashes. To refer to a poem composed—the lecturer did not say written—in Ireland as early as the beginning of the Christian era, might excite surprise, if not incredulity; but the "Book of Leinster," a well-known and most valuable compilation of the middle of the twelfth century (say 1150) referred to this poem, "The Tain Bo Cualgne," or The Cattle Spoil of Cooley. Whitaker, the learned and critical author of the History of Manchester and "The Genuine History of the Britons Asserted," expressed the opinion that Britain had first been peopled from Gaul about 1,000 B.C., or about 50 years after Homer, and about 180 years after the siege of Troy; that in about 500 years the population had spread as far north as York; that about 350 years B.C. a fresh colonisation of Belgæ took place, extending probably over the whole south coast, from Kent to Cornwall, and reaching inland perhaps as far as a

line drawn from London to Bath, producing a further progress, northward and westward, of the earlier settlers. According to Whitaker, the first population of Ireland took place about 350 B.C., in consequence of the Belgic invasion of the south of England. This gradual and slow spread of population might be well understood if we remembered that the movement must have been accompanied by the production of things necessary to existence, and that in this case there were no cities to pillage, no enemy to subvert upon. Having thus summarised what was known and what was probable of the progressive colonisation of this island, and the gradual spread westward and northward of the growing population, the lecturer proceeded to take his hearers to the Bay of Galway, where the settlers became builders of the works the present condition of which he proposed to describe more particularly.

(To be continued).

CAPTAIN E. D. LYON ON THE MYTHOLOGY AND TEMPLES OF INDIA.

THE following is the substance of a lecture recently delivered before the Royal Institution by Capt. E. D. Lyon; Wm. Spottiswoode, LL.D., in the chair.

India is the brightest appanage of the British crown, containing as it does about one hundred and forty millions of inhabitants; and yet how little is known about it! Most persons have heard of an Indian temple or pagoda; but such words are not known in India, the word used being *Devila*, which means "the house of God," and what English people call a pagoda is nothing but the door or entrance to the building of God. The difficulty of obtaining information on the subject of the Hindoo religion in India is very great. The Anglo-Indians are far too much occupied to trouble themselves on such matters, and the only persons of whom inquiries can be made are the Brahmins and the missionaries. With the former, experience teaches that the application of silver to their hands has a wonderful effect on their tongue, and if you only apply enough coin you may get any amount of information; but then comes the difficulty of separating what is true and what is imaginary. As to the missionaries, it is hardly likely they will take the trouble to study much a religion which they have come to try and root out. One of them declares that in India the natives worship three hundred and thirty millions of gods; but the real truth is, the Hindoos worship only one supreme Deity, whom they look on as too sublime, too grand, too awful for their minds to conceive. They never address any prayer to him; they have never erected any temple to his honour, and they would consider it sacrilege to do so. All their prayers are addressed to one of his triune personifications—Brahma, Vishnu, and Shiva. Brahma personifies creation; Vishnu, preservation; and Shiva, destruction. These three agree in one; for though at first sight it might appear difficult to reconcile creation and destruction as agreeing; still, when it is remembered that, with the Hindoos destruction is in reality re-creation, the coalition is easy. In former times the worshippers of the three divinities also agreed and used the same forms of worship and the same temples, as is proved by the older temples containing close together representations of the three deities; but of late years they hate each other with as fanatical a hate as is to be found in the Western world.

Captain Lyon then began the exhibition of his photographs, enlarged by the camera and illuminated by the electric light, first introducing the god Ganesa, one of the most noted in India, and the one which every Hindoo prays to before commencing any undertaking. Before he begins a journey, before he builds a house, he prays to Ganesa—"O glorious and immortal Ganesa, grant me success in what I am about to undertake!"

"I have already mentioned," said Captain Lyon, "the Indian temple or house of God. I must now explain that the temple is composed of four parts: the Gopurum, or gateway, much resembling the Egyptian Pylon; the Mundapum, or porch; the Teppa Kolum, or tank; and the Vi-manum, or sanctuary. The three first I will show you; the last is a low oblong room, perfectly plain, into which no ray of daylight is ever permitted to enter. It is here the idol is kept, and no one but a high-caste Hindoo and a royal prince is allowed to enter and if a prince goes in, he must go quite alone.

"The first temple of which I shall show you a view is that of Seringum, near Trichinopoly. It is one of the largest in India. You see the Gopura which marks the entrances from one court to another. The base is of stone, and the pyramid of brick covered with plaster, out of which all the figures are made. There are twenty-three of these Gopura in this temple, and 8,000 Brahmans live in it; but you must not suppose all the Brahmans are priests. It is from among the Brahmans that the priests are chosen, as among the Jews it was from the tribe of Levi the family of Aaron was chosen for the priesthood.

"A mundapum, or porch, of which literally thousands are to be found in India, is composed of eight stones, say 8ft. long and about 2ft. square. Take four of these and put them upright in the ground, lay the other four along the top to form a roof, and you have a mundapum; and whether of immense size and beautifully carved, or quite plain, the shape and form are the same.

"In the view before you each group of horses, animals, and figures, are cut out of one block of granite, 15ft. high, and it forms the front of one of the mundapa in the Seringum temple. The Teppa Kolum, or tank, which you see in this view, is also in the Seringum temple, and is the third part of a Hindoo temple, as already mentioned. At a festival in January, the god is put on a boat, and drawn twenty-one times round the pavilion which you see in the middle, the Nautch girls dancing and the band playing.

"Madura, the Rome of the Hindoos, is the next place to visit. Here we find the celebrated Puthu Mundapum, built by Trimul Nayak, the last king of Madura. He asked the god to come and pay him a visit; and the answer was, he had no house fit to receive him. The king erected this wonderful building, which cost one million sterling and took twenty-two years to complete. It is 338ft. long, by eighty-one broad. The roof is supported by 128 pillars, each of which is a solid block of granite twenty-five feet high, and all most beautifully sculptured.

"You have heard of the Juggernaut car, which is the next view. The god, besides his row on the tank, must have his car in which he is drawn about on a certain day every year. The whole population of the neighbouring villages assembles; the god is brought out, covered with jewels, and being carried to the top of the car by means of an inside staircase, the enormous ropes are attached, and being seized by thousands of men, the ponderous mass begins slowly to move; and what with the shouting of the men, the singing of the women, and the dancing of the Nautch girls, the scene is one never to be forgotten. The excitement becomes at last so intense that one hardly wonders that the fanatics become absolutely mad and that it is with difficulty the police, appointed by the government for the purpose, can restrain them from throwing themselves on their backs on the ground, and opening their legs, permit the wheels of the machine to pass over their bodies, welcoming so horrible a death in the belief that it will insure to them beatitude hereafter.

"Farther south we shall see the Monolith at Kalogoomulla, which not six white persons have ever seen, and a very few even know of its existence. For some reason the Brahmans will not tell any one of its whereabouts; and when questioned, deny all knowledge of it. It is cut out of a solid block of dark granite, and stands perfectly isolated. No worship of any sort is ever performed there, and it is not known when or by whom it was erected or for what purpose.

"At Tennevelly, yet farther south, are four gigantic figures, each cut out of a solid block of a dark green stone, said to be a mixture of trapstone and hornblende, twenty feet high. The one you see is the Kama Deva, or Indian Cupid, who was born with a bow and five arrows; and on asking Brahma, his father, for what purpose these were given to him, was told that to him was given the power to inflame mankind with love, and thus people the world. He thought he would try his arrows first on Brahma, and the result was he was soon blest with 149,000 brothers and sisters.

"The sacred temple of Ramisseram is on the island of Paumben, situated at the commencement of what is called Adam's bridge, which is said formerly to have joined Ceylon to the mainland. The story of the sanctity of this island and temple is to be read in the 'Ramayana,' a Hindoo poem filling a very large volume, being a history of the battles which took place between Rama and Ravana, when the latter, a monster with ten heads and one hundred

arms, carried off Sita, Rama's wife. The temple is the most sacred in all India, not even excepting Benares. It is here the pilgrim ends his long journey, which he began three thousand miles away; and no one who does not know what Indian travel is, can realise what the pilgrim suffers in this tedious march, without mentioning the austerities to which he condemns himself—such as prostrating himself, face downwards, in the dust at the end of every mile. Here is rest at last; and as he wanders in the vaning light through these sacred precincts, he forgets all he has undergone in the remembrance that he has gained his goal, and he looks forward to blessings in this world and immediate beatitude after death. The wonderful corridors of the temple itself are justly considered one of the most marvellous exhibitions of human labour to be found anywhere; their aggregate length is nearly four thousand feet; and when we consider that their section is that of a small Gothic church, and their length eight times that of our largest cathedral that all the pillars are of granite, richly carved, and observe the variety of light and shade, and the wonderful effects of perspective in the long-drawn aisles, we must admit that they form an ensemble surpassing anything of its class to be found elsewhere.

"In Avadea Covill we find again the hard stone, as at Tinnevely, which no chisel in these modern days can be made to cut. The temple is small, but wonderfully beautiful. At Tanjore the temple is one of the finest and richest in India, but, curious to say, almost entirely deserted. It is celebrated for the large stone bull Nundi, which our engineers compute must have weighed nearly one hundred tons before it was cut, and must have been brought five hundred miles, as there is no quarry of a similar stone nearer.

"At the Seven Pagodas, near Madras, are the extraordinary rocks which have been so beautifully carved, both inside and out; but by whom, when, or for what purpose, is not known. The whole undertaking seems to have been begun at once and ceased suddenly. The bassi-relievi round the sides of the hollowed-out rocks are as fine, if not finer, than anything to be found in India. There also is the temple on the seashore, supposed to be all that remains of the submerged city of Bali, the wildest fiction that ever was invented; but nevertheless immortalised by Southey in his 'Curse of Kehama.' Close by are the Five Rathas, as they are called—large boulders cut into beautiful little temples, said to be the only Buddhist temples in India, the other remains being all caves as at Karlee, where we see one of the finest of them; and curiously enough, the wood-work, both at the entrance and also at the farther end, date from the time of the original excavations, probably a few years before our Saviour. The shape of the interior is very similar to that of the early Christian churches, the Dagoba being in the place of the altar. At Tarputy, 140 miles north of Madras, we find again the same stone as at Avadea Covill and Tinnevely, and here even more marvellously sculptured. The bases of what were splendid Gopura, but now in ruins, are covered with a profusion of beautifully-executed figures, flowers, and animals, such as a Hindoo could alone have attempted. Next comes the city of Vijianuggur, which formerly covered seven square miles, and which has now almost entirely disappeared, leaving only two small temples as records of its former grandeur. This city defied for two hundred years the power of the Mahomedans, whose capital, Beejapoor, is very interesting to visit on account of the tombs of its kings, which alone in like manner remain to attest its magnificence. In this city each king built his own tomb during his lifetime; a plan which had the one disadvantage that if the king died before it was half finished it remained in the same state for ever. The verandah round the mausoleum of Ibrahim Shah is as fine as anything to be found in the East; and, when the azure colouring was fresh, the contrast between it and the gilt letters and the outer frame of the grey granite must have been grand indeed. The whole of the Koran has been engraved on the walls of this tomb. Over the windows the stone has been pierced, and the Arabic letters alone left, which are so well done and perfect as to be easily legible by any one even imperfectly acquainted with the language. Whether this marvellous exhibition of skill and patient industry, or the window of the mosque at Ahmedabad, or the screen round the Taj at Agra, bears off the palm, is a question very hard to answer."

In conclusion, Captain Lyon devoted a few words to the Jain religion: "There can be little doubt that the founder of this religion, Mahavira, was the preceptor of Buddha, and that the cause of their separation was that Mahavira tried to persuade his disciples that they should go about in a state of nudity. Buddha saw at once that such a precept could not practically become popular, and the result was their quarrel, and Buddha became the founder of the religion which, even at this day, numbers more disciples than all the religions of the West, while the Jains for a time seemed almost to have disappeared, to reappear in small numbers again, when the Buddhists were driven by the Brahminical faith out of India. There are three or four small colonies of them now scattered about, and at Bombay they are very rich, and have built on a hill they have purchased in Goozerat some very beautiful temples. They are a quiet and very hard-working race of men, and their religion is one of the very best in India; their Bible, the Kalpa Sutra, being as practically good as the Koran."

FINSBURY CIRCUS.

THIS once quiet locality is now in the hands of ruthless railway destroyers. The beautiful enclosure, with its horticultural and floricultural charms, has been invaded and desecrated by an army of navvies! Trees have been felled, flowers uprooted, and the greensward peeled off, in order that a cutting may be made, and eventually a tunnel formed for the extension of the Metropolitan Railway to Liverpool-street and Aldgate. The railway company have undertaken to put the enclosure—once the tunnel shall be finished—into its original condition. Alas! they cannot restore the sturdy elms they have cut down, nor the graceful acacias they have destroyed, although they may spread over the bare crown of the tunnel a carpet of turf to hide its deformity. The quiet and studious *habitués* of the London Institution, in the meantime, are disturbed by the sounds of pick and shovel, and the rumbling of waggons removing old and bringing in new materials. In the summer time it was refreshing for subscribers to that establishment to seat themselves, book in hand, in the leafy shades of the enclosure, where, no doubt, they imagined themselves in academic groves. This charm has now disappeared, and students of philosophy must now imbibe their lessons within the sombre walls of the institution. Seriously, it is to be feared that the cutting across the enclosure of Finsbury-circus will permanently ruin one of the few oases in the desert of London, for the draining away of moisture from their roots will kill the remaining trees.

METROPOLITAN MEWS.

DR. WHITMORE, in his last monthly report on the health and meteorology of Marylebone, has the following remarks on the health of people who live in mews. He says:—"In this parish there are 128 mews, each of these contain an average of from 12 to 15 stables, the lofts of which, with but very few exceptions, are in part occupied by human beings. At a most moderate calculation, the number of persons so located in the parish cannot be less than 4,000, whilst the horses beneath them double that amount. As a general rule, the staircase leading to the dwelling-rooms springs directly from the stable, so that when the room doors are open, there is nothing whatever to keep out of them the close and vitiated atmosphere of the stable, and which, it will be readily understood, becomes in warm weather most offensive, and, in a sanitary point of view, objectionable in the highest degree. To open the window under these circumstances affords but little or no benefit, for the reason that the manure pit is either immediately beneath or not far off. Now it might reasonably be expected that persons living under such unfavourable conditions suffer in health, and that there is a high rate of mortality amongst them; strange, however, as it may appear, such is not the case in Marylebone; they are in no degree more subject to fever or other contagious diseases than other inhabitants of the parish, and certainly not so much so as the poorer classes generally; and why, they are not may, I think, be easily explained. The class of persons who live in our West-end mews are,

for the most part, coachmen and grooms, together with their wives and families, who, it will be obvious, suffer no privations, but, on the contrary, enjoy a fair share of the necessities and comforts of life, and who, for those reasons, are able to resist the malarious influences to which they are exposed, but which, when acting upon the enfeebled constitutions of the destitute and half-starved, meet with no such resistance.

COMPETITIONS.

LEICESTER.—A limited competition having been invited for a new Nonconformist church at Belgrave, the design by Mr. Tait, of Leicester, has been adopted.

MANCHESTER.—For the church of S. George, Oldham-road, Manchester, the designs of Mr. H. Lord, architect, Manchester, have been selected in a limited competition.

STOCKPORT.—The competitive designs for the decoration of the Oddfellows' Hall, Stockport, prepared by Mr. J. A. Brown, architect, 4, Heaton-lane, Stockport, were unanimously selected by the directors.

THE MOUNTAIN CHAPEL COMPETITION.—In the Mountain Chapel competition connected with the Carlisle Diocesan Church Extension Society, the first premium, of twenty guineas, has been awarded to the design bearing the motto "In Montibus," the production of Messrs. Paley & Austin, of Lancaster; the second, of fifteen guineas, to that of Mr. C. J. Ferguson, of Carlisle, submitted under the motto "Delta."

WESLEYAN CHAPEL AND SCHOOLS, PETERBORO'.—In a limited competition for the above building the plans submitted by Mr. John Johnson, 35, Moorgate-street, London, have been unanimously selected. The proposed chapel will accommodate upwards of a 1,000 persons, and the schools 550 children. The cost of the work will be about £4,500. The style of the building is Italian.

Building Intelligence.

CHURCHES AND CHAPELS.

CHISLEHURST.—On Saturday last the Empress of the French laid the foundation-stone of the new (Roman) Catholic chapel at Chislehurst, which is to receive the remains of her late husband. The proposed chapel will be in the Gothic style, and will be built entirely of Bath stone. On the western side there will be an altar, and in the centre of this the sarcophagus in which the Emperor's remains will be placed, and which is the gift of Her Majesty the Queen, who a short time since inspected the site. The altar will be dedicated to the Virgin, the public entrance to which will be from the present church by a groined arched doorway, with a wheeled window above. The intended building will be 24ft. in length by 12ft. in width; the interior walls are to be entirely composed of Caen stone; the exterior walls, as above stated, being of Bath stone. The contractor for the work is Mr. Brass, and the architect Mr. Clutton, of New Burlington-street.

HARROGATE.—The (Roman) Catholic Church of S. Robert at Harrogate has been opened by the Archbishop of Westminster. The church is built at a cost of £3,500, exclusive of altars, of which there are three, and internal fittings, from plans drawn by Mr. George Goldie, of London. The style is that observed in the thirteenth century, and the church will accommodate 600 worshippers.

KNUTSFORD.—On Whit-Sunday the church of S. Cross, Knutsford, was reopened, after restoration and redecoration. The church did not afford many opportunities for favourable treatment. On an enormous Classic porch stands a tower and spire formed of brick, cement, and wood. The sides are pierced with light, large windows, with Gothic heads, two west-end, and one large chancel window. The ground-plan is in the form of a cross. In the arms of the cross are galleries, which are placed flush with the wall of the nave and chancel, and having another gallery at the west end, lighted by two small windows. The ceiling is elliptical in form, and rises eight feet from a wall-plate 22ft. high. The only decorative

features hitherto contained in the interior consisted of a number of small cherrywood buttons or circles placed along the centre of the ceiling, and certain nondescript wooden constructions placed along the wall-plate running round the church. The chancel ceiling has been coloured a clear azure blue, and powdered with stars arranged in circles round larger central stars, having one very large star in the centre of the ceiling. The chancel ceiling down to the wall-plate is separated from the nave by a centre design on a cream stone-colour ground, of vine-leaves and grapes, having a border on each side. Beneath the wall-plate, on a line with the above, the wall is formed into two pilasters, with brown lines for the border, inclosing blue quatrefoils; in the centre of the pilaster is a larger quatrefoil inclosing a circle, in which is the sacred monogram "I.H.S." in cream colour on a blue ground. The centre space of the plaster is filled with conventional ornament. The chancel walls are coloured of a golden buff, the cornice of wall-plate being tinted. The side walls are finished with a cresting formed of the lily conventionally treated. On the chancel walls are placed two large quatrefoils with ornamental borders—one inclosing a lamb holding the flag, and emblazoned with a red cross; the other the pelican. A border of dots and line finishes the wall against the ceiling. The chancel window and the two black tablets on this wall are inclosed with large wooden frames; these have been treated with conventional ornament and colour, in a free style. The chancel walls are finished with a dado of green, having a border running level with the bases of the framework of the windows and tablets, composed of a guilloche inclosing the sacred monogram, the lily, and the foliated cross. The dado is stencilled with a pattern composed of alternate large and small crosses and dots stencilled in blue, brown, and black. The ceiling of the nave is tinted of a light cream colour, and round each of the buttons or centres before described trefoil ornaments are stencilled with good effect. A bold geometrical cresting, formed of the Latin cross and a trefoil cross, is stencilled in a cerise colour on the ceiling above the wall-plate. The walls are coloured of a neutral tint having a greenish stone hue; and round each window is stencilled an ornamental border, lines and patrests formed of the rose-leaf, bud, and flower. A dado in a murrey colour runs round the church, finished with a border in a dark dull green and black. The whole of the works have been carried out by Messrs. Sutherland and Son, house and church decorators, of Manchester, under the superintendence of N. G. Pennington, Esq., of the firm of Pennington and Bridgen, architects, Manchester and Knutsford.

OTLEY.—On Tuesday week, the foundation-stone of a new Primitive Methodist chapel and school was laid. The new chapel, when erected, will measure 60ft. by 43ft., and the school 57ft. by 27ft. The chapel will accommodate 500 persons and the school 300. The style of architecture is Italian, freely treated. The total cost, including the site, is estimated at from £2,500 to £3,000. Mr. Alfred Marshall, of Otley, is the architect.

OXFORD.—The chapel of S. Mary Hall was reopened on Whit-Sunday, having been, since Midsummer last, in process of repair and improvement, under the superintendence of J. C. Buckler, Esq., of Oxford. The east and south windows have been thoroughly repaired, and a Reredos added of Painswick stone. The east window has been filled with painted glass by C. E. Clutterbuck. It contains fifteen small representations of events illustrative of the life of the Blessed Virgin. The roof has been boarded through the entire length, with intersecting ribs over the eastern part, and carved bosses by Messrs. Rattee and Kett, who have also supplied new seats and new oak screen. The sum expended has been between £1,100 and £1,200. The builder was the late Mr. J. Fisher, of Oxford.

SCHOOLS.

BRENTWOOD CONGREGATIONAL SUNDAY-SCHOOLS.—These schools were opened on the 4th inst. They have been erected from designs by Mr. Chas. Pertwee, architect, of Chelmsford, and comprise a schoolroom 47ft. by 28ft., with three classrooms about 10ft. square, an infant school 22ft. by 12ft., kitchen, and other offices. The schoolroom is approached by two recessed porches, and is lighted by four bold arched windows; while the roof, which is partly open, is divid-

into five bays, with triple gables towards the road. The building has been carried up in yellow stocks with red pointed arches, strings, &c., and the roofs are covered with slates and surmounted with oak-spirelet ventilator. The cost, including every expense, has been £986. 13s.

SEIGHFORD.—New national schools were opened at Seighford on Whit-Monday. Mr. Ward, of Stafford, was the architect, and Mr. Barrett, of Eccleshall, the builder. The building consists of mixed school with classroom attached, and an infant-school and teachers' residence. In the schoolrooms there is allowed an area of eight square feet per child, affording accommodation for 135 children. Bricks of a dark red colour are used for the walls, relieved by bands, &c., of buff brick. The elevation is 107ft. in length, and embraces both schools and teacher's residence. The style is Gothic. The roofs project a considerable way over the gables, and have pierced barge-boards attached, which yield a pleasing shadow; the covering is of blue tiles, red tiles being used to break the monotony. The interior walls of the schools are finished in a similar manner to the exterior, the roof being plastered at the collar beam; the woodwork throughout is stained and varnished. The whole cost was £1,022. 12s. 1d.

S. MARY'S SCHOOL, HULME, MANCHESTER.—The foundation-stone of this school was laid on the 6th inst. The school will have accommodation for 131 scholars. The building consists of a schoolroom 36ft. by 19ft. 6in., and 2 classrooms, each 18ft. by 14ft., also lavatory and cloakroom, &c. The elevations have a hipped gable to the classroom and a hipped gable over the centre bay, the windows in both these rising higher than the others. All the windows have arched heads; and buttresses divide the elevation into bays. The principal elevation has a hipped gable, from the centre of which rises an ornamental chimney-stack having an inscription stone in the centre of gable. The whole of the walls are faced externally with white headers bricks, with arches, string courses, and other dressings of stock bricks. The interior is of selected bricks. The rooms are warmed by open fire-places, and the alternate windows have part opening for admitting fresh air, while the vitiated air has its exit through openings in the ridge, the roofs being a high pitch open to the apex and plastered between the principals. Mr. Geo. Napier Hulme is the contractor, under the superintendence of the architect, Mr. John Lowe, Manchester. The total cost, including boundary walls, will be about £330.

BUILDINGS.

BILSTON.—The new Town Hall and Free Library at Bilston were publicly opened on Tuesday. The new buildings are in the Italian style of architecture, being built of brick faced with stone. They have a frontage to Lichfield-street of 95ft., and to Church-street of 74ft. There is an assembly-room on the first floor, 72ft. by 43ft., with an orchestra and retiring-room. Over the public entrance to the Town Hall is a tower, which forms a prominent feature in the building. The Free Library buildings are distinct from the Town Hall, though uniform therewith. On the ground floor there are reading-room, 26ft. by 20ft., and library, 22ft. by 17ft. 6in. The reference library is on the first floor, and class rooms on the second. The entrance-halls are laid with Minton's tiles. The total cost of the building is about £5,000, exclusive of the price of the land. The work has been executed by Mr. Nelson, builder, of Dudley, from the designs of Messrs. Bidlake and Fleeming, Wolverhampton.

KILMUN.—On Saturday the foundation-stone was laid of a new sea-side Convalescent Home at Kilmun, N. B. The Home, which has been designed by Mr. Hugh Barclay, architect, Glasgow, is a very plain structure built of whinstone rubble, faced with freestone and brick, and consists of two wings and a centre, with an entire frontage of about 176ft. The building will be two stories in height, and in each of the wings there will be sixteen bedrooms. In the centre portion, which is separated from the wings, will form the matron's room and kitchen, and on the upper story a dining-hall and reading-room. The cost is estimated at £2,500.

OAKWOOD, CHISLEHURST.—It was omitted to be stated in the description of "Oakwood" in our last week's paper, that the house was being built for the late John Chubb, Esq., of S. Paul's Church-yard, and is now finishing for his executors.

OTLEY.—The new Wharfedale Union Workhouse at Otley has been opened. The whole of the works will entail an expenditure of something like £14,000. The buildings throughout are erected of local sandstone. The architects are Messrs. C. S. and A. J. Nelson, Leeds and Derby. The contractors for the general works have been Messrs. Boothman and Broomhead, of Leeds and Newcastle.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

TERMS OF SUBSCRIPTION.

(Payable in advance.)

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N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance. Back numbers can only be sent at the rate of 7d. each, the postage charged being 3d. per copy. All foreign subscriptions unaccompanied by an additional remittance to cover the extra cost of forwarding back numbers are commenced from the next number published after the receipt of the subscription.

Subscribers receiving their copies direct from the office are requested to observe that the last number of the term for which their Subscription is paid, will be forwarded to them in a coloured wrapper, as an intimation that a fresh remittance is necessary, if it be desired to continue the Subscription.

Cases for binding the half-yearly volumes, 2s. each.

SPECIAL NOTICE.

COMMENCEMENT OF NEW VOLUME.—The large increase in the circulation of the BUILDING NEWS since its enlargement at the commencement of the present year caused a more than ordinary demand for the early numbers of the volume, many of which are out of print. We regret the disappointment of those who have been unable to complete their sets, and would remind intending subscribers that the commencement of a new volume with the quarterly number, which will be issued on July 4, will afford a favourable opportunity for commencing subscriptions.

RECEIVED.—H. J. I.—A. D.—C. H. B.—B. and W.—F. W. A.—J. W. L.

JAS. HICKS.—The time was extended to the 1st of July.

E. W. C.—Since the first week in January.

SUBSCRIBER TO THE "B. N."—There is no such paper as the BUILDING NEWS published in the United States.

LATCHFORD.—Write to the secretary.

Correspondence.

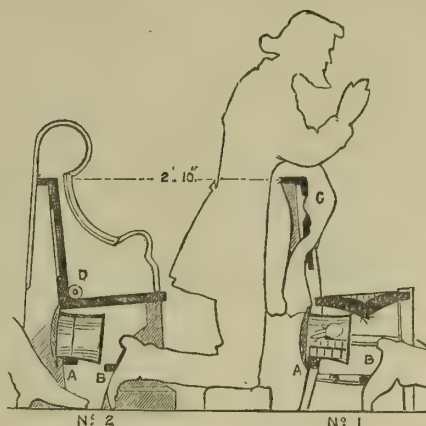
THE "CHIMNEY-POT HAT."

To the Editor of the BUILDING NEWS.

SIR,—Surely Daddy Long Legs does not think it sacrilegious to go to church without his chimney-pot hat, if so his religion is all smoke, and the sooner it is blown away the better. I have no sympathy for his Christy's Best, if he makes a God of it. In London, he will be well repaid by a visit to the Metropolitan Tabernacle, where he can sit with ease and suspend his so called chimney-pot hat between two elastic cords fixed on the under side of the seat for that purpose, for in that admirably constructed building he will find temporal and spiritual comfort combined.—I am, Sir, &c., June 9th, Lambeth. **FELT HAT.**

SIR,—Mr. Longlegs will find the question of the convenient disposal of the "impedimenta" which some people consider themselves bound to bring to Church,

discussed at some length in the correspondence of the *Church Builder* for January and April, 1871. In the meanwhile, I would venture to suggest that a good deal of the difficulty will be found to be removed by placing the hat in front of its owner, instead of behind him as is often done, and beg to submit the inclosed sketch as an explanation of a working out of the pro-



blem based upon this principle. No. 1 represents the application to the "unmonumental" church chair, and No. 2 to a bench. It will be seen that the method of attachment is in both cases the same, A A representing in either figure the supporting rail, between which and the back edge of the seat the hat rests, hanging by its brim, and protected from the feet of the person in front by the rail B B; these two rails having always existed in their proper places in the case of the chair. This method, moreover, unless the wearer has gone in for an inordinate amount of pomatum, renders the inside of the hat available as a receptacle for his books and gloves, a convenience which will, I am sure, be appreciated by those people, not a few in number, who are seldom satisfied without bringing something like a small library to church with them; and, further, gives the owner of a hat placed in this way a great pull over his neighbour in front, should the latter offer to contest the situation with him on behalf of his own head-gear, as by the insertion of one end of the brim behind the leg of the chair, the hat becomes a fixture, and defies all hostile efforts to remove it.

Having thus provided for hats, I would wish to protest against the very selfish and uncorsetious habit of throwing the great coat over the back of one's own chair, to the great inconvenience of the person kneeling behind, and more especially so if the coat happened to be wet. The only considerate way of disposing of it, unless one is prepared to go to the opposite extreme, and to sit on the coat rather than cause annoyance, is to lay it, carefully tucked in, over the back of the chair in front, as shown at C, No. 1. This reduces the nuisance to others to a minimum, and if it be answered that this plan is difficult of adoption when the seat in front is already occupied, it is surely no great inconvenience to wait until the person in front rises.

The proper disposition of a wet umbrella is indeed a poser, unless there be provided both an ample supply of umbrella-stands in some convenient spot, and a properly regulated system of receipt and distribution. Some temporary arrangement, to be brought out on wet Sunday's only (as on week days the inconvenience will not generally be found to be serious) would probably best meet the exigencies of the case, as it seems a pity permanently to disfigure the benches with separate troughs and racks, which would be only occasionally required to be used. A dry umbrella or a stick is best placed on the seat behind one, as shown at D, No. 2, as nothing laid on the floor will be improved by the contact, if indeed it escapes being trodden on.—I am, Sir, &c.

C. SANCROFT WEBBER.

1, Upper Berkeley-street, West, June 9, 1873.

THE INSTITUTE MEETINGS.

SIR,—Although not a member of the Royal Institute of British Architects, I have always taken a deep interest in its proceedings, and have done all in my power to make them such as would, as nearly as possible, carry out their object; but I have with regret been compelled to admit that the duties have not been fulfilled as could be desired, and that the peculiar opportunities afforded to such a society have not been seized in a manner to benefit the profession at large. The contrast between the Institute of Architects and the Institute of Civil Engineers is most striking, and in no respect greater than in the manner in which the public meetings are attended and conducted. At Great George-street the magnates of the engineers are distinguished for their constant attendance, the proceedings are conducted with spirit, and nothing is wanted to inspire confidence and give dignity and weight to the society. How different, alas, is the line of conduct which appears to have grown to be the rule at Conduit-street, and which was fully exemplified in all its details last Monday evening. The evening was one of especial interest to the profession and to the Institute; it was the first meeting at which the new president, Sir George Gilbert Scott, would formally

preside, and, as his first duty, present to his predecessor, Mr. Thomas Henry Wyatt, the royal gold medal—the award of which had been graciously approved by Her Majesty—and distribute the other medals and prizes awarded by the Institute. On such an occasion, at least it would have been expected that the great men of the profession would not have been conspicuous by their absence, and that the few who were present would, on such an occasion, have in control their disregard of the best interests of the Institute, and would betray some slight sense of decorum, self-respect, and courtesy to the gentlemen whom the council had invited to read the paper of the evening. But no; immediately on the completion of the agenda there was a general exodus, which left only one or two members on the front benches. This was of itself to be greatly regretted, but the more so when one or two of the great men lingered just outside the room-door, and there, to the great annoyance of those within hearing, loudly chatted away for some minutes, and this, be it remembered, while Dr. Hayward was reading his most interesting and valuable paper, throughout the whole course of which there were continual interruptions and noisy conversations between the members, quite sufficient to prevent the following Dr. Hayward with the attention that was my desire. But, will you believe it, sir?—no less than five persons (we will not say gentlemen) quitted their seats, and, with their backs to Dr. Hayward, audibly commented upon some of the drawings hanging on the walls, and for which medals had been awarded—still, be it borne in mind, during the reading of the paper. Altogether it would be difficult to conceive a less respectful gathering of gentlemen than that at the Royal Institute of British Architects on the occasion mentioned; and, if only for its own credit's sake, it is nothing less than the absolute duty of the Council to at once consider how the growing evils above mentioned are to be met, the continuance of which will most assuredly lead to greater contempt than that with which the profession generally is now in some quarters regarded.—I am, &c.,

W. W.

Intercommunication.

QUESTIONS.

[2884].—**S. Simon Stylites.**—Permit me to thank "Professor" and the Rev. Mackenzie E. C. Walcott for their erudite and lucid replies to my "Sakramentshaus" question a few weeks since. I will, if you please, trouble these gentlemen with another. Who was S. Simon Stylites? Was he a kind of Medieval Diogenes, or a mere anchorite Christian—a saint of real or supposed existence? Some account of him would oblige.—**STUDENT.**

[2885].—**Clearing Walls of Bugs.**—Can any subscriber tell me how to cleanse some walls of bugs without extensive repairs?—**INQUIRER.**

[2886].—**Measuring Buildings.**—Will any of your readers kindly oblige me by naming one or more buildings of architectural merit suitable for measuring, as required by the R.I.B.A., in Manchester or the neighbourhood?—**LOCAL BORE.**

REPLIES.

[2873].—**Slatings.**—The hips in question are technically known as close-cut or mitred hips, and are formed by neatly cutting the slates to the requisite bevel or mitre, and bedding them in oil putty or lead about 12in. wide, weighing 1½lb. to the foot superficial, having similar lap to the slating. This undoubtedly is by far the neatest method of covering a hip, and is perfectly water-tight. "A. J. W." can easily specify from the above description. The lead, may be specified under the heading "Plumber," but the slater often executes the whole, leadwork included. Under any circumstances, specify 1½lb. lead, and, above all, see that you get it, as thicker lead makes but an indifferent job, and the above-mentioned is only forthcoming in any place where the process is novel, upon its being insisted upon.—**F.**

[2874].—**Enamelling Deal Black.**—"Jack Plane" should stain the deal with iron liquor. Let it get dry—then smooth with glass-paper, and then wet with shellac varnish. Black two or three times lightly with camel-hair brush.—**JOS. RICHARDSON.**

[2878].—**Schools on the Brighton Line.**—In reply to the above question, we have pleasure in informing your correspondent that we were architects to the infant schools at the side of the railway near the Streatham Common station. The schools were erected three years ago for the Rev. Stenton Eardley.—**GEORGE & VAUGHAN, 11, Argyll-street, W.**

PROPOSED TUNNEL BENEATH THE HUDSON RIVER, NEW YORK.—To aid in communicating across the Hudson River between New York City and the New Jersey shore, a railway-tunnel is proposed, and the New York Legislature is now considering a Bill granting a charter for this purpose. The Pennsylvania, the Erie, and the New Jersey Central Railways, all roads of large traffic, now terminate in Jersey City, and their goods and passengers for New York have to be taken across the Hudson River at great expense. Hundreds of thousands of persons doing business in New York live in the towns on the New Jersey side. The project involves great engineering difficulties, but it is thought they can all be conquered.

Our Office Table.

A NEW PARK FOR THE METROPOLIS.—Another handsome addition to the number of metropolitan parks is that which is just on the point of completion at Deptford. It comprises a space of land of about seven acres, situated in the portion of the town inhabited by the poorer classes, to whose service it has been dedicated by the owner, Mr. W. J. Evelyn, J.P., of Wotton, Surrey, who possesses considerable property in the neighbourhood. The land adjoins the new Foreign cattle-market, and within its boundary is situate the ancient manor-house of Sayes Court, the seat of Sir John Evelyn, author of the *Diary*, and ancestor of the present proprietor. This was the residence of the Czar Peter of Russia during the period of that monarch's employment as a shipwright in the old Deptford dockyard. The manor-house has been restored, and the grounds around it, separated from the park, have been tastefully laid out. The park, to extend which a number of old houses have been removed, has been planted with trees and shrubs under the direction of Mr. J. Evelyn Liardet, and in one part of it a space has been reserved for cricket, Volunteer drills, football, &c. A stand has also been erected in the centre for the accommodation of a band of music.

AMALGAMATED SOCIETY OF ENGINEERS.—The 22nd annual report of the Amalgamated Society of Engineers, Machinists, Millwrights, Smiths, and Pattern-makers, for the year ending December, 1872, has just been issued. The year 1872 has, from a financial point of view and in increase of membership, proved the most successful yet chronicled in the history of the organisation. During the twelve months the council opened 13 new branches: 11 in England, namely, Birkenhead 2nd, Brightside, Chelsea, Chorley, Garston, Goole, Handsworth, Hartlepool 2nd, King's Norton, Newcastle-on-Tyne 3rd, and Queensbury; one at Govan, in Scotland; one at Kingston, in Canada; and one at San Francisco; so that at the close of the year the society had 351 branches, with 41,075 members, 5294 of whom were admitted during the twelve months. In consequence of the excellent state of trade, the society has been able to add to its previous balance the sum of £41,987 9s. 3d., thereby making the total accumulated fund £158,313 15s. 10½d., or £3 17s. 1d. per member, being the highest amount per member ever possessed, except in the year 1866.

AN ARCHITECT'S WILL.—The will, with five codicils, of Mr. Samuel Sanders Teulon, architect, of Craig's-court, Charing-cross, and of Hampstead, was proved on the 22nd ult. by Messrs. Charles Henry Lardner Wood, George Phillips, and Ewan Christian, the executors, under £30,000. The testator bequeaths £50 to be applied for the completion of St. Stephen's Church, Hampstead (which was erected from his designs), and £20 to the Architects' Benevolent Society, besides numerous other legacies to various charities.

BUILDING SOCIETIES' BILL.—Mr. Winterbotham, on Monday, in answer to Mr. Arthur, stated that it was proposed to withdraw the Building Societies (No. 2) Bill and introduce it in an amended form on Friday; and Mr. Cross postponed his bill on the same subject until the re-drawn bill of the Government was in the hands of members.

CHURCH RESTORATION IN KENT.—"I do not know how it may be in other English counties," writes the London correspondent of the *Scotsman*, "but in Kent there is now a perfect mania for church restoration. I believe I could enumerate at least twenty old parish churches, the restoration of which has been completed during the last twelve months. One of the most recent and not the least successful of these attempts to beautify without modernising our ancient ecclesiastical fabrics, has been made at Cheriton. I particularly call attention to this church, because I have lately had an opportunity of inspecting the interesting monuments which were, during the progress of the restoration, brought to light. The chief of these is a tablet to the memory of Elizabeth Raleigh, who, as the mouldering epitaph informs the reader, was a 'granddaughter of the famed Sir Walter Raleigh.' The stone, which was found about a foot-and-a-half under the present floor, has been permanently fixed against the wall of the church. Mixed up with some farm buildings in the immediate neighbourhood there are traces of an old

residence of the Raleighs. I learn that the oldest stone in the churchyard, the inscription on which, although almost illegible, has recently been deciphered, turns out to have been erected to the memory of a local notability, who, in the civil Wars, gave refuge to the Duke of Richmond, when that Royalist nobleman acted as a secret emissary of Charles II. on the coast of Kent."

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The annual meeting of the above society was, held on Friday, the 6th inst., at the Board-room, 7, Westminster-chambers. The report showed that the society had been working most successfully during the past session, and that the number of members was still increasing. Cordial votes of thanks were passed to the President, Mr. C. W. Whitaker, and the other officers, and the following members were elected office-bearers for session 1873-74. President: C. H. Rew; Vice-Presidents: G. W. Willcocks and W. F. Butler; Members of Council: E. H. Brewster, J. A. Coombs, J. J. A. Flower, C. Kingsford, W. Meakin, E. Perrett, and C. J. Samuda. Hon-Treasurer: W. C. Street; Auditors: H. Sandall and G. Cruickshank. Hon. Accountant: J. Wagstaff Blundell. Secretary: Edward Speed.

DANGER OF BALCONIES.—We rarely think, says the *Lancet*, that those adornments of our houses, the balconies from our drawing-rooms, are sometimes stepping-stones into eternity; but an examination of some of them would remove all doubt. Many in front of the older houses, consisting of time-worn flags, others of rusted iron, and others of rotten wood-work without support or bracket, the wonder is that they do not more frequently give way. Hardly a week passes in which some do not fall either from the weight of a few small plant-pots, or from a gust of wind, and some apparently unprotected, while many are known to be too treacherous to be trusted to support the weight of an ordinary person. Why should not balconies be subjected to periodical inspection? A regular and systematic examination ought to be made of the balconies in the old streets, for it cannot be less culpable to allow a balcony to remain in a condition dangerous to those who may stand on it or to passers-by than it is to wilfully leave an open grating on the pathway.

LOST OR UNACCOUNTED-FOR GAS.—At the tenth annual meeting of the Association of British Gas Managers, held last week at Edinburgh, Mr. W. B. Emmerson, Darlington, read a paper on "Lost, or Unaccounted-for gas." He considered it absolutely necessary to take a fair start in tracing the causes, and that due correction should be made for temperature, &c., when determining the amount of gas actually made, in comparison with that recorded by the station meter, and attributed the loss to a variety of causes, such as unsound gas-holders, small and imperfect pipes, and careless main-laying, unsuitability of joints for the ground in which the pipes are laid, chipping instead of drilling holes for services, want of provision for equalising pressure in hilly districts, unregulated public lights, and want of attention to the keeping of their services in good repair, improper selection of meter to suit the particular place and circumstances under which it is placed, and neglect of a periodical inspection. The remedy was prompt and regular attention to all these points. There was a discussion on this and another paper. It was agreed that the great points to be attended to were the looking after the laying of the mains, the due examination and registration of the meters, particularly with reference to the gas supplied to local authorities and other public bodies.

MEMORIAL TO THE LATE MR. S. S. TEULON.—The following circular has been issued:—"Various friends of the late Mr. Teulon having expressed their wish to contribute towards placing a memorial window in St. Stephen's church, Hampstead, the noblest and the last completed of the works of his original genius, we, the undersigned, will gladly receive promises of assistance towards providing the stained window, proposed to be the most easterly in the south aisle, immediately overlooking his residence, and to be executed by Messrs. Clayton and Bell. J. Kirkman, vicar; Ewan Christian, C. H. L. Woodd, Thomas Boddington, Gunnersbury House, Acton."

PAYMENT FOR REJECTED TENDERS.—The High Wycombe Builders and Contractors' Association have issued a circular, stating that, as it occupies a deal of time to take measurements, quantities, and make accurate estimates, the members have agreed to charge one-quarter per centum for

estimates not accepted. If in competition, the percentum to be charged on the amount of accepted estimate. Should neither of the estimates be accepted, the percentum will be charged on the average estimation. A correspondent, in support of the position assumed by the association, writes us, that the difference in the tenders lately sent in for some local almshouses, and in those for a Primitive Methodist chapel last week, was £120. The trustees paid a quarter per cent. to the unsuccessful competitors, and accepted the lowest tender, and thus recognised the principle that unsuccessful competitors are entitled to some compensation for the labour and expense incurred by them.

PUBLIC ROADS IN IRELAND.—A return for the financial year ending in March, 1872, states that in Ireland the year's outlay upon public roads amounted to £614,844. Sums amounting to £529,806 were expended in repairs of roads of the length of 46,931 miles, and the remainder of the expenditure was upon bridges, cutting hills, &c., and new roads of the length of 193 miles. Since 1854 the public roads of Ireland have been increased 2,724 miles, but part of this length consisted, not of new roads made, but of old farm-roads, by-roads, and lanes converted into public carriage-roads, and of roads which formerly were only occasionally repaired. The return from Meath states that no new roads have been made in that country since 1854, as "every imaginable new road" had been previously made as a relief-work on the occasion of the famine of 1847.

THE ELGIN MARBLES.—To the Philhellenes who cry out against what they call the vandalism of Lord Elgin in removing the sculptures of the Parthenon at Athens, and consigning them to the British Museum, to be destroyed by the dirt of London, a very effective answer has just been given by the arrival of a new set of plaster casts from the slabs of the frieze which Lord Elgin found it impracticable to remove, and of which he had to be contented with casts. By comparing the new casts with those taken by Lord Elgin, it will be seen that in the meantime (1801-73) the original marbles have suffered very severely from two causes—malicious destruction, and the wear and tear of weather. A German archaeologist, who took advantage of the scaffolding erected for the purpose of making the new casts, describes in a recent number of the *Berlin Archaeological Journal*, the surface of the marble as so thoroughly undermined that the greatest tenderness was required even in taking a cast by the gelatine process, a condition of things very different from that of the marbles in the British Museum. The new casts are already in process of arrangement in the Elgin Room, and when this is done it is intended, according to a correspondent of the *Scotsman*, to range the old casts by their side.

THE GAS SUPPLY OF THE METROPOLIS.—A meeting of the London Gas Consumers' Association was held on Friday last at their offices, 4, Spring-gardens, to take steps to secure for the metropolis a supply of gas at a fair and reasonable price. The evidence before the Commissioners appointed by the Board of Trade to revise the scale of illuminating power of gas, together with their award thereon, was read, which increases the price of 16-candle gas to 4s. 4d., and of 23-candle gas to 6s. 3d. per 1,000 cubic feet. The report of the half-yearly meeting of the South Metropolitan Gas Company (for twelve months past supplying gas at 3s. per 1,000 feet, free of meter-rent, being a net charge of 2s. 10d. per 1,000 feet), states that, "notwithstanding the reduction in the price of gas last year to 3s. per 1,000 cubic feet, and the increased cost of coals and all other materials and labour, the profit of the half-year amounts to £15,836, against £15,064 of the corresponding period of 1871, the increase in the cost of coal having been met by extra receipts for coke during the half-year under review." The increase of 7d. amounts to £357,810 per annum, and of 10d. to £511,300 per annum. It was contended that, with due care and management, all the London companies can supply gas at the South Metropolitan tariff of 2s. 10d. per 1,000 feet, and that a saving in the cost of gas amounting to £715,820 a year is within the reach of the consumers.

THE MAGLIANA FRESCOS.—It is strange, remarks the *Academy*, that the sale of two genuine works by Raphael, one of them in tolerably good condition, should not have created more interest than did that of the Magliana frescoes at Paris a few weeks ago. These frescoes were painted for Leo X. to adorn the walls of the chapel of a

favourite hunting-seat of his, called La Magliana, about six miles from Rome. In the seventeenth century the Popes appear to have given up hunting, or at all events to have deserted La Magliana, and it was made over to the Convent of S. Cecilia, of Trastevere. But the nuns of Trastevere had no use for the place, and therefore rented it to a farmer, without, it would seem, making any arrangement for the preservation of the frescoes. The farmer probably cared less for frescoes than for pigs, but he cared a great deal for his own dignity, and in order to avoid saying his prayers with his domestics he had a sort of tribune erected, to which he gained access by means of a door cut through the very centre of Raphael's "Martyrdom of S. Cecilia." Nothing indeed was left of this work but a few figures on either side, that were sold the other day to a Russian agent for 11,500 francs. The other fresco, however, as it did not interfere with the farmer's dignity or comfort, was suffered to remain, and by and bye, the nuns of Trastevere, getting into difficulties, bethought them of their neglected treasures at Magliana, and had them transferred to canvas, and then pledged them at the Monte di Pietà. Here they remained for about a year, when they were again removed to the Basilica of S. Cecilia in Trastevere. Finally, in 1869, they were bought by M. Oudry, who had them conveyed to France. The principal of these frescoes, the only one indeed worth speaking of, for the S. Cecilia is a mere ruin, represents God the Father blessing the Earth. This important work, the only fresco by Raphael out of Italy, was secured for the Louvre by M. Haro for 207,500 francs.

THE NEW LAW COURTS.—Mr. Street has certainly not been well treated in the matter of the New Law Courts, but it is at least satisfactory, remarks the *Guardian*, to hear, as we do on good authority, that things are nearer a settlement than Mr. Ayrton would have us suppose. The designs are now, probably, out of that active Minister's jurisdiction, and there is little doubt that the tender for about £780,000 will be accepted by the Treasury. This tender has been delivered in spite of the enormous increase in the price of all building which has been acknowledged by Government in their estimates for works in barracks, and again in the case of the new Natural History Museum, where the Office of Works, according to the statement of Mr. Walpole and Mr. Ayrton in the House of Commons the other day, have agreed to a large addition to Mr. Waterhouse's estimate, in order to meet the increased cost of building. This addition is reported to be no less than 15 per cent. on the original estimate. The plans for this building were begun at the same time as those for the New Courts, so it is hard to see why an addition should be made to the cost of the one if none whatever is to be made to the other. Yet this seems to be the meaning of Mr. Ayrton's recent speech. It is now seven years since Mr. Street first made plans for this work, and we certainly fear that when next a great public building is wanted, no architect of the same eminence will be found willing to incur the trouble, annoyance, and even monetary loss to which it appears necessary that the nation's "servants" are to be subject.

THE TIMBER TRADE OF AMERICA.—The *Times'* American correspondent, writing from Philadelphia on the 27th May, says:—"A noteworthy event in financial circles has been the suspension of a number of business houses in Albany and New York city engaged in the lumber trade. They combined for the purpose of controlling the lumber traffic in the Northern markets, but their combination was overthrown."

CHIPS.

A new line of railway between Hanley and Tunstall is to be opened the first week in August. The principal station will be at Hanley, where a building of considerable dimensions is in course of erection. Whether the loop line will be used as a through route, or only as a local line, is a question for further consideration.

At a sale by auction of land in Manchester, on the 29th ult., a small plot of land at the corner of King-street and Deansgate fetched £4,000, being about £74 a square yard.

Mr. Gladstone has been invited to open the new Bradford Town Hall on the 10th of September next.

One of the buttresses of S. Leonard's Priory, Stamford—one of the oldest specimens of architecture the town can boast of, some portions of it dating from the time of William the Conqueror—shows signs of speedily falling *en masse*, unless

steps be taken to prevent it. The corresponding buttress, too, bulges in the centre. On Monday week, while levelling the ground near the west front, the workmen came upon a stone coffin close to what was once of the principal doorway of the nave: it contained bones disposed in such a manner as to induce this belief that it had previously been unburied and its contents rudely handled. The lid of a small coffin has also been turned up.

In connection with the Social Science Congress, to be held at Norwich, from the 1st to the 8th of October next, there will be an exhibition of educational, sanitary, and domestic appliances, based on the experiment which proved so successful at Leeds in 1871.

The new aisle of S. Paul's Church, Wokingham, was opened on Whit-Sunday. The work has been carried out by Mr. Deacon, from plans prepared by Mr. Woodyer, of Reading.

The memorial-stone of a new Wesleyan Chapel were laid at Loppington, Salop, on Whit-Monday. The style will be Gothic, and the building will seat 150 persons. Mr. W. Gethin of Frankwell, is the architect.

The foundation-stone of a new school in Drayton-street, Hulme, Manchester, was laid on Friday in Whitsun-week. Cost, about £800; architect, Mr. J. Lowe; contractor, Mr. G. Napier.

The workmen and others, numbering about 400, connected with the new church, parsonage, and schools, in course of erection at Collinghurst, Manchester, by Messrs. Ellis and Hinchliffe and Messrs. Crellin and Bailey, under the direction of Mr. J. Lowe, architect, were liberally treated to an enjoyable trip to Southport, and the agreeable concomitant of a duplicate spread on the Wednesday of Whitsun-week, at the cost of the donor of the entire group of buildings—C. P. Stewart, Esq., of the Atlas Works, Manchester.

We regret to hear of the death of Mr. Cox, of the well-known firm of Cox and Son, of 28, Southampton-street, Strand. The business of the firm will, we are informed, be carried on as usual under the same style by Mr. Edward Young Cox and Mr. Thomas Cox, the sons of the deceased gentleman.

Trade News.

WAGES MOVEMENT.

BIRKENHEAD.—The strike of the joiners and masons still continues at Birkenhead, with apparently the same obstinacy on both sides as at its commencement. Several of the masters have obtained men from a distance, some being from London, and it is alleged that instances of intimidation have taken place during the last few days. A movement is on foot amongst the various branches of the trade in the borough to consider what is termed "The joiners' struggle," with a view probably of assisting those who are "on strike."

LONDON.—A crowded meeting of the operative masons was held on Wednesday night, at the Falstaff Music Hall, Old-street, S. Luke's, for the purpose of considering the course to be adopted in consequence of the refusal of the master builders to comply with the request of the men for an advance of a halfpenny per hour on the present rate of wages. The chairman stated that in the early part of the present year the committee of the London lodges had sent in a memorial to the committee of the Master Builders' Association requesting an advance in the existing rate of wages to the extent of a halfpenny per hour—viz., from 8½d. to 9d. per hour—with a notice that such advance should be given at the expiration of six months from the date of the memorial. The masters declined to increase the rate of wages during the present year, but they would be prepared to pay 9d. per hour on and after the 1st March, 1874, coupled with the condition that from that date the hour for leaving work on Saturdays should be one o'clock, instead of twelve o'clock, as at present. The following resolution was unanimously adopted by the meeting, amidst loud cheering:—"That this meeting of the masons of London, having considered the letter received from the Master Builders' Association, desires to express its regret at the proposition therein contained, and pledges itself never, under any circumstances, to return to one o'clock on Saturdays; and further declares its full determination to firmly adhere to the terms of the memorial sent in by the committee." The effect of the above is, that unless the master builders concede the halfpenny per hour advance on the 29th of July next, the whole body of masons will cease work on that day.

ORMSKIRK.—On Monday a great number of the bricklayers of Ormskirk struck work. Three weeks ago the men gave notice to the masters that they required an advance of 2s. per week. The masters, with one exception, have refused the demand, and consequently, the men struck work on Monday morning. The present rate of wages is 28s. per week. Both masters and men seem determined to fight the dispute out.

SOUTHPORT.—Three months ago, the operative joiners of Southport issued circulars to the masters, requesting an advance of wages from 7½d. to 8d. per hour, and a reduction of hours from 5½ to 4½ per week—obtained by the bricksetters, masons, and plasterers. The masters offered 7½d. per hour, and con-

ceded the limitation as to the number of hours. A deputation of six of the operatives was appointed to confer with an equal number of their employers to endeavour to bring about an amicable settlement; but the latter resolved to adhere to their original offer. In consequence of this refusal an aggregate meeting of the trade was held on Wednesday week, when it was agreed to accept 7½d. on the 9th of June, and the other farthing in three months. A reply was received from the masters offering 7½d. as a permanency, and leaving the impression that if these terms were not accepted the same evening, they would fall back upon the 7½d. The deputation who waited on the employers acquainted the meeting with this arrangement, when it was unanimously agreed to abide by the original notice for 8d. per hour. The dispute thus remains unsettled.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portmadoc and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.

24 by 12	22 by 12	20 by 10	18 by 10	18 by 9
37½s. 6d.	33½s. 6d.	25½s. 6d.	21s.	19½s. 6d.
16 by 10	16 by 8	14 by 10	14 by 8	12 by 8
19½s. 6d.	14s.	17s.	11½s. 6d.	6½s. 6d.

Per m of 1,200 Slates, Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Slates, Bangor, and Builders' Ironmongery. A & G's Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

GUILDFORD.—For an enlargement and improvement of the female infirmary wards at the Guildford Union, for the guardians thereof. Mr. Henry Peak, architect.

Loe	£515 0 0
Brett	498 0 0
Strudwick	455 0 0
Mason	450 0 0
Clark	448 10 0
Garnett	445 0 0
Mitchell and Son	443 0 0
Pollard and Son (accepted)	415 0 0

HACKNEY.—For infant school, Percy-street, for the Rev. R. D. Tyssen, Rector of South Hackney. Mr. Edward Low, architect.

Forrest (accepted) £425 0 0

HEDNESFORD, STAFFORD.—For the erection of school-room and classrooms for the trustees. Mr. Ralph Chamberlain, architect.

Trow and Sons	£850 0 0
Whitmore	686 16 8
Rowley and Lynex	610 0 0
Mann	575 0 0
Barton	535 0 0
Simcox (accepted)	512 0 0

KENSINGTON.—For additions, alterations, and repairs to No. 10, Holland Villas-road, Kensington, for Mr. John Child. Mr. Joseph Lavender, architect.

Foxley (accepted) £1,173 0 0

LEICESTER.—For warehouse in Southampton-street. Mr. Edward Burgess, architect. Quantities by Mr. L. C. Kidd.

Loveday	£3,074 0 0
Bland	2,737 0 0
Osborne Bros.	2,696 0 0
Tomlinson	2,625 0 0
Tyers	2,500 0 0
Major (accepted)	2,474 0 0

LONDON.—For alterations and additions at the "Archway Tavern," Highgate. Mr. H. J. New on, architect, 16, Bessborough-street, Piccadilly. Quantities by Mr. H. W. Lamb, 11, Dorchester place.

Hockley	£1,309 0 0
Taylor	1,122 0 0
Shurmur	843 0 0
Brindle (accepted)	794 0 0

LONDON.—For new bank and shop premises, Edgware-road and Praed-street. Messrs. Bird and Walters, architects.

Hill and Sons	£8,898 0 0
Higgs	8,566 0 0
Lathey Bros.	7,900 0 0
Newman and Mann	7,875 0 0
Adamson and Co.	7,739 0 0
Henshaw and Co.	7,433 0 0
Brown	7,393 0 0
Williams and Son	7,162 0 0
McLachlan	7,090 0 0
Mark	6,848 0 0
Temple and Foster	6,647 0 0
Ebbs and Sons	6,512 0 0
Thompson and Smith (accepted)	6,367 0 0

MIDDLESEX.—For memorial school, Littleton. Mr. Edward Low, architect.

Knight and Son (accepted) £600 0 0

HOLLOWAY.—For alterations and repairs, &c., to the "Durham Castle" Tavern, Seven Sisters-road. Messrs. Bird and Walters, architects.

Henshaw and Co.	£1,950 0 0
Hill and Sons	1,920 0 0
Langmead and Way	1,820 0 0
McLachlan	1,817 0 0
Brown	1,790 0 0
Newman and Mann	1,775 0 0
Williams and Son	1,757 0 0
Wicks, Bangs, and Co.	1,593 0 0
Ennor (accepted)	1,454 0 0

NOTTINGHAM.—For new warehouse, Queen's-road, Nottingham, for Messrs. Charles Cox and Sons. Messrs. Hovenden, Heath, and Berridge, architects.

Lynam	£9,805 0 0
Fish and Sons	9,738 0 0
Dennett and Co. (accepted)	9,635 0 0

STATES.—For mission church and schools. Mr. Edward Low, architect.

Carpenter's and Joiner's Work.

Beaumont	£1,122 0 0
Excavator, Bricklayer, Mason, Plasterer, Tiler, &c.	
Mole	£236 0 0

STAINES.—For two houses and shops, High-street, for Mr. T. P. Harris. Mr. Edward Low, architect. Quantities supplied by Mr. Frederick Johnston. (Shop fronts not included).

Turner	£2 338	0	0
Smith	2,190	0	0
Colliver	2,175	0	0
Sawyer	2,089	0	0
Messom (accepted)	2,048	0	0

BATH AND OTHER BUILDING STONES, OF BEST QUALITY.

RANDELL, SAUNDERS & CO., Limited, Quarrymen and Stone Merchants.

List of prices at the Quarries and Depots, also cost of transit to any part of the United Kingdom, furnished on application to

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[ADVT]

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GREEN ROOFING-SLATES.

As supplied to H.R.H. The Prince of Wales at Sandringham. The Penryn Sea-green Slates are specially adapted for Churches, Public Buildings, &c., &c.

(Less costly than ordinary Gothic Tiling.)

These durable and non-absorbent slates can be obtained in sizes suitable for Gothic Architecture, at prices as under.

in Railway Trucks, Docks, Gloucester &c.

	1,800 Slates	per square	Equivalent to
Best Green Slates 14 by 7	2 17 6	.. ..	15s. 6d.
Do. do. 13 by 8	2 17 6	.. ..	16s. 6d.
Do. do. 13 by 7	2 5 0	.. ..	14s.
Do. do. 12 by 7	1 18 6	.. ..	13s.
Do. do. 12 by 6	1 7 6	.. ..	11s.

Prices of large Sizes, Cost of Transit, Reference estimations, and Sample Specimens may be obtained on application to

MESSRS. RANDELL & CO., Corsham, Wilts.

Specimens at Museum of Geology, Jermyn-street, Piccadilly, W., and at Architectural Museum, Tufston-street, Westminster.

COMPETITIONS OPEN.

BASSENTHWAITE, CUMBERLAND, June 30.—For plans, &c., for the erection of a chapel. A premium of £25 is offered for the best design. Mr. Jos. M. Richardson, Hutton House, Penrith.

DEVON COUNTY ASYLUM, June 24.—For plans, specifications, and estimates for additional buildings at the Asylum at Exminster. The architect whose plans may be adopted will be employed to superintend the works, on the usual terms of commission, provided it be found that they can be executed within the estimated amount. The sum of £25 will be given for the second best design, namely, £10 for that of the chapel, and £15 for that of the other buildings. T. E. Drake, Clerk to the Committee, Exeter.

MADRAS TRAMWAYS COMPANY, July 31.—The Directors offer a premium for the most approved system of checking the receipts of the conductors of cars. W. Davison, Secretary, 17, Cornhill, E.C.

MANCHESTER, September 1.—For designs for the erection of a new fruit market and other buildings. First premium £200, to merge in the commission if the architect be selected to superintend the erection of the market; premium of £150 for the second, £100 for the third, and £50 for the fourth design. City Surveyor, Town-hall, Manchester.

NORFOLK AGRICULTURAL ASSOCIATION.—For a design for Norfolk labourers' double cottage. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NORFOLK AGRICULTURAL ASSOCIATION.—For designs for farm buildings for a Norfolk farm of about 300 acres. A premium of £10 will be given for the best design. J. Bacon, Secretary, Attleborough.

NOTTINGHAM, July 15.—For designs for a new Gothic church. Premiums of £75, £50, and £25 will be awarded to the second, third, and fourth designs. The one accepted will be adopted by the Committee, should it fulfil all the necessary requirements. Mr. Wm. Clarke, The Park, Nottingham.

SHREWSBURY, June 21.—For design for a memorial drinking fountain. A premium of £5 will be given for the selected design. Mr. Kent, 38, High-street, Shrewsbury.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB, Tileries, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ADMIRALTY, June 16.—For the erection of a Coastguard station at Bacton, Norfolk. Director of Works, Admiralty, Spring Gardens-terrace, S.W.

BILDON SEWERAGE WORKS, June 30.—For the construction of about 750 yds. of brick sewers. J. Brook, Clerk to the Board, BILDON.

BARDSEY, CARNARVONSHIRE, June 23.—For alterations and additions to tower and dwellings, and new mineral oil store at the lighthouse. Mr. Robin Allen, Secretary, Trinity House, London, E.C.

BLACKFRIARS.—For the erection of a range of warehouses in Tudor-street. Messrs. Smith and Seymour, architects, 1, Gresham Buildings, E.C.

BRIGHTON, June 24.—For the purchase of two portable engines. F. J. Tillstone, Town Hall, Brighton.

BRISTOL, June 24.—For widening Bristol Bridge. Mr. F. Ashmead, Engineer, 13, Prince-street, Bristol.

BUCKLEBURY, BERKS, June 25.—For alterations and additions to the school building. Mr. J. H. Money, architect, Broadbury, Newbury.

BUENOS AYRES, July 1.—For the supply of cast-iron pipes. J. F. Bateman, Engineer, 16, Great George-street, S.W.

CHET VALLEY, NORFOLK, June 17.—For the completion of the works left unfinished by the late contractor for the Chet Valley Improvements. Mr. J. C. Copeman, Clerk to the Improvement Commissioners, Loddon, Norfolk.

CLECKHEATON LOCAL BOARD, June 18.—For the construction of main sewers and other work. J. D. Hirst, Clerk to the Board, Boardroom, Cleckheaton.

DAVENTRY, June 16.—For the construction of about 2000 yds. of 12in. and 9in. pipe sewers, with manholes, &c. Mr. E. Sharman, Surveyor, Wellingborough.

DUBLIN AND DROGHEDA RAILWAY, July 1.—For the construction of a branch railway about a half mile long in Dublin. Engineer's Office, Amiens-street, Dublin.

GREAT SOUTHERN AND WESTERN RAILWAY, IRELAND.—For the construction of the North Wall Extension (Nos. 1 and 2) Branch Railways, Dublin. Engineer's Office, Kingsbridge Terminus, Dublin.

HANTS, June 20.—For the erection of a new church at Edge End, near Batley. Mr. J. Colson, architect, S. Swithin-street, Winchester.

HIGH AND LOW BISHOPSIDE SCHOOL BOARD, June 16.—For the erection of schools, master's house, outbuildings, and fence walls, at Pateley Bridge. George Corson, architect, 25, Cookridge-street, Leeds.

HOLLAND, LINCOLNSHIRE, June 30.—For the reconstruction of Pinchbeck Bars Bridge. F. T. White, Clerk of the Peace, Boston.

HORBRURY LOCAL BOARD, June 23.—For the construction of about 8,000 yds. of brick and earthenware pipe sewers. G. H. Holt, Clerk to the Board, Horbury, near Wakefield.

LEEDS, June 17.—For paving, flagging, and levelling Richmond-court, Dew-lane, Lees-yard, Forbes-street, Evesham-terrace, Green Dragon-yard, and Pembroke-street. A. W. Morant, Borough Engineer, Town Hall, Leeds.

LEEDS, June 23.—For the erection of extensive premises in George and Dragon Yard, Briggate. Messrs. Wilson and Bailey, architects, Central Market Buildings, Leeds.

MORLEY WATERWORKS, June 25.—For the construction of a reservoir at Churwell. Mr. E. Filbiter, 16, East Parade, Leeds.

NORFOLK COUNTY LUNATIC ASYLUM, June 28.—For the erection of new female wards, boundary walls, and other works, at the asylum at Thorpe. Mr. R. Makil-waine Phipson, County Surveyor, Surrey street, Norwich.

NORTHAMPTON SCHOOL BOARD, June 28.—For the erection of new schools in Spring-lane. Mr. R. Walker, Architect, 10A, King's Arms Yard, Moorgate-street, E.C.

PORTSMOUTH, June 16.—For the construction of sewers, paving, and road-making. Mr. J. E. Greatorex, Surveyor, Landport Road, Portsmouth.

RICHMOND, SURREY, June 17.—For the supply of 50 yds. of broken Bombay stone. Mr. E. J. Pinkerton, Surveyor, Richmond.

RYE, SUSSEX, June 17.—For the construction of a sluice and bridge on the Tillingham River. Mr. Edward Elliott, Engineer, Scotsfoot, Rye.

SALISBURY GASLIGHT AND COKE COMPANY, June 16.—For the purchase of tar. Mr. E. E. S. Kelsey, Secretary, The Close, Salisbury.

SHAWFORTH, NEAR BACUP, June 29.—For the erection of a new Wesleyan chapel and schools. W. Waddington, architect, Burnley.

ST. SAVIUR'S UNION, June 18.—For alterations at the General Relief Station and Dispensary, Westmoreland-road, Walworth. Messrs. Jarvis and Son, architects, 29, Trinity-square, Borough, S.E.

THE TRUSTEES OF THE RIVER WELLAND OUTFALL ACT, June 23.—For the erection of a new outfall sluice from the Lords Drain into the Welland. Messrs. Bonner and Cathrop, Clerks to the Trustees, Spalding.

TILNEY S. LAWRENCE SCHOOL BOARD, NORFOLK, June 16.—For the erection of schools and teacher's residence. Adams and Son, architects, Bridge-street, Lynn.

WATES, June 23.—For the erection of police stations at Llantrissant and Pandy. Mr. Thomas Dalton, C.P., Cardiff.

WALSALL, June 16.—For the erection of S. George's Church. Mr. Robt. Griffiths, architect, Greengate-street, Stafford.

WAR DEPARTMENT CONTRACTS, June 18.—For the supply of cast-iron pipes for a fire main at Woolwich. Col. W. D. Gossett, Royal Engineer Office, Woolwich.

WARRINGTON, June 23.—For rebuilding Mill-lane Bridge and re-forming the road. Mr. H. B. White, Back-street, Warrington.

WATLINGTON, OXON, June 18.—For the erection of schools to accommodate 262 children. Mr. W. Wiggins, Watcomb Manor, Watlington.

WHITBY, June 23.—For the construction and erection of a mineral oil store at the Whitby North Lighthouse. Mr. Robin Allen, Secretary, Trinity House, London, E.C.

WISBEACH, June 20.—For the erection of villas in Clarkson-road. Messrs. Adams and Son, architects, Wisbeach.

WOODLESFORD, June 17.—For the construction of sixty houses. H. Shaw, Architect, Leeds.

WRAYSBURY SCHOOL BOARD, June 19.—For the erection of new schools at Wraybury. J. Doulton, Vine House, Wraybury, Staines.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

(From the Public Ledger.)

	LEAD.		
Pig. Foreign .. . per ton	£23 0 0	£23 5 0	
" English W.B. .. .	25 0 0	25 5 0	
" Lead Co. .. .	24 15 0	0 0 0	
" Other brands .. .	23 12 6	23 17 6	
Sheet Milled .. .	24 10 0	24 15 0	
Shot, Patent .. .	26 10 0	26 15 0	
Red or minium .. .	25 0 0	0 0 0	
White Dry .. .	29 10 0	0 0 0	
" ground in oi .. .	0 0 0	0 0 0	

TIMBER.

	load	£14 0 0	£14 10 0
Teak .. .	4 0 0	5 10 0	
Quebec red pine .. .	3 5 0	6 0 0	
" yellow pine .. .	4 0 0	4 10 0	
" pitch pine .. .	7 0 0	9 0 0	
Quebec oak, white .. .	5 0 0	6 0 0	
" birch .. .	4 15 0	6 0 0	
" elm .. .	4 10 0	5 0 0	
Dantzic oak .. .	5 0 0	7 0 0	
" fir .. .	3 10 0	5 0 0	
" undersized .. .	2 15 0	3 5 0	
Riga .. .	4 0 0	4 5 0	
Swedish .. .	2 12 6	3 0 0	
Wainscot, Riga .. .	4 10 0	6 15 0	
Masts, Quebec red pine .. .	4 10 0	6 10 0	
" yellow pine .. .	4 0 0	6 10 0	
Oregon .. .	9 0 0	12 0 0	
Lathwood, Dantzic fm. .. .	8 10 0	10 0 0	
" St. Petersburg .. .	11 0 0	12 10 0	
Deals per C, 12ft. by 8 by 9in			
Quebec Pine, 1st qual. .. .	20 0 0	21 0 0	
" 2nd do. .. .	14 10 0	16 0 0	
" 3rd do. .. .	10 0 0	10 10 0	
Canada Spruce, 1st .. .	11 10 0	12 0 0	
" 2nd & 3rd .. .	10 0 0	11 5 0	
New Brunswick .. .	10 10 0	11 0 0	
Archangel, yellow .. .	14 10 0	15 10 0	
St. Petersburg yellow .. .	12 10 0	14 10 0	
Finland .. .	9 0 0	13 0 0	
Memel and Dantzic .. .	0 0 0	0 0 0	
Gothenburg, yellow .. .	10 10 0	13 0 0	
" white .. .	10 0 0	10 10 0	
Geffe yellow .. .	12 0 0	13 10 0	
Christiania .. .	10 0 0	13 10 0	
Battens, all sorts .. .	7 5 0	10 0 0	
Other Norway .. .	9 10 0	10 10 0	
Flooring boards per square of 1in, first yellow .. .	0 12 6	0 13 6	
First white .. .	0 10 6	0 11 6	
Second qualities .. .	0 8 6	0 10 6	

COPPER.

	per ton	£90 0 0	£98 0 0
British—Cake & Ingot .. .	32 0 0	100 0 0	
Best selected .. .	96 0 0	104 0 0	
Sheet .. .	100 0 0	107 0 0	
Bottoms .. .	89 10 0	91 0 0	
Australian cake .. .	88 0 0	0 0 0	
Spanish cake .. .	81 0 0	86 0 0	
Chili Bars, cash .. .	91 0 0	92 0 0	
" Refined ingot .. .	0 0 0	0 0 0	
Yellow metal .. . per lb.	0 0 9	0 0 9½	

IRON.

	per ton	£5 13 6	£0 0 0
Pig in Scotland, cash .. .	13 10 0	0 0 0	
Welsh Bar, in London. .. .	12 10 0	0 0 0	
" Wales .. .	14 0 0	15 0 0	
Staffordshire .. .	12 0 0	13 0 0	
Rail, in Wales .. .	17 0 0	20 0 0	
Sheets, single in London .. .	15 0 0	16 0 0	
Hoops, first quality .. .	14 0 0	15 0 0	
Nail Rod .. .	19 0 0	20 0 0	
Swedish .. .			

OILS, &c.

	per tun.	£38 0 0	£0 0 0
Seal, pale .. .	95 0 0	96 0 0	
Sperm body .. .	41 0 0	0 0 0	
Cod .. .	37 0 0	0 0 0	
Whale, South Sea, pale .. .	43 0 0	0 0 0	
Olive Gallipoli .. .	39 0 0	0 0 0	
Cocanut, Cochiti .. .	39 0 0	39 10 0	
Palm, fine .. .	38 0 0	0 0 0	
Linseed .. .	39 15 0	0 0 0	
Rapeseed, English pale .. .	23 10 0	29 0 0	
Cottonseed .. .			

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BANKRUPTS.

(To Surrender in London.)

James Hibberd, Britannia-terrace, Kensal-road, and Harlesden, builder, June 18, at 12.30.—William Innes, Abingdon-street, civil engineer, June 18, at 2.

(To Surrender in the Country.)

Joseph Burnicle, Middlesbrough, joiner, June 27, at Stockton.—James Jackson, Eccleshall, builder, June 24 at Bradford.

SITTINGS FOR PUBLIC EXAMINATION.

S. Youngman, Old-street and Richmond-street, S. Luke's, timber merchant, July 8.—R. Smith, Northampton, builder, July 9.

DIVIDEND MEETING.

W. Bowen, Norwich, plumber, painter, glazier, and decorator, June 26.

DECLARATION OF DIVIDEND.

G. Scorsah, Sheffield, timber merchant, div. 7s. 3d.

SCOTCH SEQUESTRATION.

John Smith, Edinburgh, builder, June 17, at 12.

PARTNERSHIPS DISSOLVED.

Perry, Brooks, and Perry, Lye, near Stourbridge, nail and chain manufacturers.—G. Wailes and Co., Stroud engineers.—Bedford and Leach, North Ormsby, Yorkshire, nail manufacturers.—Patchett and Smith, Pateley Bridge, stone merchants.—Hopton and Walker, Manchester-street, Gray's Inn-road, timber benders and wheel manufacturers.—Robert Smith and Sons, Colne, joiners and cabinet-makers.

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 20, 1873.

FIRES.

THE ruin of the Alexandra Palace, through the dropping of a spark or two, should make some impression upon the minds of both those who build and those who occupy. From the day, nearly eight hundred years ago, when the first S. Paul's Cathedral was destroyed, London may be described as a City of Fires. Leaving out of view less important structures, we have had twice to rebuild the Custom House. The Opera-House and Astley's Amphitheatre; the Surrey, Covent Garden, Drury Lane, Olympic, Royalty, Pavilion, and Queen's Theatres have been seen in ashes—some of them again and again. We lost the old Royal Exchange and the old Houses of Parliament, with the great tower over the Choir of Westminster Abbey, besides public halls, wharves, docks, and ancient edifices; and the average of disaster is, and has been for several years past, rapidly on the increase, as official statistics prove. Even the great Metropolitan fortress—the Tower—did not escape; and Windsor Castle itself was, not very long ago, in danger. One wing of the Crystal Palace, also, fell beneath the fury of the same power, and has not since been restored. Well, then, to approach a practical issue, is it true that building materials are becoming more and more combustible? Hardly, because the old perish in a greater ratio than the new. The Alexandra Palace had been only recently re-erected; but the former Houses of Parliament and the Tower of London could lay no claim to youth. Or that we are in the habit of storing together vast masses of easily ignitable material? Such a peril is impossible to avoid, so long as manufactures and commerce exist. But, with reference to pipe-lights and portable furnaces, the remedy appears not difficult, under a system of vigilant supervision and the adoption of simple practical processes. It is an old story concerning the qualities which render iron and stone, under particular circumstances, perilous; and we have had an endless succession of receipts for rendering all things unflammable; besides fire annihilators which, somehow, never seem to be brought into use. There is also a project before the world for constructing absolutely fireproof warehouses. We shall not, in this page, discuss its merits, which, at best, could never apply to such structures as the Crystal and Alexandra palaces, or our great cathedrals and abbeys. These we cannot divide into isolated compartments, or roof with asbestos, or floor with encaustic tiles. It is, then, to our facilities for suppressing a conflagration when it has once broken out, and to the precautions which are neglected—some of them so trivial that it is difficult to conceive such terrible consequences from causes so minute. We have a magnificent Fire-Brigade, but in such instances as the Tooley-street, the Crystal Palace, and especially the Alexandra Palace conflagrations, its powers are naturally unequal to the contest with so sudden and vast an outburst of flame. It is no disparagement to the force, indeed, though it may suggest improvements in the apparatus at its disposal,

to say that millions' worth of property and many human lives have been lost through the weakness of the machinery provided in this immense and wealthy metropolis for overpowering and extinguishing fires. We have the old-fashioned parish-engines, of little or no value—worn out, ill-equipped, and inefficiently manned. Then certain great establishments maintain their own engines and staffs, the use of which is occasionally given to the public. Lastly, the Fire Brigade; but of what does it consist? Of about fifty engines, drawn by horse or hand, a few under four hundred men, and four floating stations with power enough at their disposal to fling up water to a height of rather less than a hundred feet! Now, considering the vast number of buildings constituting the metropolis, the work done by this organisation is marvellous; but there are physical limits to its capacity, and, considering that the Alexandra Dome was situated on a hill, and two hundred and twenty feet in altitude, there is nothing to marvel at in the fact of its swift destruction. Nor were the hydrants in the interior more available. Paris has nearly a thousand regular firemen, and rarely witnesses a serious fire. On the other hand, we have our police always on the watch; but the systems of alarm are different. In Belgium and Holland a powerful horn is blown, from the summit of a lofty tower, on the first appearance of a red gleam among the houses; in German cities flags are exhibited by day and lamps flashed by night; in America, electric wires connect the steeples of churches or the tops of public edifices with the various stations—each of which plans appears more quick of action than our own. But what about the causes of these calamities? We revert to the well-known reports made to the House of Commons by the late Mr. Braidwood. In nearly all cases they are expressed by one word—carelessness, if not recklessness. Carpenters' and cabinet-makers' shops, saw-mills, and oilmen's warehouses, when once kindled, are scarcely ever rescued from total ruin. Ill-placed flues, boilers, and stoves are the agents of constant incendiarism. Yet we do employ wood in an exorbitant degree, even in our East-end architecture. But householders would do well to bear in mind the figures belonging to the subject, when reflecting upon the chances of mansion, or villa, or cottage being suddenly burnt down. The greatest number of fires recorded in London, during a particular period of years from the establishment of the Brigade, was due to the ignition of curtains. We cannot call this, in any large proportion of cases, pure accident. Other causes follow in this order:—Flues, candles, gas, sparks from grates, and tobacco-smoking. We can construe no moral from the upset of lights by dogs and cats; the playing of children with lucifers, heat from sun, suicides, or Christmas games; but it would be possible to settle the list into something like a formal programme of probabilities affecting building property in England. The secretary of a great insurance office, for example, has affirmed that the introduction of lucifers and pipe-lights cost them, at first, £10,000 a year. To these we must add the introduction of inflammable oils, scarcely less capable of being brought under control than the celebrated Greek fire. It is, however, a question of the utmost importance to consider how these disasters, which bring the proudest works of our architects and builders, within a few hours, to the ground, can best be prevented, or, if happening, can most easily be confined within a limited range. The hot-water warming apparatus, it has been shown, when applied above a certain point of temperature, in connection with woodwork, is dangerous, and was very near, a few years ago, bringing about the destruction of Apothecaries' Hall. It did, indeed,

set the premises of Messrs. Day and Martin on fire, 1848. Turning to the class of buildings most frequently destroyed, they are, to begin with, naturally, dwelling-houses, then lodgings, and next taverns. After them, shops, workshops, houses under repair, unoccupied tenements, and so forth; but no inference must be drawn from these calculations. The lucifer-match makers are set down at a low figure, yet they are the most terrible of all. Still, there are many others which certain offices regard as too hazardous to be insured at any premium: floorcloth manufacturers, gunpowder-dealers, wadding manufacturers, and varnish-makers among the number. Others are charged extra prices—as flambeau-makers, coffee-roasters, laboratory chemists, fat-melters, and wax-refiners. Party-walls do not protect their neighbours. Even if they did, what might be the effect of even a confined fire in one of the enormous S. Paul's Churchyard warehouses? It is necessary to suggest no more than that the dome of the Cathedral is principally constructed of oak, dried by the seasoning of a hundred and sixty years. There, as at the Alexandra Palace, the roof is too high to be reached by water from any engine that could be brought into play, even though it were worked by steam-power, and what a national misfortune might be the result! When the Houses of Parliament were burnt, October 16th, 1834, the fire, caused by the breaking of a gas-pipe, had been smouldering for several days amid the timbers of the roof; the cause of the conflagration by which that splendid structure, the old Royal Exchange, was consumed, remains to this day unknown; the partial ruin of the Tower was due to the simple overheating of a flue. Thus it may be perceived at what a disadvantage our public offices stand with respect at once to the prevention and to the repression of fire, whenever that devastating force has gained the slightest hold of them in either inaccessible or remote positions. The burning of the Alexandra Palace, following so closely upon other calamities of the kind, will surely have directed the public mind seriously to this subject, involving as it does so many and such vital interests.

HISTORIC ART STUDIES.

BY DR. G. G. ZERFFI.

GREEK ARCHITECTURE OF A LATER PERIOD.

(With Illustrations.)

ORDER is in architecture the magic element that endows inorganic matter with life, and brings harmonious union into the variety of the component parts. Architecture does not consist in heaping stone upon stone, in placing beam upon beam, nor even in measuring, calculating, sifting, arranging, and constructing. Any artisan or workman can be brought to perform these functions with the greatest accuracy. This was never better understood than in Greece at the period of which we now treat, yet real life appears to be on the wane in the buildings shown in our illustrations. The manly and active architecture of the Doric order gave way to the more feminine and passive Ionic, and both had to yield first to the Corinthian, and finally to a mixture of various styles. The architects gradually lost the pure and simple forms so powerfully expressive of the conflicting forces of nature, and gave themselves up to learned refinements and over-decoration.

The architect has to work with masses, and so long as he does not understand how to master his weighty material, he will use it in defiance of the laws of symmetry and proportion, and only produce an impression by a waste of material. Thus the Egyptians, Assyrians, and Babylonians, untrammelled by any laws of proportion, heaped stone upon stone, brick upon brick, and produced monstrous structures, which, in spite of their massiveness, were gigantically ugly. On the

other hand, when a correct order has been formed, and improved upon by a refined taste, showing to what extent the artist has consciously become master of matter, another tendency may be traced in the historical development of art—that of killing the effect by an elaborate minuteness of detail. The technical difficulties of the work are forced into prominence, and mar the simple impression induced by the building, which often is decorated with incongruous materials. Thus carvings, fit only for wood and ivory, are executed in stone, at heights where they altogether lose their effect, and become mere incumbrances. The Indians outdid all other nations in this, and were conscientiously followed by the revivalists of their architecture—the Goths. The transition link in the development of these styles is to be found in the change from the Greek architecture of this, to the Roman architecture of a later period. We cannot think that the Korinthusian order was altogether an outgrowth of the Doric and Ionic, as we find traces of it in pre-historic times. The lotus and papyrus in India and Egypt suggested the cup-form as a capital long before the legend of Kallimachos—the little basket on the grave of a maiden and the surrounding acanthus leaves—was circulated. The curious point, historically speaking, is that this richly-decorated capital, influencing the whole construction of temples and monuments, should only have come into general use at a time when sculpture and architecture had begun to decline. The Greek artists added the Ionic volute to the use of the cup-like capital, and improved the symmetry of the details. During the despotic rule of Alexander the Great this order became more universal, and was adopted by the Romans, in preference to others, during the reigns of their most sanguinary tyrants. The Korinthusian order is undoubtedly the most realistic expression of pomp and vanity. The architectural catholicism which is conveyed in this combination of Asiatic and Doric elements was brought to perfection during this period by the refined taste of the Attic artists, influenced by the traditions of the best Classic style.

The transition was not sudden; we can plainly see the struggle between simplicity and the new spirit. In Fig. 1 we give a fragment of the temple of Zeus, at Nemea, in the northern Argolis, of which some columns still exist, showing, in the neglected details, the smaller architrave, and the superficial treatment of the system, the marked influence of discontent with better forms. The measurements which we have of this temple in our art-histories and archaeological records are generally erroneous. According to Dr. Semper, who visited the building, the following figures give a correct idea of the proportions. Taking three average distances from axis to axis of column as base of a rectangle, the sides of which are equal to the height, measured from the edge of the last step of the stylobate to the upper edge of the kymation of the corona, and taking the semi-diameter of the lower part of the column as module, we have:

14·38 (base)

(12·63 height of column + 3·344 [height of architrave and frieze]) = 15·974 (sides). The upper diameter of the column is 0·809. The abacus 2·16 modules, being only one-seventh of the breadth to the height. The echinus is narrow, and nearly straight-lined. There are only four slightly cut and widely separated rings, and one indentation. The horizontal and vertical lines at this period of Greek art lose their proper relation. The columns are too elongated, and the architraves too heavy or too mean. The Ionic element predominates in the decoration, and the rectangle, measured as above, assumes more and more the form of a square.

The Choragic Monument of Lysikrates, at Athens (see Figs.—2, elevation, 3, ground-plan, and 4, details), is undoubtedly the finest

specimen of the Korinthusian style. It may be called an essay in stone on the spirit of the times in which it was constructed. It is elegant and splendid, but yet how faulty! The whole was made to carry a tripod, the prize obtained by the Choragus, Lysikrates, 334 B.C. The poetical and artistic forces of Greece were decaying. The temples in honour of the gods or goddesses disappear, and spiritual man, with his powers of divine reason, takes the places of the divinities. Philosophy has advanced him to a full consciousness of his nature; he no longer trains his body, but begins to concentrate his mind on metaphysics. Through this spiritual training poetry and art are sadly neglected. The monuments erected to the gods of Phidias give way to constructions for the glorification of a choragus! The key to understanding this monument is the *omphalos*, which received the sacred tripod, and to which the whole monument merely forms a base. A slender circular construction (see Fig. 3) was raised on a square substructure which was 11ft. high (see Fig. 2). The circular building was surrounded by six Korinthusian half-columns, which, for the first time, sink into a secondary position. Frieze and cornice were gracefully decorated and covered by a flat cupola, 5ft. in diameter, made of a single marble block. The whole monument was 34ft. high, and of the purest Pentelic marble. The roof was crowned by a fantastic bunch of flowers, with a rich corolla, destined to bear the tripod. The *omphalos* represented the dynamic force of the Korinthusian capital in its general outlines and refined details. Frieze and cornice (see Fig. 4) are Ionic, or rather of an undecided eclectic character, presenting a mixture of Asiatic and Doric forms, united by a strong feeling of symmetrical proportion. We have at Athens the monument of another Choragus—Thrasyllos, in an entirely different style (see Figs. 5, 6, and 7). The purpose of this was also to bear a tripod. It was erected 320 B.C., on the southern declivity of the Akropolis, and formed the front of the entrance to a cave (see Fig. 7, Ground-plan). The rock-hewn sanctuary was thus revived. There were at first only two Doric pillars, supporting a simple entablature; but later, when the statue of Dionysius was placed in the centre, with two ornaments at the sides, a third pillar, of smaller dimensions, was added in the middle. Greek art thus condescends to mere patchwork, and renounces the laws of congruity and harmony.

In Figs. 8 and 9 we have the Propylæa at Eleusis, leading to the Temple of Demeter, erected about the middle of the last century B.C. As may be seen from Fig. 9 (the ground-plan), the building is a mere copy of the Propylæa at Athens. Six steps led to the porch, the ceiling of which was supported by six Ionic columns. The style, as may be seen in Figs. 10 (capital) and 11 (base), was soft and feminine. A side-view of the capital is given in Fig. 12, and Fig. 13 shows the section of the volute. The ceiling of the porch was also a mere copy of that of Athens. Fig. 8 *a*, represents the section of a cross-beam of the ceiling. Fig. 8 *b* shows two richly-adorned cassettes; and in Fig. 14 we have a most charming, highly-finished, and admirably-modelled Akroterion. In Figs. 15, 16, and 17 we have details of the inner Propylæa of the temple at Eleusis, where the grand mysteries were celebrated. The lesser mysteries were held at Agra, in Attika, on the Ilissus. They began with a sort of confession. The fundamental principle was a mystic explanation of the conflicting forces of nature—*spirit* and *matter*; of *purification* and *reconciliation*. Many of these ideas, with their symbolic meanings and ceremonial forms, may be traced in early Christian dogmas and ceremonies. The great mysteries consisted of a solemn teaching of *ethic truths*. These mysteries were the origin of Greek civilisation; poets, kings, and priests worked hand in hand, like architects, sculptors, and painters, to attain perfection in the

social organisation of the people, as well as in art. The mysteries, however, sank by degrees with the social condition of the people into empty formulæ and mere ceremonies of a loose and objectionable character. The *first* day of the festivities was devoted to solemn meditation; the *second* to ablutions and purification; the *third* to fasting; of the *fourth* nothing is known; the *fifth* was called *λαμπαδων ημερα*, from a torch-procession, representing the wanderings of Demeter, symbolic of the human life; the *sixth*, called *Ιαχχος* was the most solemn. On this day the infant son of Demeter was crowned with myrtles, and attended in procession by the initiated worshippers, who returned on the *seventh* day. The *eighth* was called *Epidauria*, on which those who had come too late were initiated. On the *ninth* two vessels filled with wine were emptied, the one towards the east, the other towards the west, and the night festivities began. Atheists, Epikureans, and, at a later period, also Christians, were called upon to retire; oaths of secrecy were administered, and the people were given up to the terrors of a gloomy night. Flashes of lightning pierced the darkness, secret voices whispered round them, terrible shrieks and claps of thunder were heard, and ghastly phantoms appeared. In fact, all the artifices of modern spiritualists were employed to heighten the solemn moment when they were taken into the splendidly ornamented and brilliantly illuminated temple of the goddess, the incarnation of the ever-young mother of nature. After the solemnities the worshippers were dismissed with the solemn formula *Κοῦζ Ομπαζ* (from the Indian formula "Kansha-Om-Paksha"—see Dr. Creuzer, "Symbolik und Mythologie"). In accordance with these mystic ceremonies we see the capitals of the temple (see Fig. 15) ornamented with winged griffins, rising from a nest of acanthus-leaves. Fig. 17 shows the base of the pillar. The plan of the temple is ascribed to Iktinos, but the decorations are of a later period. In front of the Propylæa, at Eleusis, stood a small Doric temple (see Figs. 18, 19, and 20), an amphiprostylos (see Fig. 19, Ground-plan) with two columns in *Antis*. The whole temple was 21ft. broad by 40ft. in length. With the exception of the roof, the material was Pentelic marble. The Akroterion (see Fig. 20) was both rich and pompous, but still bearing vestiges of good taste, inclining to over-decoration.

Figs. 21, 22, 23, and 24, represent elevation, cornice, capital, and ground-plan of the Tower of the Winds, Lantern of Diogenes, or Clock of Andronikos Kyrrhestes, who constructed this small monument about the middle of the second century B.C. It was a sun-dial and weather-cock placed on the new market-place in the form of an octagon, provided with two porticos (see Fig. 24, Ground-plan). In the interior there was a water-clock (*klepsydra*), traces of which may be still seen. On the flat pyramidal roof rose a brazen revolving weather-cock, in the form of a Triton pointing with a staff in the direction of the wind. Only eight winds were known; these are sculptured on the frieze. *Boreas*, the cold, stormy, north wind, was represented as an old, grim-looking man. *Kaikas*, the north-east wind, as an old man with an angry countenance. *Apeliodes*, the east wind, as a cheerful-looking man—the best friend of vegetation. *Eurus*, the south-east wind, as the harbinger of much rain, as an old man with a sullen face. *Notus*, the south wind, as a young man emptying a jar of water. *Libs*, the south-west wind, as a strong and powerful man, apparently pushing a ship before him. *Zephyrus*, as a beautiful youth, with a kind and smiling face; the only figure without tunic, wrapt in a loose mantle, filled with flowers. *Skiron*, the north-west wind, which was very dangerous to the health, was represented as scattering ashes and burning coals from a *pyrainos*

(a brazen fire-pot), with an air of languor. Frieze, cornice, and the capitals of the columns (see Fig. 25) show a heavy clumsiness reminding us of Egyptian patterns, and an attempt to be colossal in a very small way. We are struck with this in comparing our modern Gothic churches with those of Rheims, Chartres, York, or Cologne. The Greeks were no longer what they had been. In Asia Minor the Ionic style still flourished in its effeminate magnificence and luxury. The spirit of a conquering genius hovered over the gorgeous temple of Athené Polias at Priene, constructed by the architect Pytheos, 340 B.C., and consecrated by Alexander the Great (see Fig. 26). The temple was a peripteros of six columns in front, by eleven on the sides; 64ft. broad by 116ft. long, and shows a mighty cornice and compressed capital. We have next the temple of the Didymæan Apollo at Miletus, one of the most splendid temples of antiquity, rebuilt after its destruction by the Persians. It was 164ft. broad by 303ft. long, a hypæthral dipteros of ten columns by twenty-one. The architrave is (Fig. 27) compressed, and out of proportion in relation to the mighty capital (Fig. 28) with its projecting volutes; whilst the base, with its colossal torus, offends against the laws of symmetry. Pæonios of Ephesus and Daphnis of Miletus were the architects of this temple. The severity and simplicity of Greek Classic art had passed away. The East, with its overheated imagination and unbounded forms, its incapacity for mastering matter, destroyed really high art. Luxury and an enervating Oriental sentiment became the characteristics of an art which we shall see bending beneath the iron power of Rome, to glorify brute force and to proclaim the splendour of universal tyranny.

MR. WILLIAM LONGMAN'S BOOK ON S. PAUL'S CATHEDRAL.*

THIS is indeed a dainty book, quite fit for the drawing-room table, and will have the effect, doubtless, of interesting those who but for such a book would hardly perhaps care to do more than to know simply of the existence of S. Paul's Cathedral—nothing of its eventful history, or of its great architect. Such books as these, with their hot-pressed paper, and clear type, and smart covers, are typical of the time, and seem almost to throw into the shade the objects themselves which they illustrate. Mr. Longman has almost, we are afraid, eclipsed S. Paul's itself, and there are doubtless not a few who will read and admire this fine book who would hardly care to put themselves out of the way to examine the building itself. Books are ruling the world. It is only to be hoped that the things about which the books are written will now and then meet with a little of the "reading world's" attention!

It will be useful, in the first place, to give the reader some idea of the matter which has thus been so industriously got together and put into this popular and handy form. The Cathedral-Church of S. Paul's is emphatically the National Cathedral, more so, indeed, than any other in Great Britain, and the history of it must therefore lay claim to a national interest. It is indeed a right remarkable structure, and so, too, is the very ground it stands on, for as far as history reaches back this very spot of ground has been consecrated to some religious use. Before the seventh century a temple dedicated to "Diana" stood on the very spot now covered by S. Paul's. It would be curious to catch a glimpse of this temple, and to compare it, together with its congregation and their doings, with the present structure, and its way of work. Long before the commence-

ment of the seventh century, this Pagan Temple, which may have disappeared some time before, was replaced by the first Christian church. It was attached to a monastery founded by Ethelbert, King of Kent. Melitus, the companion of S. Augustine, was then Bishop of London. It is curious to note that this monastery was endowed with the Manor of Tillingham, in Essex, the only piece of land which has not, as Mr. Longman says, been swallowed up in the mass of property placed under the administration of the Ecclesiastical Commissioners. It is curious to note, too, that it still furnishes part of the fund provided for the "repairs" of the fabric of the present cathedral. No record whatever remains of this church. It stood for five centuries, and was then destroyed by fire during the Conqueror's reign. This brings us down to the year 1087-8. The next cathedral was built and remained standing until destroyed by the fire of 1666. It was begun by Maurice, Bishop of London, in 1087. It is this cathedral which Hollar drew and engraved, almost as it existed, just before the Great Fire of London. They are not a little valuable, these engravings of "glorious old Hollar," as Pugin called him, for without them we should not know what the old Gothic Cathedral of S. Paul's was at all like. Now we can, to a great extent, realise it to ourselves, and Mr. E. B. Ferrey has, with great pains, gone to work and made out, with no small exactness, what the old cathedral really was like, and what was the character of its details. We must refer the reader to the book itself for the perspective view of the exterior, and another of the interior of old S. Paul's.* The reader should compare them with the present cathedral, and also, as a matter of curiosity, with Westminster Abbey, dedicated to S. Peter. In Hollar's day, be it observed, London was yet a "Gothic" town, i.e., the common houses and other buildings harmonised in style of architecture with the great cathedrals and the multitude of churches about them. At page 15, Mr. Longman has given a view which we also give, of this strange bit of "old London." Any one mounting to the dome gallery of S. Paul's, and with this quaint view in his hand, will find some difficulty in recognising his whereabouts. It is curious to note how completely a town disappears, nothing remaining of it but the old names and memories of things gone by. Mr. Longman, in his second chapter, gives an interesting account of old S. Paul's and its surroundings, for it was anciently encompassed by a wall in which there were no less than six gate-houses. The Bishop's Palace also stood at the north-west corner of the churchyard. There was also the Chapter-house, and a "Charnel-house." There were also numerous chapels in and about this Gothic cathedral, and a great cloister, and as a remarkable appendage to the cathedral, the extremely beautiful parish church of S. Faith, built under the choir. Paul's-Cross also must not be forgotten, with its pulpit-cross of timber mounted upon steps of stone, and in which sermons were preached every Sunday in the forenoon. At page 21 is given a view of S. Paul's Cross, its pulpit, and its quaint congregation, as it appeared on Sunday, March the 26th, 1620. We can thus see into the past to the very day and hour!

The style of the architecture of old S. Paul's, be it observed, ranged from Early-Norman to Early-English Gothic and Decorated; the Perpendicular was scarcely represented. Now this brings us to the New Cathedral and the great fire, premising that in chapter III. we have a complete description in detail of the architecture of old S. Paul's, and Mr. Ferrey has illustrated it with a series of elevations and sections of the cathedral. The plan of old S. Paul's at page 29, should be compared with the plan of the present ca-

thedral, and its comparative adaptability for modern requirements carefully studied. It must be observed, while we are on the subject of the old Gothic work, that the cathedral suffered several times from fire, and that the "restorations" were somewhat slow in accomplishment, and that it was in one of these restorations that the Renaissance found and forced its way into the Gothic work, and actually hid it; for the Italian portico, by Inigo Jones, formed one of these restorations. Inigo Jones, like Wren, knew nothing of "Gothic," but he was a most accomplished and complete master of the Italian Renaissance, and the portico which he designed and added to old S. Paul's was a really magnificent work, though so incongruous and so out of harmony with the Gothic work which it masked. Nothing in architectural history is more curious than the way in which the old Gothic died out, and the way in which the Renaissance took its place. Dean Milman thought that the substitution of the Renaissance for the Gothic was but the natural result of the change in religious feeling. "The Reformers," said he, "needed not for their simple forms the vastness, height, long processional aisles, broad naves, and the rich choirs." But however this may be, the old Gothic was gone, and the Renaissance took its place.

And this brings us down to the date of Sir Christopher Wren, and to his work. Wren "reported" on the restoration of old S. Paul's, for before the Great Fire he evidently did not intend the entire rebuilding of the cathedral; but the Great Fire solved all doubts, for, as quaint old Pepys put it, in his never-to-be-rivalled "Diary,"—"Paul's is burned, and all Cheapside. Up by five, and by Paul's Wharf, and saw—miserable sight—Paul's Church, with the roof fallen, and the body of the quire fallen into S. Faith's." It must, indeed, have been a woeful sight, and did most surely settle the question of "restoration or rebuilding."

It was this Great Fire that gave Wren his chances, for soon after it he was appointed deputy surveyor-general, and principal architect for rebuilding the whole city. He began by fitting up a portion of the dilapidated cathedral for temporary use for divine service. Wren was convinced that a new cathedral was necessary, though there is no little difficulty in reducing to strict chronological order the different plans made by Wren for the rebuilding of S. Paul's. Page 97 shows what would seem certain to be his first idea, for it was made before the Great Fire. His second design, shown on page 109, and of which the model in the South Kensington Museum gives the best idea, and which should be carefully studied by all those who wish to understand how the idea grew in Wren's mind, is remarkable as being a complete departure from any Gothic model, for in plan it is pure Renaissance. It was evidently his idea in this design to make the cathedral—the whole of it—*useful*. It was Wren's notion of a "reformed" cathedral. But in his third design, page 113, he seems to have tried to reconcile, as nearly as possible, the Gothic idea of a cathedral, "to a better manner of architecture," and with the addition of a cupola. We add the plan of the Greek-cross idea of a cathedral; it is worthy of attentive study and comparison with that of the Latin-cross idea, page 119, which we also give. It was the clergy of the cathedral, be it observed, who objected to the Greek cross. The old Gothic forms and arrangements evidently having held in their minds very great and lasting influences, they could not get rid of the "long-drawn aisles" and Gothic perspective of the old cathedral. It was this which compelled Wren to turn his thoughts to a cathedral form so "rectified" as to reconcile as near as possible the Gothic to a "better manner of architecture." He made sundry designs; one of them was approved by Charles the Second, and on the 14th of May, 1675, the King issued a Royal

* "A History of the Three Cathedrals Dedicated to S. Paul in London, with Reference Chiefly to their Structure and Architecture, and the Sources whence the Necessary Funds were Derived." By WILLIAM LONGMAN, F.S.A. London: Longmans, Green, and Co.

* We regret that we cannot give the plan, section, and elevation of Old S. Paul's, consequent on the fact of their being line engravings in Mr. Longman's book.

Warrant for beginning the work. Wren was to begin with the east end or quire. At page 115 is a drawing, which we reproduce, of the cathedral at this date. It shows a curious enough variation of the dome construction. At page 125 will be found a block plan, showing relatively how the old and new cathedrals severally stood, with an indication of the surrounding streets. This drawing, which is of great interest, is from Sir C. Wren's drawing in the All Souls' collection, Oxford. And here may we not regret that all these illustrative drawings and engravings are so scattered about? Would it not be a good plan to collect them all in some central spot, say in the S. Paul's Chapter Library, or in the South Kensington Museum? Together they would be not a little useful; but *apart*, as now, they are all but useless. Wren now got to work at last in right earnest, and on June the 21st, 1675, nearly 200 years ago, the work was commenced, and the first stone laid!

We have, most unfortunately, little or rather no information of the progress of the building during the course of its construction. Some "diary" of Wren's, how it might have enlightened us on the subject of practical building!—how much of his time Wren devoted to the work, and what he meant by "superintending." Wren found one day a stone with the word "Resurgam" written on it, and that is about all that has been recorded! Wren was treated scurvily enough; sent about his business before the cathedral was finished, and had no small trouble to get the little money that was due to him for work done paid. The narrow-minded Commissioners fairly worried him to death. Their very names are forgotten, but the cathedral yet remains as the monument and memorial of the genius and perseverance of the illustrious man who thought it out and *worked* it out. England owes not a little to Christopher Wren! The central building of its capital city is the work of his head and hand.

We have thus, as far as is possible in so short a compass, endeavoured to afford to the reader an outline of the contents of this new book on S. Paul's Cathedral. It will be found a convenient and handy book of reference for very many things in connection with S. Paul's. That it is exhaustive of the subject cannot be said. It is, as we have said, a drawing-room book, and so does not pretend to go into those professional details and rough work which, after all, really make a building what it is; and we cannot help thinking that the book to truly illustrate S. Paul's has yet to be done. It is easy and pleasant enough to saunter through a fine building, with gloved hands, but it is impossible to build it so or to "adorn" it so. Something more and something different is needed to impress on the dead and formless materials provided by Nature the seal and impress of man's heart and hand. And if this be so with the building, then is it so with the looking into and the representation of it. It would be impossible to exaggerate the importance of this principle. It is a most wonderful thing to go into and to thoroughly examine an old structure full of evidences of the power of mind and hand of the common workman, and to ask, but to ask in vain, for the name only of him who executed some certain form or quaint detail. But all has been long buried and forgotten, and so that the one solitary item of interest after the sight of the object itself can never most assuredly be come at. It is a pity, but there is no help for it. In this book of Longman's one need never to be conscious that the workman who did the work ever had even an existence! Such is the modern world's "outlook" on architecture!

On account of the great pressure on our columns, we are compelled to postpone the insertion of a interesting selection from the woodcuts which illustrate the book, which Messrs. Longmans have kindly placed at our disposal. We hope to give these in an early number.

C. B. A.

PRESERVATION OF WOOD.

DR. BOUCHERIE has read a paper before the French Academy of Sciences which ought not to be lost sight of. He contrasts (says Mr. Charles Holtzapffel) the increasing consumption and the rapid decay of timber with its slow rate of production, which make it necessary to economise its employment.

Dr. Boucherie argues that all the changes in woods are attributable to the soluble parts they contain, which either give rise to fermentation or decay, or serve for food for worms. As the result of analysis, he says that sound timbers contain from three to seven per cent. of soluble matter, and the decayed and wormeaten rarely two,—commonly less than one per cent. He therefore concludes that since the soluble matters of the wood are the causes of the changes it undergoes, it is necessary for its preservation either to abstract the soluble parts in any way, or to render them insoluble by introducing substances which should render them unfermentable, which, he considers, may be done by many of the metallic salts and earthy chlorides. He took a poplar-tree, simply divided from its root, with its leaves and branches undisturbed, and immersed it erect in a vessel containing pyrolignite of iron. In six days it was entirely impregnated, even to the leaves.

He repeatedly operated upon trees lying on the ground, by attaching to their bases waterproof bags containing the liquid. The experiments were varied in many ways. Sometimes portions of the branches were lopped off, but the crown or tuft was always left upon the principal stem. At other times the aspiration was effected by boring detached holes near the earth supplied with different fluids, which give rise to all kinds of diversities in the result, and other trees were pierced entirely through, and a horizontal cut, extending to within an inch or so of each side, was made with a thick saw, leaving only sufficient wood for the support of the tree.

The hardness of the wood was considered by various workmen to be more than doubled by the action of the pyrolignite. The warping and splitting, principally due to the continual effect of the atmosphere in abstracting and restoring the moisture, was stayed by impregnating the wood with a weak infusion of the chloride, so as always to retain it, to a certain degree, moist. One-fifth of the pyrolignite was also added in this case.

The seasoning of the wood was also considered to be expedited by this process, which was not found to interfere with the ordinary use of oil, paint, &c. Large boards of the prepared wood, some of which were painted on one or both sides, and similar boards of unprepared wood, were compared, and at the end of twelve months the former were perfect as to form, the latter were warped and twisted.

The great object in all processes for the preservation of wood is not only to make it more enduring, but also to leave it uninjured as regards its fibres. Unfortunately, we have not sufficient data to go upon to be enabled to pronounce definitely on the subject; and no doubt a series of experiments on wood, treated with a view to preservation, would be a great acquisition to our practical knowledge. One thing is certain, and that is, that wood to be used in building, for railway-sleepers, &c., must be as free from sap as possible to begin with, or no amount of treatment will remedy the grave fault, for the presence of sap means, more or less, defective wood. Such wood, properly treated by such methods as are now practised by many eminent firms, has a fair chance of sustaining their reputation; but to send green, sappy wood to be creosoted, is simply a waste of money. A very great advance would be made if builders would use unflammable wood, and those who have the conduct of the erection of buildings containing articles of great value should stipulate for this, and be

prepared to pay for it. Who knows but that the Alexandra Palace might have been spared had the wood been subjected to some such process?

SANITARY ENGINEERING.*

THE present volume, which treats entirely on works of sewerage and house drainage, is offered by its author as an instalment to be followed by other volumes, so as to complete the whole range of the works in which the sanitary engineer is engaged. His own personal experience has given him a right to speak *ex cathedra* in all matters connected therewith, and the absence of any work treat-solely on subjects relating to sanitary engineering will secure for his book a favourable reception. Mr. Latham introduces his subject by pointing out the importance of the study of animal and vegetable physiology, and the right understanding of the uses and disposal of the agents which promote life and health, and the duty of the community to insist upon the execution and due maintenance of the works necessary in our artificial civilisation for the observance of the natural laws which regulate health. That it is to the interest of any town or nation so to do is well shown by his comparison of the average mortality in Croydon previous to the sanitary works carried out there under his direction with that during the thirteen years since they have been in operation. During the former period the mortality was 23·66 per thousand, during the latter it has been 18·64 per thousand, showing a saving of 5·02 per thousand per annum. The mean population for the thirteen years during which the works have been in successful operation has been 37,375. By taking the mean saving of life of 5·02 per thousand and multiplying it by the mean population in thousands, and again by the number of years, we get $37,375 \times 5 \cdot 02 \times 13 = 2,439$ lives saved. Of this number six-tenths or 1,463 would be persons above the age of twenty, probably one-tenth of these would be infirm from age, leaving still 1,317 persons in the full vigour of life. Using these figures, we get at the money value of the benefits conferred on the town by the works, as follows:—

	£	s.
2,439 funerals saved at £5 each	12,195	0
2,439 × 25 = 60,975 cases of sickness prevented, at £1	60,975	0
1,317 value of labour at £19. 10s. for 6½ years	166,929	15
	£240,099	15

The cost of the works amounted to £195,000, thus the saving effected exceeds by twenty-five per cent their total cost. In the face of figures like these surely those local authorities who have hitherto looked calmly on the loss of life occasioned by their neglect will bestir themselves.

Agreed as all sanitarians are as to the necessity for the execution of sanitary works, they are by no means so as to the modes by which the desired end is to be effected. "All the elements known to the ancients have been adopted in their turn as sanitary agents." It must, however, be seen, in the opinion of the author, that the water-carriage system is the best adapted to the varied requirements of a town population for effecting the speedy removal of the principal matter liable to decomposition, though it should not be overlooked that other systems are applicable, and may be advantageously carried out where circumstances hinder the entire use of water-carriage.

The objects of all sewerage are threefold—1st, the drainage of the surface; 2nd, that of the subsoil; and 3rd, the removal of faecal and other liquid refuse. The sewers of ancient cities combined two of these objects, the removal of surface-water and faecal refuse. The early sewer-works of this country only conveyed to the nearest outlet the surface

* "Sanitary Engineering." By BALDWIN LATHAM, C.E., M.I.C.E. London: E. and F. N. Spon.

drainage. Up to the year 1815, it was illegal to pass faecal matter into sewers. Such matter accumulated in cesspools; but the evils of this system were so great that about the year mentioned the laws which guarded sewers were tacitly allowed to lapse. It was not, however, till 1847 that the first Act of Parliament was passed which made compulsory the passing of faecal and similar matters into sewers.

Much difference of opinion has been expressed as to the manner in which the objects sought to be fulfilled should be effected. No general principle can be laid down for the guidance of engineers beyond that of its being a first requirement that the works shall be capable of fulfilling their purpose, irrespective of pecuniary result, although that question must by no means be lost sight of. The matter for consideration in designing works for any district will embrace the area of the district to be sewerred, its rainfall and the proportion to be admitted into the sewers, its geological character and physical outline, the present and prospective number of its inhabitants, the supply of water in the district, the sanitary appliances in operation or to be adopted, and the position of the outfall and mode of disposition of the sewage. In surveying the area of the district, it will, in many cases, be necessary to arrive at a thorough knowledge of the districts in close proximity governed by other authorities—sometimes with the view of recommending them to combine either for sewerage or for disposing of the sewage of their respective districts. In cases where rain freely falls on the higher lands above the district to be dealt with, it must be conducted either by natural or artificial channels to an outlet, to avoid burdening the sewers with a large and intermittent volume of water. The engineer is not unfrequently called on to define a district for the purpose of adopting the Local Government or other drainage Acts, and in doing this should carefully consider the natural drainage area, and make the district selected "compact and practicable." Much information is given by Mr. Latham as to the preparation of plans, the extent to which the Ordnance maps may be relied upon in surveys, and the obtaining of compulsory powers for the execution of the works; the advisability of adopting the separate system, by which the rainfall is excluded from the sewers; the influence of geological strata upon health, and that of the physical outline on surface discharge and ventilation of the sewers, and the method of estimating the probable increase in the population of any district.

In the construction of the early sewer works in this country, it seems to have been taken for granted that, sooner or later, they must all choke from the accumulation of deposit, when it became necessary frequently for men to enter channels of 2ft. diameter on their hands and knees to remove the decomposing matter. For such a practice there was, of course, no more necessity than there is to send boys up chimneys to sweep them, if only the proper principles of sewer construction were rightly understood. Experience has demonstrated that, by proportioning the size, form, and inclination of a sewer to the volume of sewage it has to convey, it may be made self-cleansing. Some valuable tables of velocities of flow necessary to remove obstructions are given, and another set carefully worked out relating to the discharge of sewers.

In regulating the course of sewers, the main lines will generally take the direction of the natural drainage valleys, the subsidiary sewers being now usually laid in straight lines, with manholes at every point of lateral deviation, and manholes, lampholes, or ventilators at every vertical deviation, or change of gradient, such an arrangement being well illustrated by a plan of the sanitary works of the town of Dantzic, which were designed by Mr. Baldwin Latham, in conjunction with Mr. E. Wiebe, C.E. The plan of breaking the sewers up into steps was adopted for two

reasons, one being to aid ventilation, and the other to assist in the discharge of the sewers. Opinions vary as to whether houses should drain to the back or front. On economical and other considerations, Mr. Latham has found it better to place sewers in public thoroughfares than in private land at the back of houses. Of course, there is the objection arising from having to carry house-drains through or under the houses, but when properly constructed and well ventilated, the evils arising therefrom are more imaginary than real. In securing a good outfall, the natural lines of drainage may sometimes be deviated from—hills may be tunnelled, and valleys crossed with aqueducts or siphons. Natural streams should not be covered in and converted into sewers, but may often be so improved as to expedite the discharge of the surface-water of the district. The principle of interception is a very important one, and often seriously influences the financial success of a scheme for the disposal of the sewage of a district. By its adoption certain portions of the sewage are intercepted in the higher parts of a district, and not allowed to gravitate to the lowest level, and thus the sewage of a large tract of such a district can often be conveyed by direct gravitation to a suitable outfall, leaving only the lowest zones to be dealt with by artificial power. In large districts and sea-coast towns the principle is an important one on other considerations, and in the Fen districts it has been well worked out, and applied with great advantage.

The form of sewers is of importance. The circular form is, no doubt, the strongest for all purposes of construction, but on other grounds it is advisable to adopt for sewers having an intermittent flow, such a sectional form as shall insure the greatest velocity when the smallest volume is passing through them, and in such cases the egg-shaped form is best. A number of examples are given by Mr. Latham of the different forms employed, from those used by the Romans downwards. The materials used for constructing sewers are bricks of all kinds, tiles, stone, stoneware, asphalte, cement, concrete, iron, and timber. That the selection of materials is a matter of importance will be believed when it is stated that there are few brick sewers in London of greater age than fifty years which have not been underpinned and extensively repaired, owing to the erosion of the water and the grinding nature of the sand and solid matter passed through them. Smaller sewers and house-drains are at the present time usually of stoneware or fireclay. In the larger sewers great care is necessary in the selection of the bricks to be used for the work. Concrete has been used with good results, a considerable degree of tenacity being gained by its employment. To the selection of a proper cementing material too great importance can hardly be attached. The probable chemical action of the sewage upon the materials composing the cement must be carefully considered; and another vital point is the selection of a pure silicious sand for mixing with the lime or cement. The foundation of the sewers should also be borne in mind, and the means of providing artificial foundations in unfavourable situations.

Of still greater importance is the matter of sewer ventilation. This, says Mr. Latham, is easy and safe: "only make sufficient openings, and the sewers will ventilate themselves." We cannot stop here to ask if this is so; at any rate, many mechanical contrivances have been devised, both on the "Plenum" and "Vacuum" systems, without, as yet, any very decided result being obtained. Those who would read-up the question, which we have repeatedly discussed in these columns, will find its history and present position clearly epitomised in Mr. Latham's book, to this portion of which we intend to return on some other occasion. The concluding chapters are on the form and position of manholes and lampholes, gullies

and traps, water-closets and urinals. The book is illustrated with twenty-one lithographic plates, and is, as we said at first, a good first instalment of what is likely to be a useful series.

PRACTICAL HINTS ON FURNITURE.

THE following notes on Furniture are by Mr. G. J. Henkels, of Philadelphia, U.S.

Proper Treatment for Varnish.

When the polish on new furniture becomes dull it can be renewed by the following process: take a soft sponge, wet with clean cold water, and wash over the article. Then take a soft chamois skin and wipe it clean. Dry the skin as well as you can by wringing it in the hands, and wipe the water off the furniture, being careful to wipe only one way. Never use a dry chamois on varnished work. If the varnish is defaced and shows white marks, take linseed oil and turpentine in equal parts; shake them well in a phial and apply a very small quantity on a soft rag until the colour is restored; then with a clean soft rag wipe the mixture entirely off. In deeply-carved work the dust cannot be removed with a sponge. Use a stiff-haired paint-brush instead of a sponge. The cause of varnished furniture becoming dull, and the reason why oil and turpentine restore its former polish, it will be appropriate to explain. The humidity of the atmosphere and the action of gas cause a bluish-white coating to collect on all furniture, and show conspicuously on bright polished surfaces, such as mirrors, pianos, cabinet-ware and polished metal. It is easily removed as previously directed. The white scratches on furniture are caused by bruising the gum of which varnish is made. Copal varnish is composed of gum copal, linseed oil, and turpentine or benzine. Copal is not soluble in alcohol as other gums are, but is dissolved by heat. It is the foundation of varnish, as the oil is used only to make the gum tough, and the turpentine is required only to hold the other parts in a liquid state, and it evaporates immediately after its application to furniture. The gum then becomes hard and admits of a fine polish. Thus, when the varnish is bruised, it is the gum that turns white and the colour is restored by applying the oil and turpentine. If the mixture is left on the furniture it will amalgamate with the varnish and become tough; therefore the necessity of wiping it entirely off at once. To varnish old furniture, it should be rubbed with pulverised pumice stone and water to take off the old surface, and then varnished with varnish reduced, by adding turpentine, to the consistency of cream. Apply with a stiff-haired brush. If it does not look well, repeat the rubbing with pumice-stone, and when dry, varnish it again.

Moths in Furniture.

There are two species of moths which infest furniture. One is a large fly of silvery white colour; the worm of the same is shaped like a chestnut worm, and is familiarly known. It rarely infests furniture. The other is a small fly of a dark drab colour; the worm is about one-fourth of an inch long, and tapering from the head to the tail. It was first observed by upholsterers about thirteen years ago. This fly penetrates a sofa or chair, generally between the back and seats of sofas, or under the seats, where the vacancy among the springs affords a safe retreat. It may make a lodgement in one week after the furniture is placed in the house. If such should be the case, in two months the worm will appear; and the continual process of procreation in a few months increases the number to thousands. This moth has no season. It destroys in winter and summer alike, and it is kept in active life by the constant heat of the house. We find at the same time in the same piece of furniture, the fly, the worm, and the eggs; thus showing that they are breeding and destroying all the time. It does not eat good pure curled hair, but fastens its cocoon to it, the elasticity of which prevents it being disturbed. The inside of furniture is used by it only for the purposes of propagation. The worm when ready for food crawls out and destroys the covering, if of woollen or plush material, and falling to the carpet destroys it. It rarely cuts through plush from the inside, as it is of cotton back, but there are instances where the worms have cut up muslin on the outside backs of sofas. There is no protection against them but continual care.

New furniture should be removed from the walls at least twice a week at this season of the year, and should be well whisked all round, and particularly under the seats, to prevent the fly from lodging. This is an effectual preventive, and the only one known. Cayenne pepper, Scotch snuff, camphor, turpentine, and all other remedies for protection from the large moth are of little or no avail against the furniture moths. Saturation with alcohol will not destroy them when in a piece of furniture. If the furniture is infested, they may be removed by taking off the muslin from under the seats and off the outside ends and backs, where they congregate most, and exposing to the air as much as possible. Beat well with a whisk or the open hand, and kill all the flies and worms which show themselves. This done often will disturb them, and may make them leave the furniture, in their desire to be left in quiet. When the furniture is free from moths and is to be left during the summer months without attention, it may be protected by camphor in small bags or highly concentrated pambouli. The safest way is to have the furniture well whisked twice a week. If the moths attack the carpet, which they will first do under the sofas and chairs, spread a wet sheet on the carpet and pass a hot flat-iron over it quickly—the steam will effectually destroy both worms and eggs. If furniture is delivered in a dwelling free from moths, the upholsterer's responsibility ends there and all rests with the housekeeper, as no tradesman can tell whether the moth will attack it or not. There are cases where the furniture has been in use ten or twelve years before being attacked. It would be as fair to hold the tailor responsible for the safety of clothing from moths as to hold the upholsterer responsible for the safety of furniture.

Antique and Walnut Furniture finished in Oil or Wax.

This style of furniture is very effective if the design is *Renaissance*—old style revived. In removing ancient buildings there were many fine sculptured oak panels (copies of those found in the Vatican at Rome, and designed by Raphael, Michael Angelo, and other celebrated artists) the wood of which from age had become very dark. They were adapted to buffets, bookcases, cabinets, &c., in connection with new oak. The new wood was dyed with nutgalls to match the panels, and all finished in oil or wax. This was to bring the carvings out in bold relief, as varnishing or bright polish destroys the effect. The colour of American walnut, when oiled, approaches very nearly the colour of dark old oak, and finishes much finer. American walnut requires the grain to be well filled with a composition to resist the action of the heat of our dwellings; and mere oiling will not do, as it leaves the pores of the wood so open that it absorbs the heat. In a room at a temperature of 75 deg. the oiled walnut will absorb the heat to within 5 degs. of that of the room; whilst varnished oak will reflect the heat, and will not reach over 45 to 50 degs. It is, therefore, important to have wood well seasoned, and the grain filled with shellac or other material to prevent shrinkage. If the furniture is well varnished, it is easily renovated by rubbing with a rag moistened with turpentine and linseed oil in equal parts. If not properly finished, and the dust collects in the pores of the wood so much that it will not wipe off, the application of oil and turpentine will restore the colour, and a very light coating of shellac will protect it in a great measure. If nothing but oil is in the wood, it is best to have a cabinet-maker finish it properly, otherwise it must be oiled every time it looks rusty. Linseed oil hardens wood, and well-made walnut work, finished with it and shellac, will, in a few years, become polished almost like a bronze. The French use this finish only on sculptured work, or on very fine root walnut veneers in connection with polished ebony mouldings. They do not use it as a finish for plain furniture, but use a polish made of gum-shellac and alcohol, applied by manipulation, using a wooden pad, moistened with polish, inclosed in a soft old woollen rag. It makes a fine soft finish, and wears well in a humid climate, but evaporates soon in ours. Wax is used on walnut when the natural colour is to be preserved; and in connection with ebony mouldings, polished finely, the effect is beautiful. This style is the favourite in Europe, and will no doubt become popular here.

Polishing Veneers.

Get a little chromate of potash, and put in a

4oz. bottle, add water. After cleaning off veneers, legs, &c., saturate a sponge with the above, and go over your work evenly. According to the strength, in a few minutes you may make lightest mahogany any colour you require. When dry, polish. Corked up, it will keep any length of time, always ready for use, and you can repeat it either before or after oiling, if not dark enough. But if you get your work too dark, you will have a job to paper it evenly, especially in turned work. It will not stain where there is a polish or glue.

SOME OF THE REMAINS OF OUR REMOTE ANCESTORS IN WESTERN BRITAIN.*

(Concluded from Page 686.)

THE late John O'Donovan, a most accomplished topographical antiquary, in a short sketch of the history of Aran, written while he was engaged on the Ordnance Survey of Ireland, and now in manuscript in the Library of the Royal Irish Academy, quoting from the book of Lecain, a compilation of historical tracts, made in 1416 (and now in the same library), said, "that a short time before the birth of Christ, a colony of the Firbolgs or Belgic race, arrived in Ireland from Britain. The chief was Aengus, the son of Uathmore (Watmar), who seemed to have been a man of rude magnificence, and considerable power, from the fortress which he erected in Aranmore to command, not only the other islands in the Bay of Galway, but all the western coast of Connemara. Might we not, without any violation of historic probability, connect the invasion of the South Coast of Britain by Diuitians 100 B.C. with this arrival of a Belgic clan in Ireland from the very district invaded; their final settlement in Aran, shortly before the Christian era, and the erection of the structure which we proceed to examine? The islands of Aran were three in number, lying in the mouth of the Bay of Galway, from the harbour of which they are distant twenty-eight miles. The largest and westernmost, Aranmore, was nine miles long and about two miles in its greatest breadth, the others are much smaller. *Aran* or *Inishmore* (the Great) rises from a generally low shore on its N.E. side to its greatest height of 406ft. in about the centre of the island; the S.W. side is very abrupt, and faces with bold and deeply undercut cliffs, of from 200ft. to 300ft. in height, the tremendous waves of the Atlantic. Upon the highest of these precipitous and overhanging cliffs, more than 300ft. above the level of the sea, stand the ruins of Dun-Aengus (the fort of Aengus), a fort constructed according to sound principles of engineering. The walls were threefold; each of the walls perfect in itself, of Cyclopean construction. Huge stones were placed in the surrounding plains, so as to make the approach as difficult as possible; reminding us of the palisades with which the New Zealanders fortify their dwellings. The inner space was half oval, 146ft. at its widest opening towards the sea, and 93ft. at the end towards the land; the length of the inner fort was 150ft. Not less interesting were two other forts—the first, Dun Oghil, a double oval construction with its axis from N. to S., the outer wall 109ft. by 107ft., the inner building 75ft. 6in. by 91ft. Dun Onaght was nearly circular, 90ft. by 91ft., with its axis from N. to S. and the entrance South-east. A primitive dwelling in the form of a tumulus, or a stone-mound, deserved a careful study, as a proof that the builders of these dwellings knew how to construct for the purpose of protecting themselves. These houses had generally two entrances, which were shut according to the wind blowing from one or the other quarter. A peculiar feature of these houses was that they were provided at regular distances with holes, to allow the smoke to pass through, and the air to circulate and ventilate the building. The ground plan was an oval, 13ft. by 19ft. in the inside. After having described Dubh Cathair, the lecturer entered into a highly interesting and minute description of some bronze shields and British ornaments worn by men and women, as also the hilts and sheaths of daggers found in different parts of England and Ireland. Next, the mode of writing was described. The old Britains used only fifteen letters. The study of these old remains, though much neglected, was of the utmost importance to the conscientious artist. It furnished him with the power to reconstruct the life of our common

forefathers, and made him acquainted with excellent patterns of ornamentation, scarcely surpassed in delicacy and correctness by anything we produce in our times.

The Chairman, Mr. PHENE, having called upon the members to open the discussion,

Mr. WM. TAYLOR, late Commissioner of Patna, expressed the delight with which he had listened to the learned lecturer. During his residence in India trying to employ also his time with useful studies and sketches of Indian weapons, daggers, &c., of which he had a large collection in the South Kensington Museum and the International Exhibition, he was struck by some peculiar weapons which he had only seen in India, and two specimens of which had not long ago been found in Ireland. He did not exactly know by what means these weapons came there, but they went far to prove an early connection between the farthest East and West.

A young gentleman entered into an ethnological discussion, contradicting some of the dates of the lecture, and protesting against the idea that the Britons were Kelts.

Dr. ZERFFI blamed the last speaker for his dogmatic way of speaking, and advised the young to study first and then to argue. He found in Mr. Burchett's lecture much valuable information, and thought it proved the gradual extension of the Aryan race, united in language, mode of constructing their early buildings and ornamentation.

The usual vote of thanks to the lecturer having been proposed,

Mr. BURCHETT, in replying, begged to state that he disliked nothing so much as dogmatism in science; he advanced all his statements with great care, using more than once the words "probably," "very likely," and "may be," which did not look as if he had given implicit credence to either Whitaker or any other author; he, however, thought it his duty to try to find some common ground on which Britons and Irish might find themselves as members of one great family.

The usual vote of thanks to the Chairman terminated the proceedings.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

(FROM A CORRESPONDENT.)

A REGULAR meeting of this Society was held at the rooms in New York, March 5th, 1873.

A paper on "Shaw's Gunpowder Pile-Driver," by Samuel R. Probasco, C.E., of Brooklyn, New York, was read.

This pile-driver was set at work in October, 1872, on a line of sheet piles for a reservoir dam in the valley of Parsonage Creek, Long Island. The material to be penetrated was sand and fine gravel, cemented together in places, so as to be hard and difficult to move with a pick, and like "hard-pan." Clay was found below the water-level of the basin; some borings showing it at 15ft. below the surface; the lower stratum was tough and tenacious, and the whole material was under water.

The machine in form resembles any ordinary pile-driver. A cast-iron block, called a "gun," resting on the head of the pile, is bored out, and receives, without windage, a wrought-iron piston attached to another cast-iron block, called the "ram," which is lifted by explosion of powder in the bore. When the piston leaves the gun, a cartridge is thrown in, which, exploded by the heat freed by the piston in its descent, throws the ram upwards again, and forces the pile downwards. The area of the piston is adjusted to the weight of the ram, which also is adjusted to the work to be done. Soda powder cartridges in cylinders of 1½oz. to 1½oz., coated with blacklead and paraffine, are used. The coating is expected to keep the powder dry, lubricate the gun, preserve the requisite tightness, prevent escape of gas, and cause the entire force to be exerted on the base of the piston. The piston is made a little smaller than the bore of the gun, and has on its lower end a steel ring, which fits the bore closely. The performance was as follows:—At first several explosions were necessary to lubricate the gun, which leaked gas, so that the ram would not go to the requisite height to move the pile. After a few shots the piston moved up regularly, and, in its descent, fired the charge, forcing the pile down and itself upward.

When the resistance is slight, this machine may be economical; but when, as in this case, it

* Lecture by R. BURCHETT, Esq., of the Science and Art Department, delivered before the Society for the Encouragement of the Fine Arts.

required 300 blows from cartridges costing 2½ cents each to force a pile down 15ft. or 16ft., it cannot be called so. The gas from the explosions cut passages in the ring at the end of the piston, and thereby much lessened the power of the machine. The gun became hot from the rapid discharges, and the bore enlarged, whereby more gas escaped. Seven piles were driven with it—each costing more for powder than the contractor got for piles in place—when the machine refused to work. On examination, the steel ring was found furrowed by the powder, and the piston (diameter 5in.) so bent by striking the bottom of the gun as to be useless. The air-cushion, relied upon to preserve this, was lost by the furrowing of the ring.

The inventor, on being consulted, decided that the excessive consumption of powder was due to the piston being too small for the ram, weighing over 1,700lb. The bore of the gun was then enlarged to receive a piston of 7in. in diameter, and ten piles more were laid, when the machine was again laid aside.

The result of this trial was similar to the first, except that the piston was not bent. The gun got so hot as to fire the powder before the ram reached its place. Altogether 17 piles were driven to a depth of from 14ft. to 19ft., requiring from 200 to 300 blows of 1½oz. cartridges. An ordinary pile-driver was then employed, with a hammer weighing 1800lbs., and falling 8 to 10ft. In this way 11 piles were put down, 15½ft. in 10 hours, costing per pile no more than 100 blows from the powder-machine. These 100 blows at best would put the pile down but 10ft.

The piling was spruce, from 10in. × 10in. to 10in. × 14in.—20ft. long, with 2in. square tongue and groove.

The piles were bevelled at the point on three sides, leaving the grooved side untouched. The groove was driven on the tongue of the preceding pile. The heads were protected with a light band; 7 piles were driven without shoeing; the eighth split and showed the necessity of protection at the point. A cast-iron cup shoe, weighing about 40lbs., with a groove in it, and made with three bevels and one plain side, was found to stand the work.

The tendency of the tongue of the pile to work up was obviated by twisting a chain tightly about the pile and tongue; a lever, with rope attached, was used for this purpose, the force being applied as the blow was delivered; 75 piles were driven in this way to a mean depth of 15½ft. By experience, 6in. more depth has been attained, which is about the maximum penetration in this kind of material, and this can only be done with the best of sound dry spruce.

A brief discussion followed, after which a paper on "Rail Economy" by C. P. Sandberg, C.E., of London, England, in reply to the discussion upon a former paper of his on the same subject, was read.

In that discussion it had been remarked under the head of "Traffic Capacity," that the weight on locomotive driving-wheels stated therein differed from American practice; that on the Philadelphia and Reading Railroad 4 tons on drivers were not exceeded for a 64lb. rail, and that on the Erie Railway 5½ tons had been found too much for a 70lb. rail.

Mr. Sandberg herein replied that "it would be interesting to know what weight the rail and the rail joint would carry in the two instances mentioned. 6½ tons on drivers on a 60lb. rail, as stated in the table, and considered excessive, might not be so. The table showed that the 60lb. rail of standard section, with fish-plate, would carry 14 tons in the middle between 3ft. bearings, and 9½ tons at the joint between 2ft. bearings. According to the table, the maximum load on drivers on standard sections was one-third what the rail in the middle would carry, and two-thirds of what the rail-joint would sustain. In order to obtain the full value of the material, the joint ought to be as stiff as the middle of the rail. For this it is best to use the fish-plate as thick as will not interfere with the tire-flange; the angle should be as small as will permit an easy rolling of the rail. This angle is 11° and 15°—the latter for light rails—experiments having proved that the smaller the angle, the stiffer the joint. With this fishing, the capacity of the rail at the joint is two-thirds that at the middle, while with ordinary fastenings it is but one fourth. In regard to the Erie sections, experiments have shown that this rail will bear at the joint but two tons, while at the middle it will carry 10 tons; hence it is not strange that 5½ tons on the drivers proved disastrous.

The necessity of sufficient thickness in the fish-plates is often overlooked. It is, doubtless, prudent to increase the number of drivers on American roads, but the statement that 6½ tons on a 60lb. standard rail section, with standard fastenings, is excessive, should be modified. This load is not the most economical for working a line, but that to which an increase of traffic might extend. Many European railways with a 70lb. section have a joint carrying only 6 tons, owing to too large an angle and too thin a fish-plate.

THE USE OF WIRES IN CORRECTING ECHO.

THE following communication from the Rev.

Robert R. Gregg appears in *Nature*:—

Having seen in the newspapers some notices of the use of wires for correcting the echo by breaking the waves of sound in churches and public buildings, we were anxious to try the experiment in the Cathedral of S. Fin Barre, Cork, the nave of which is of great height, between 60 and 70ft., and narrow in proportion to its height. We were unable to obtain any reliable information as to the placing of the wires, so that what we did was very much in the way of experiment. I should state that the desks for the officiating clergy and the choir are placed at the intersection of the transepts, nave, and chancel, so that this may be regarded as the point from which the sound starts. The organ is placed in a gallery at the west end, and the organist seated in this gallery has always heard much more distinctly than the people sitting about two-thirds down the nave, particularly those close to the pillars; but the echo seemed to render the sound indistinct, more especially in the transepts, the north and south walls of which presented a large flat surface, and appeared to us to be probably the source of the echo.

At first we tried the wires strained at a considerable height, the level of the triforium, but they produced comparatively little effect; we then strained a double course of wires at about a height of 12 or 15ft. round the large piers of the central tower, so as to encompass the choir, and other wires completely across the nave and side aisles, and the effect was certainly very good. There was a greater distinctness of sound throughout the building. Our organist, who is a very accomplished musician, did not know that the wires were put up, and remarked to me one day after service, that he did not know what it was, but that everything seemed to him in better tune.

This encouraged us to make further experiments. We then strained three wires completely across from the south wall of the south transept to the north wall of the north transept, so as to pass over the heads of the choir, but the effect was quite too great; it seemed to kill the sound; every sound seemed to stop at once; all resonance was gone. These wires we had at once to take down, and I shall add that, as regards the organist, the wires over the heads of the choir seemed to produce a much greater effect than those directly between the choir and his seat; it appears to him as if he had a bad cold and could not hear distinctly.

These wires appear to prevent the voices rising and filling the cathedral. It seems very difficult to determine where to place the wires so as to produce a really good effect; but that they have a very great effect, far beyond what one would have supposed *a priori*, is admitted by all who have taken an interest in the matter here. Several members of the congregation have remarked that they heard better in the cathedral now, without knowing the cause. We have used very thin wire; a stranger would not perceive it unless his attention were called to it. We hope to make some further experiments, especially with regard to the transepts of the cathedral.

The inexpensive nature of the experiment and the important result likely to be obtained makes this a matter of great importance, independently of the great interest it possesses in a scientific point of view.

I may add that when in Dublin I attended Divine service in S. Andrew's Church, and having officiated in the church at different times I am well aware of the difficulty of filling it in consequence of the echo, but the use of the wires appear to have made a very great difference, as I heard most distinctly. It seemed to me, however, that a far greater number were used than my experience in Cork would have led me to suppose were necessary.

A NEW PATENT STONE POLISHING MACHINE.

LAST week, a number of architects and others met in the works of the North British Patent Stone Polishing Company, Dalry, in order to witness the trial of a machine, invented by Mr. Wm. Adams, for the working and polishing of freestone, marble, and granite. Mr. Adams' machine consists of two platforms or tables, standing parallel to each other, and resting at either end upon a double crank-shaft. These shafts are joined by strong connecting-bars, one of them being connected with the steam-engine or other driving power. The stones are laid on edge face to face upon each of the platforms, and as the machine works, the platforms are alternately raised and depressed with a motion like that of the engines of a paddle-wheel steamer. The stones are thus rubbed against one another, and receive the most delicate polish. Each platform has an upright back, which can be moved backwards and forwards by means of screws to suit the thicknesses of the various stones, besides being provided with adjusting screws, in view of the roughness and inequalities of the stones. Sand and water are supplied from above by means of a simple apparatus invented by Mr. Wm. Beattie, architect, Edinburgh, and fall between the surfaces of the stones, rapidly cutting off the raised and rough portions, and reducing them to a smooth and uniform surface. The advantages claimed for this invention are its extreme simplicity, and the fact of its requiring no steel tools or other implements which would necessarily require to be frequently sharpened and upheld at much expense. The operation is so rapid that a load of freestone can be worked from a quarry face to a finely-polished surface in a space of time varying from ten to twenty minutes, according to the hardness of the stone. Granite and marble can, it is said, be worked in about one-third of the time taken by the machines at present in use. The machine is also of a light and simple description, and can be fitted with wheels so as to be moved about from place to place. The trial appears to have afforded satisfactory results.

PARLIAMENTARY NOTES.

THE VACANT LAND ADJOINING THE PALACE OF WESTMINSTER.—Mr. Ayrton, on Monday, stated, in reply to a question from Lord J. Manners, that several proposals had been made for the purpose of dealing with the land near the Houses of Parliament, but none of them had been finally approved. There was now a new proposal under consideration, which would involve considerable expense. If it should be approved an estimate would be submitted, and the House would have full opportunity of knowing all the details.

METROPOLITAN TRAMWAYS PROVISIONAL ORDERS BILL.—On the motion for the second reading of this bill on Tuesday, in the House of Lords, Lord Cairns stated his intention in committee to oppose that portion of the measure which related to the extension of tramway to Albert-gate, as highly dangerous to the public. The bill was read a second time, as were also the Local Government Provisional Orders (No. 2) Bill, Local Government Provisional Orders (No. 3) Bill, and the Local Government Provisional Orders (No. 4) Bill.

ART LOANS TO MUSEUMS.—"A Lender to the South Kensington Museum" writes, suggesting a plan which would facilitate the prompt removal of valuable works of art from museums in case of fire, viz.: to place all the cases in which they are contained on wheels, say of three or four inches in diameter, with a handle like that of a bath-chair, movable and kept fastened by its side or beneath the case. The objects, if tall, such as vases, could be fixed by their feet very readily, or be laid on their sides when about to be moved. When a fire occurred, those in the neighbourhood could be first moved away. Every museum should have two doors, in case the fire occupied one. When breakable objects are upstairs, then the cases should not be so heavy but so that two, or, at the outside, four men could carry them by poles, in the manner of a sedan chair. They could be run on their wheels to the staircase and then carried down, like the chairs made for invalids. Nearly every stall, case, or table, could be so made. It might further facilitate the moving were the wheels placed on rails.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CHURCH OF S. LUKE'S, VICTORIA DOCKS.

WE have pleasure in giving this week an exterior and an interior view of this church, which is about to be erected from the designs of Messrs. Giles and Gane, architects, for the Rev. Henry Boyd (vicar), at the Victoria Docks, London. The total length of the church from east to west in the interior is 136ft. 3in.; the width, 51ft.; nave, 86ft 6in. by 25ft. 3in.; 41ft. 6in. to cornice; the height from nave-floor to ridge is 64ft.; height of spire from ground to top of vane is 216ft. On account of the site being marsh ground, it is found necessary to carry the foundations down to the gravel, which is 11ft. 6in. below the present level. The materials will be picked yellow stocks with red brick and Bath stone dressings. The roof will be red deal, and the benches of pitch pine. The accommodation with benches and chairs is for 1,000 people.

RESIDENCE FOR CATHOLIC BISHOP, NEWARK, NEW JERSEY, U.S.

This house is to be built in connection with a cathedral on a large scale, proposed to be erected in Newark, a large and rapidly increasing city. It will be the first example in America of an episcopal residence built with a definite expression of its object both as to plan and architectural character, the ordinary type of dwelling-house of the better class having been hitherto employed. As the building is to afford accommodation to the clergy attached to the cathedral as well as to the bishop, the plan has been carefully made with that object, and consists of the quarters devoted to the latter, with private apartments and rooms for business, &c.; of the private rooms for each priest; of the public rooms, or guest rooms, parlors, refectory, library, record room, oratory, &c., and a cloister 150ft. long by 9ft. wide; and finally of the kitchen, offices, and servants' quarters. These buildings form three sides of a square, with a total development of about 22ft. To the rear is an extensive kitchen court, partly surrounded by offices and out-houses. The material is to be the local stone, which appears to be a sandstone affording both walling stone and ashlar. The principal apartments are to have lofty framed dados of walnut and chestnut, which will be used in the doors and other joiners' work. Every precaution has been taken to secure the future inmates of the building against the extremes of temperature. The commencement of the work has been delayed by the translation of the Bishop, Dr. Rosevelt Bayley, from the see of Newark to the metropolitan see of Baltimore since his last visit to England, when he entrusted the work to Mr. Goldie. The plans and specifications have been prepared by Messrs. Goldie and Child, of Kensington-square, who are to be assisted in the actual superintendence of the work when begun by Mr. O'Rourke, a local architect of Newark.

We give three pages of lithographs of the house, consisting of front, side, and rear elevations, cross and longitudinal sections, and ground and first-floor plans.

VISIT OF THE ARCHITECTURAL ASSOCIATION TO MESSRS. POWELL AND SONS' GLASSWORKS.

YESTERDAY (Thursday) week, a large number of the members of the Architectural Association visited the well-known glassworks of Messrs. Powell and Sons, Temple-street, Whitefriars. The visitors were first conducted to one of the furnaces, and witnessed the varied and dexterous manner in which the red-hot glass, or "metal," as it is technically termed, is manipulated by the workmen. The principal manufactures of this firm comprise all kinds of Mediæval glass for window decoration, opaque glass for mosaic pavements and wall decorations, all kinds of flint glass articles for table use, and every variety of chemical glass. In the article of table-glass, Messrs. Powell and Sons have done much to revive the style of work produced by those famous workers in glass, the Venetians of old, some of Messrs. Powell's workmen particularly excelling in this kind of work, one of their *employés*—Mr. Joseph Leicester, well known as a prominent leader of the working classes—having taken three prizes for this description of work at one of the Society of Arts' Art-Workmanship competitions. Having spent some time in watching the highly interesting operations of the glass-

blowers, the visitors proceeded upstairs to what were of greater interest to them as architects, viz., the mosaic and stained glass departments, over which they were conducted by Mr. Golding. In mosaic Messrs. Powell have introduced a *specialité* of their own, which they call *opus sectile*, and which affords a very beautiful as well as durable material for permanent wall decorations. The whole of this work consists of opaque glass, of Messrs. Powell's own manufacture, and which can be made of various tints and colours. For a picture executed in *opus sectile*, the ground-work usually consists of tesserae of the material, either gilt or coloured; but in the figures and other portions of the picture, larger portions of the material are used, as, for instance, in the case of a panel of a reredos which was shown to the visitors, in which the head of Our Saviour consisted of one piece of the opaque glass of a light tint, the features being painted in enamel colours by an artist, and then burnt-in, or "fired." The various pieces forming the picture are fixed to the wall with Portland cement, just in the same manner as ordinary tiles would be fixed. By this means a large surface of permanent wall decoration is obtained in very few pieces as compared with the innumerable tesserae of the Venetian mosaics. Among the works which Messrs. Powell have executed in this material may be mentioned reredoses at S. Giles's, Reading, under the direction of Mr. J. P. St. Aubyn, architect, and at Christ Church, Clapton. The material is also being used for domestic wall decorations at a new mansion for Mr. Cubitt, M.P., at Dorking, and likewise at the mansion of Mr. Ford Barclay, at Woodford. The same material—opaque glass—which is thus used for wall decorations is also being largely used for floors, cut up into shapes to any design, and fixed with cement in the ordinary way; or it can, of course, be laid in the form of mosaic. This material may also be used in combination with asphalt, the pieces of opaque glass of the required design and colour being bedded in the asphalt, which of course forms the ground. The latter variety of pavement is now being laid down in the chancel of S. Peter's Church, Eaton-square. This opaque glass and asphalt pavement, which of course can be laid to any design, possesses the additional advantage of affording a very good foothold. Of another variety of this pavement, Messrs. Powell executed about 800 square feet for the new courts at the South Kensington Museum, laid in patterns designed by Mr. Moody. Another very useful and pleasing application of this material consists in its use, in combination with semi-transparent glass, for the surfaces of floors or pavements through which it is desired to transmit light—to serve, for instance, instead of the iron gratings or ordinary rough-plate-glass lights to areas in front of shops and houses. This new combination of opaque and semi-transparent glass is carried out as follows:—The pavement through which it is desired to transmit light may be laid in squares not perhaps exceeding 1ft. square, and either resting on or bedded in a framework of wood, iron, or stone, as may accord with the exigencies of construction. A piece of rough plate glass, 1in. thick, and of the size of the square pavement or floor light, is fixed in the opening of the floor, its top surface being $\frac{3}{4}$ in. below the surface of the floor, and then tesserae of $\frac{3}{4}$ in. rough plate glass are cemented together over the surface of the inch thick square of glass, the centre of the square being composed of tesserae of opaque glass of a different colour worked in the form of crosses, fleurs-de-lys, &c. This variety of pavement has all the appearance of, and indeed, really is, mosaic, and makes an excellent and very strong pavement light. In the stained glass department several works were seen in progress, including a stained-glass window designed by Mr. Ellis A. Wooldridge for a church at Hong Kong, and also a series of windows for Thurstford Church, Norfolk, by the same designer. In domestic stained glass, a number of windows illustrating the story of the "Sleeping Beauty," designed by Mr. T. G. Jackson (Jackson and Graham), are at present in course of execution by Messrs. Powell. Mr. Golding stated that all the coloured glass used by Messrs. Powell is made on their own premises, from analyses of specimens of Mediæval glass. In glass for coloured windows, what by many persons would be considered imperfect and defective glass—i.e., glass full of innumerable small seeds or specks (air-bubbles) is a desideratum, inasmuch as this very impurity or imperfection of the glass gives a greater variety and play of light. It was maintained by some people, said Mr. Golding, that the

Mediæval glass possessed this quality by accident—that it was due to the imperfect manipulative processes of the Mediæval glass-workers, who could not make glass free from these so-called defects; but Mr. Golding said he was convinced that this view was not correct, the rich effect of Mediæval glass being evidently intentionally brought about by the peculiarity of the glass. Before leaving the works, the visitors were shown another *specialité* of Messrs. Powell and Sons, and which, for want of a better name, is at present known as "Indian work." This consists in applying to flat surfaces, such as ceilings, walls, doors of rooms or cabinets, &c., whether of plaster, stone, cement, or wood, ornamentation (such as flowers, leaves, stars, or any conventional or geometrical ornamentation whatever), consisting of thin glass, only one-hundredth part of an inch thick, silvered on one side, and fastened to the surface to be decorated with a tenacious cement. For the centre bosses of small flowers, &c., the round discs of this thin glass may be made either concave or convex. The work is called Indian work inasmuch as similar work is done in India, but with a less brilliant effect, as the glass used by the Indians is coated with lead instead of silver. The visitors were shown a ceiling treated in this way, and were informed that Messrs. Powell had done a great deal of this kind of work at Elvedon Hall, the residence of the Maharajah Dhuleep Singh. It will be of some interest at the present time to mention that Messrs. Powell and Sons have at present in hand an order for a dozen mirrors for the British Legation at Teheran, the frames of which will be richly ornamented with thin glass, applied or veneered in the manner we have described.

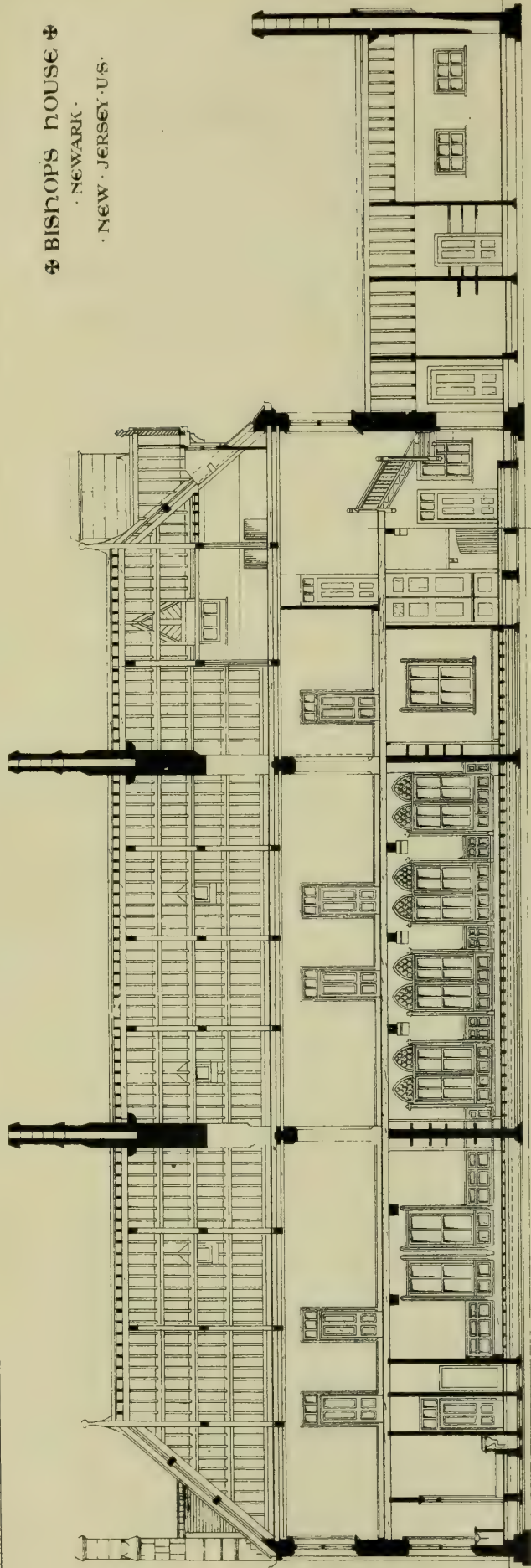
ARCHITECT TO THE CHILIAN GOVERNMENT.

SOME months ago, as might be seen by our columns, the Minister Plenipotentiary of the Republic of Chili advertised for the services of a Government architect, offering a three years' appointment, with a salary of £800 a year, and a free passage out and home. Some ninety-six applicants responded. We hear that, after a very exhaustive inquiry on the part of the consul and agents, the selection has fallen on an English architect. Pending, however, the order to send out the successful candidate, the Chilean Government has suspended for the present its intention of negotiating for the services of an architect.

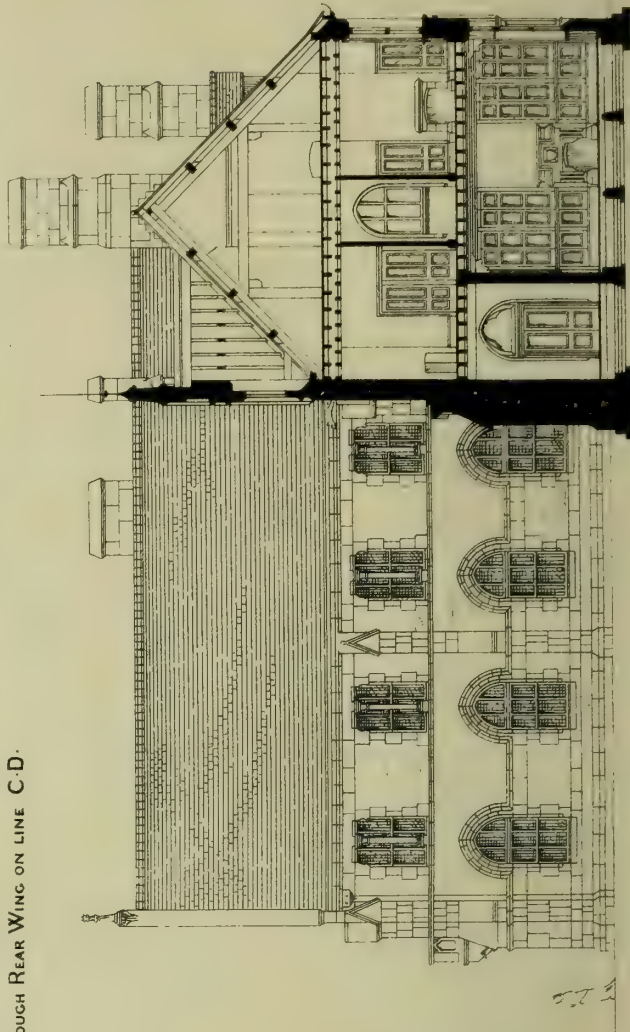
IMPROVEMENTS AT DOUGLAS, ISLE OF MAN.

THE inhabitants of Douglas, some time since, decided to increase the popularity of their town as a summer resort, by the construction of a new street from the landing-place to the better part of the town. Estimates and plans were obtained, the most noteworthy being furnished by two Liverpool architects—Mr. William Culshaw and Mr. C. O. Ellison. The former restricted his scheme to the formation of a good street through the lower part of the town, giving the required access to Prospect-hill. Mr. Ellison not only projected a good line of thoroughfare, but proposed to enclose the objectionable part of the shore, thus forming a promenade, and reclaiming about five acres of land. The cost and the difficulty involved in the execution of Mr. Ellison's design were assumed to be so great that the three architects to whom the plans and estimates were referred decided in favour of Mr. Culshaw's scheme, and a bill is now before the insular legislature granting powers to carry out his design. The feeling in Douglas, however, is said to be strongly in favour of the more complete plan prepared by Mr. Ellison; and a memorial, signed by several hundred ratepayers, has been presented to the Lieutenant-governor and council of the island, with the object of obtaining a more complete improvement than that comprised in Mr. Culshaw's design. The estimate for Mr. Culshaw's design is £30,000, for which little is obtained beyond the much-needed street. Mr. Ellison offers greater inducements, at a cost which will not, it is asserted, exceed that of Mr. Culshaw's plan. Mr. Ellison allows £14,800 for the new street, including £3000 for compensation; and about the same sum for the embankment, or nearly £30,000 for the whole. The Commissioners of Woods and Forests are ready to consent to the enclosure of the shore on payment of a trifling sum, and the land thus reclaimed would, it is estimated, sell for £10,000.

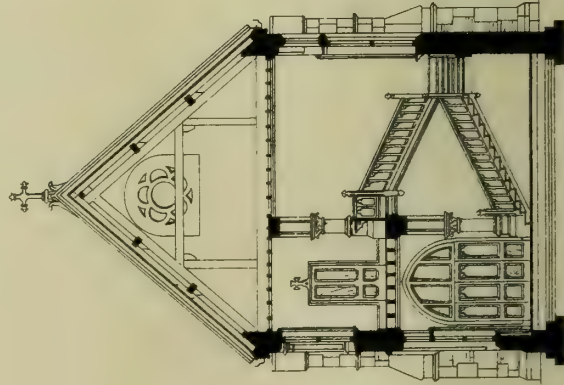
✠ BISHOP'S HOUSE ✠
NEWARK.
NEW JERSEY U.S.



LONGITUDINAL SECTION THROUGH REAR WING ON LINE C.D.



SIDE ELEVATION TO FORE COURT



CROSS SECTION OF ENTRANCE WING.

CROSS SECTION OF REAR WING.

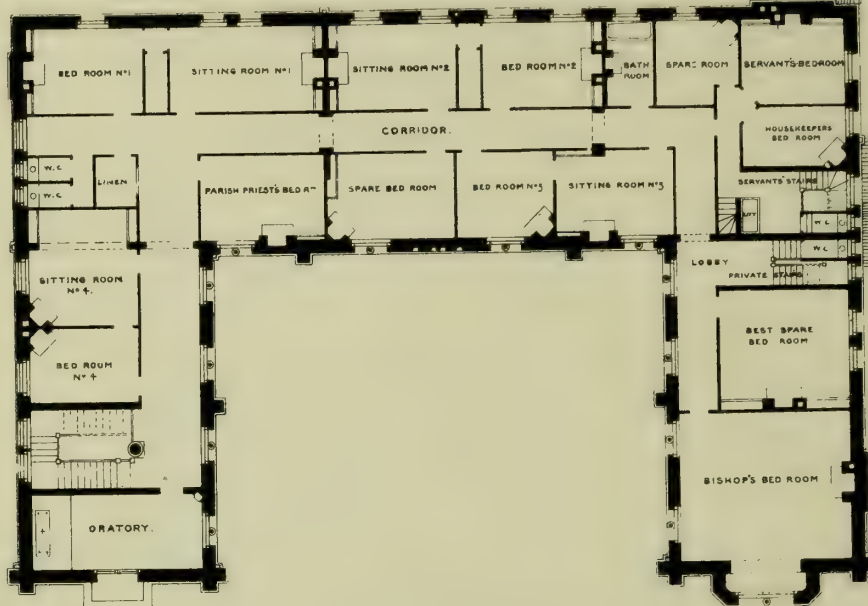
GOLDIE & CHILD
ARCHT'ES

PHOTO LITHOGRAPHED & PRINTED BY JAMES ALLEN, 51 GRAFTON ROAD, W.I.

BISHOP'S HOUSE
NEWARK
NEW JERSEY U.S.

PROPOSED CATHEDRAL

BLOCK PLAN

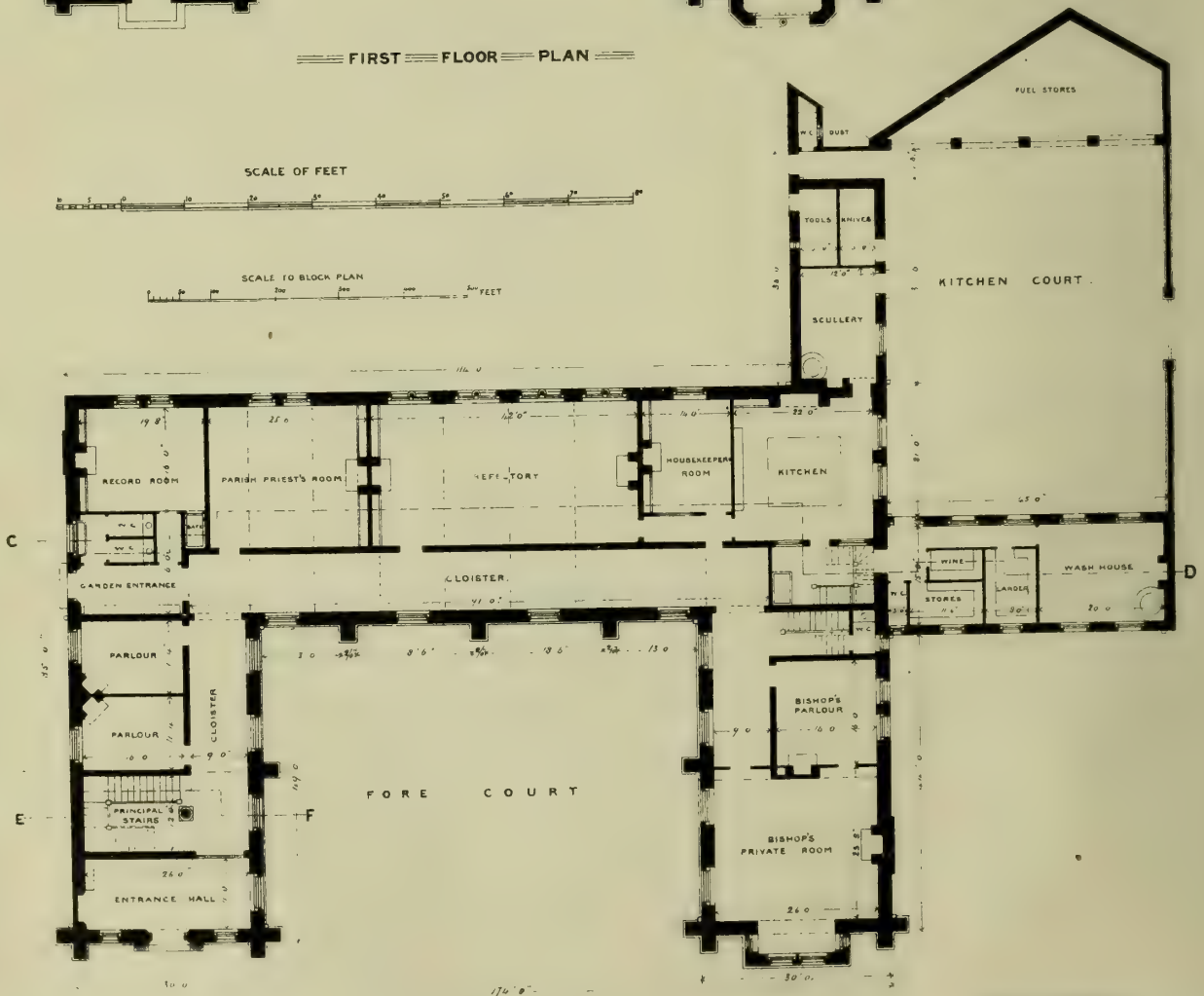


FIRST FLOOR PLAN

SCALE OF FEET

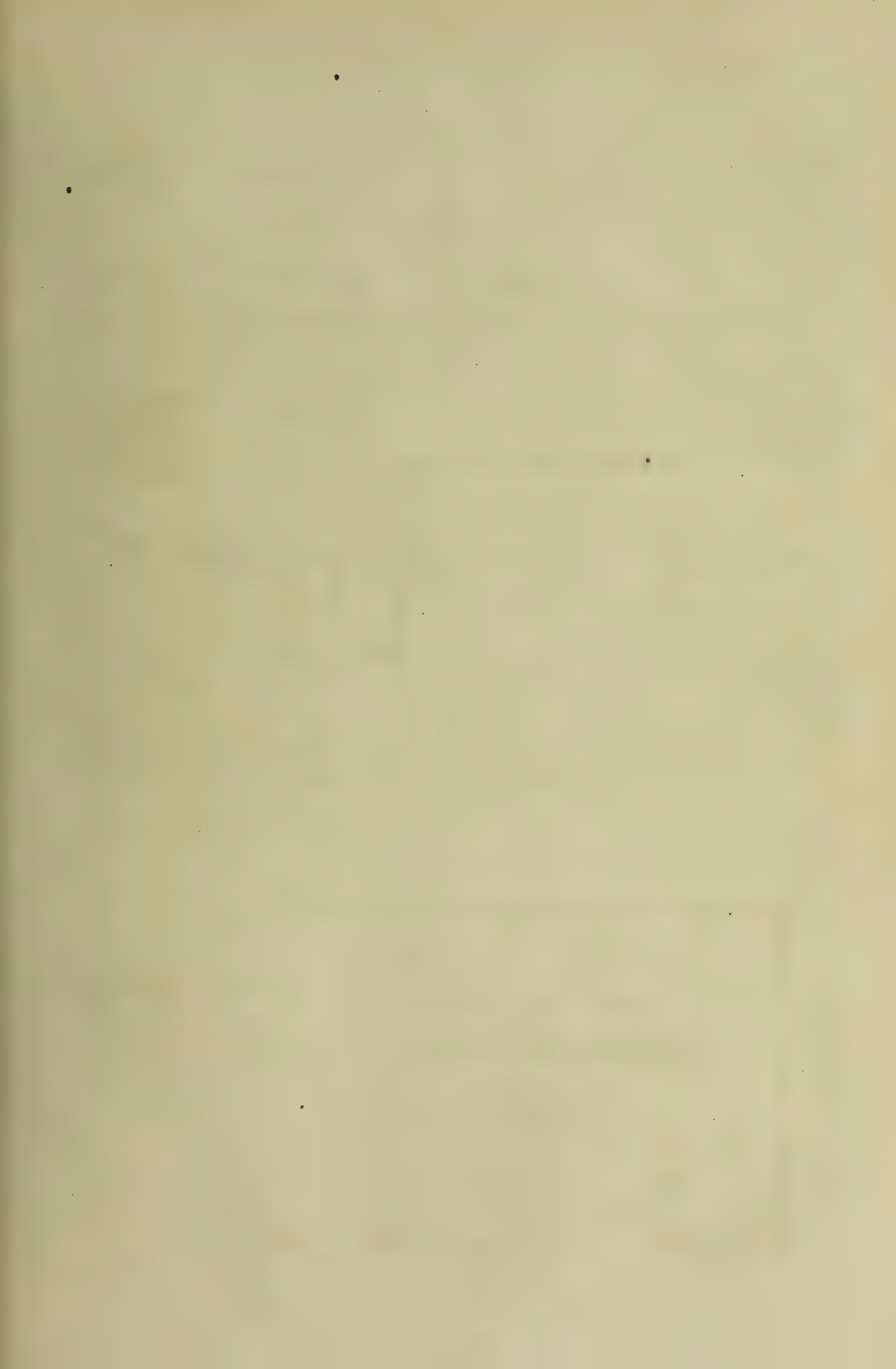


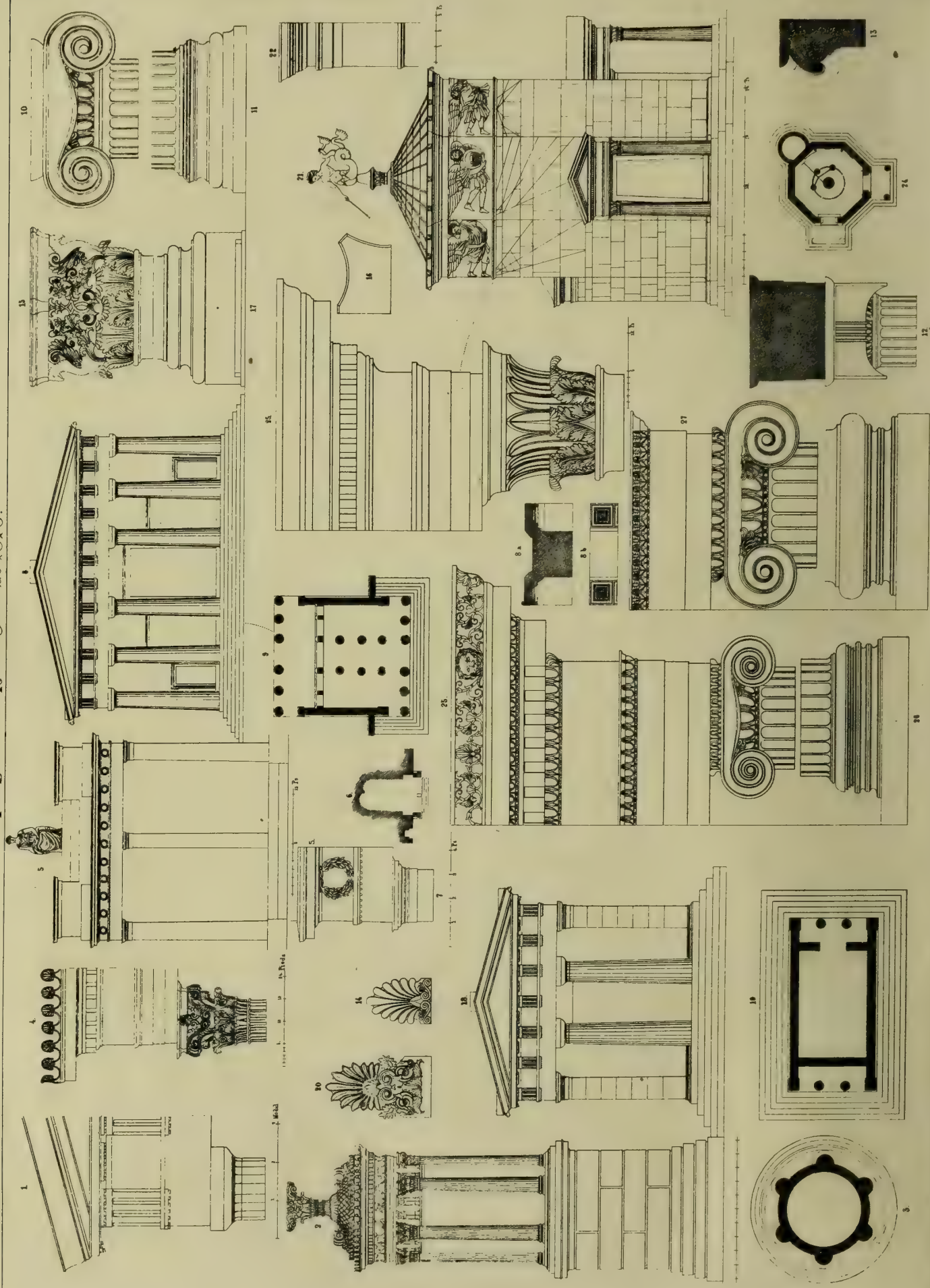
SCALE TO BLOCK PLAN



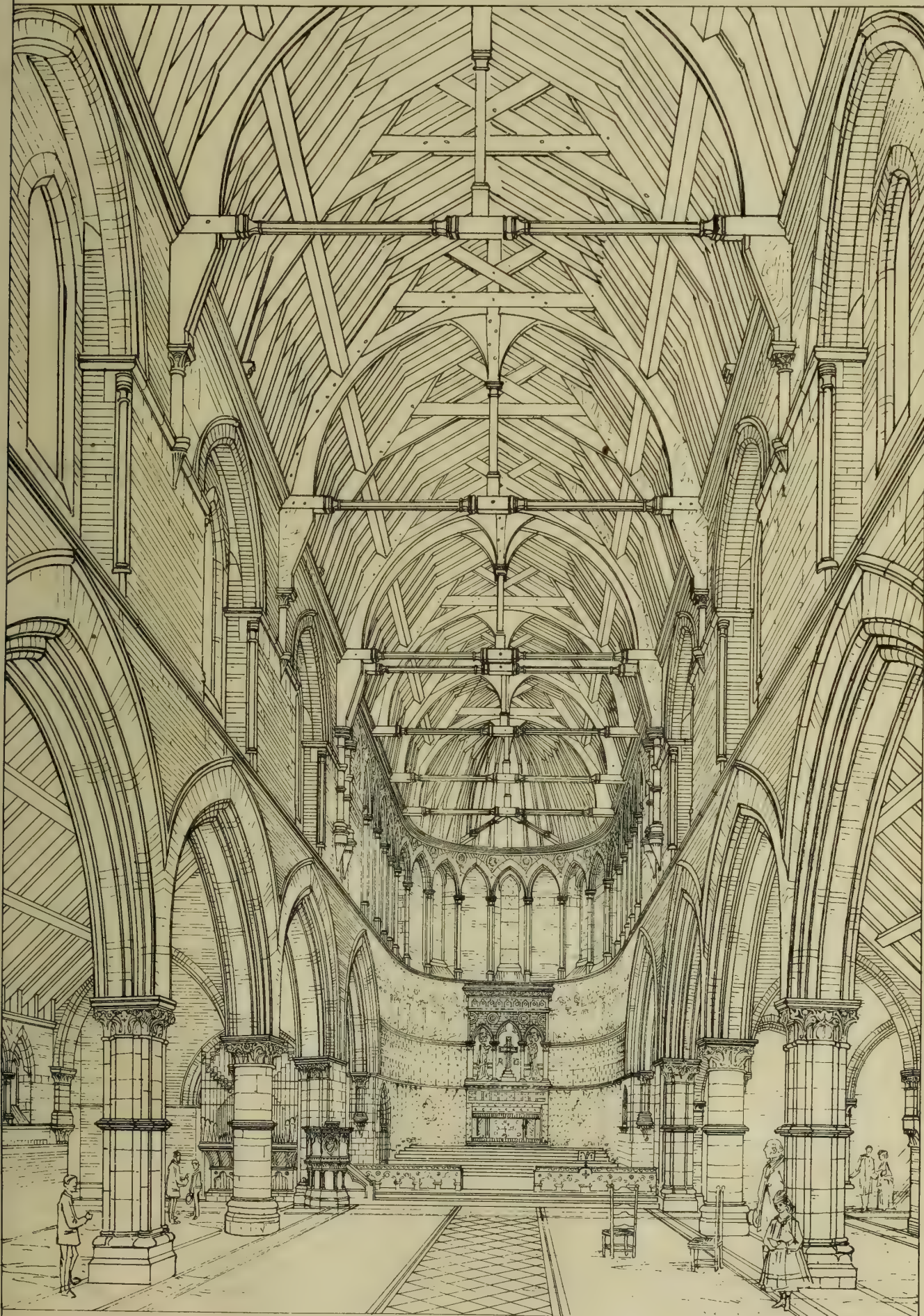
GROUND PLAN

GOLDIE AND CHILD,
ARCHITECTS, LONDON.



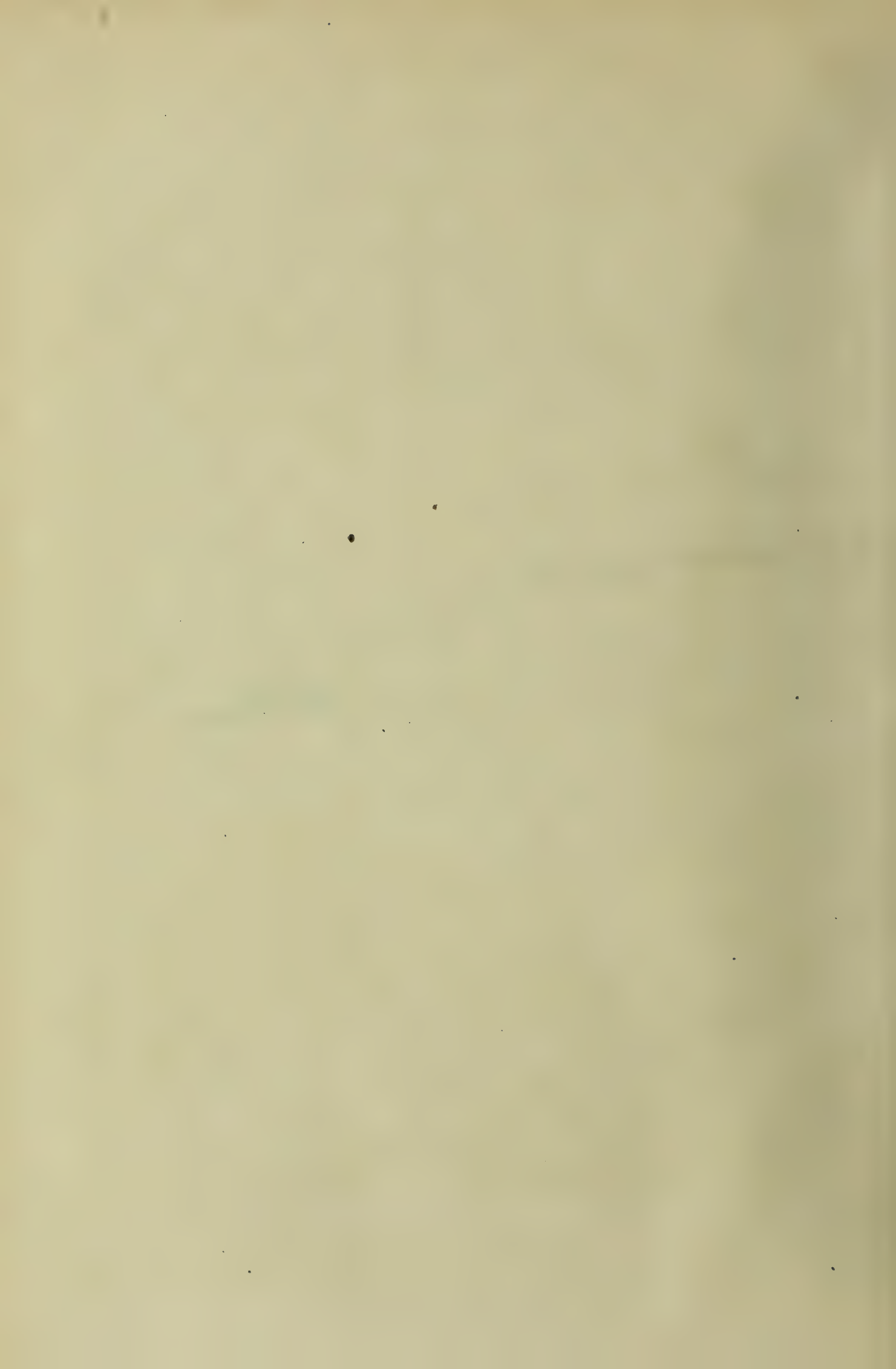


CHURCH OF ST. LUKE VICTORIA DOCKS LONDON

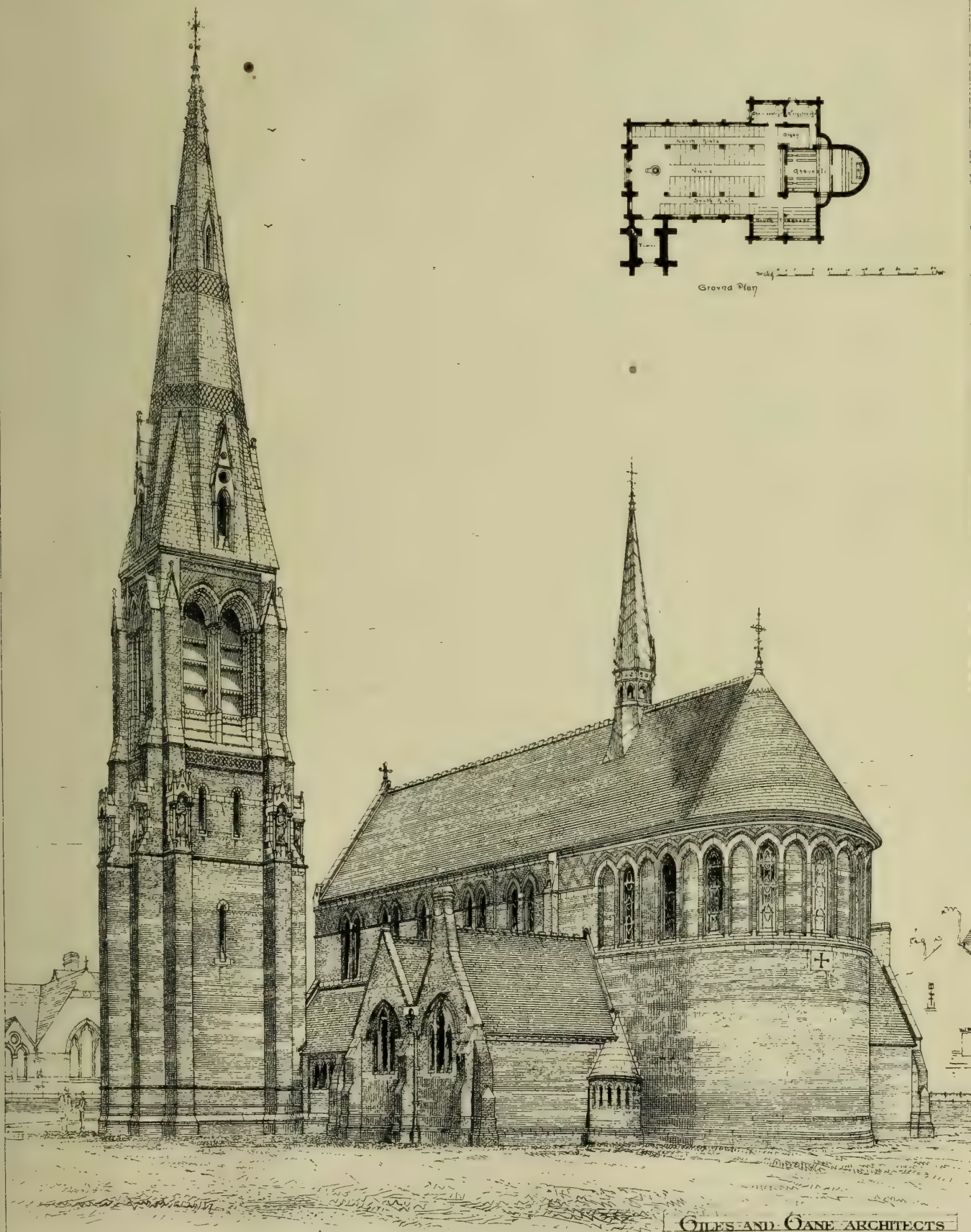


INTERIOR VIEW.

GILES & GANE, ARCHT.
FURNIVALS INN LONDON E.C.



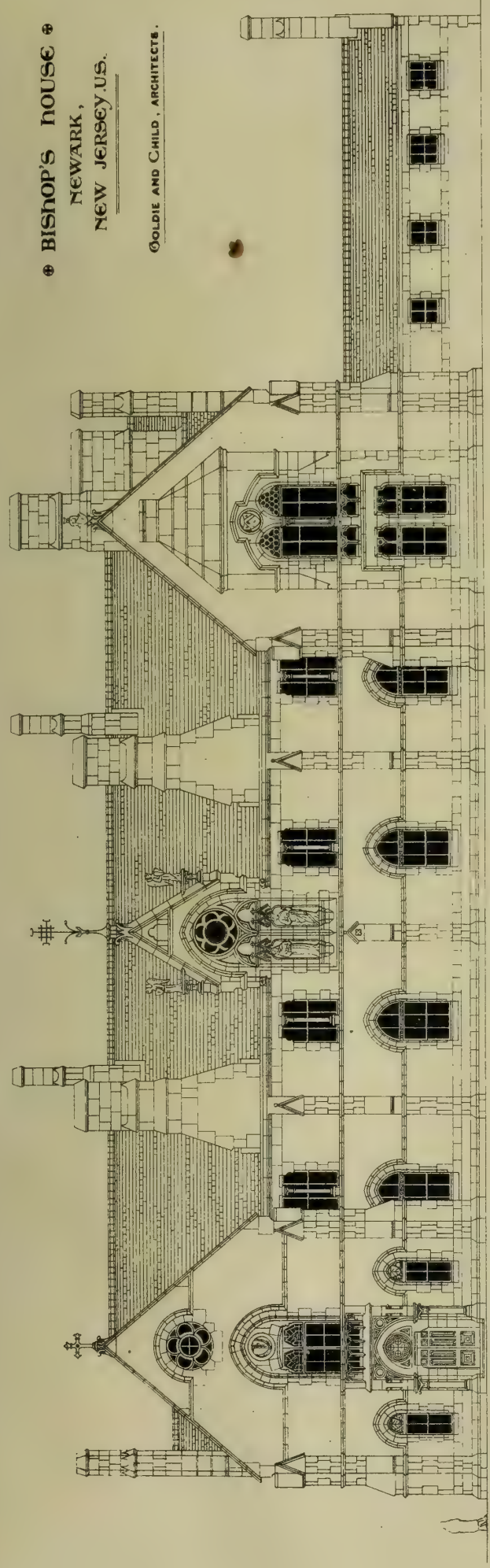
CHURCH OF ST. LUKE VICTORIA DOCKS LONDON
SOUTH EAST PROSPECT





• BISHOP'S HOUSE •
NEWARK,
NEW JERSEY, U.S.

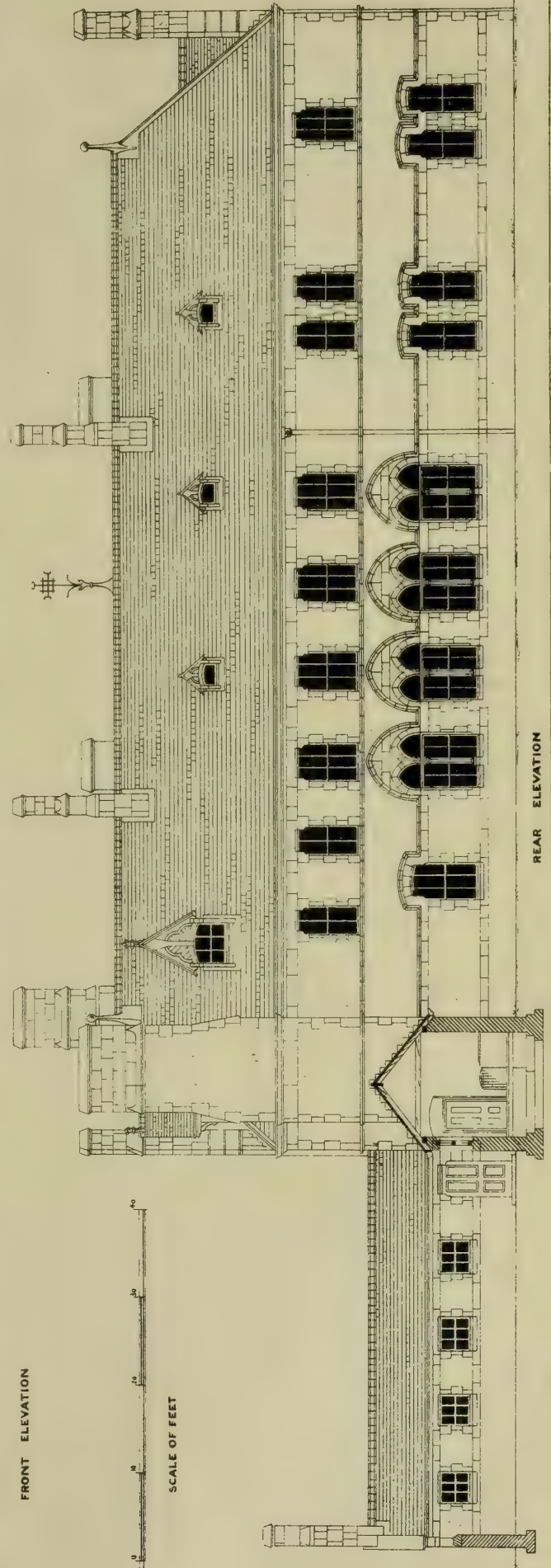
GOLDIE AND CHILD, ARCHITECTS.



FRONT ELEVATION

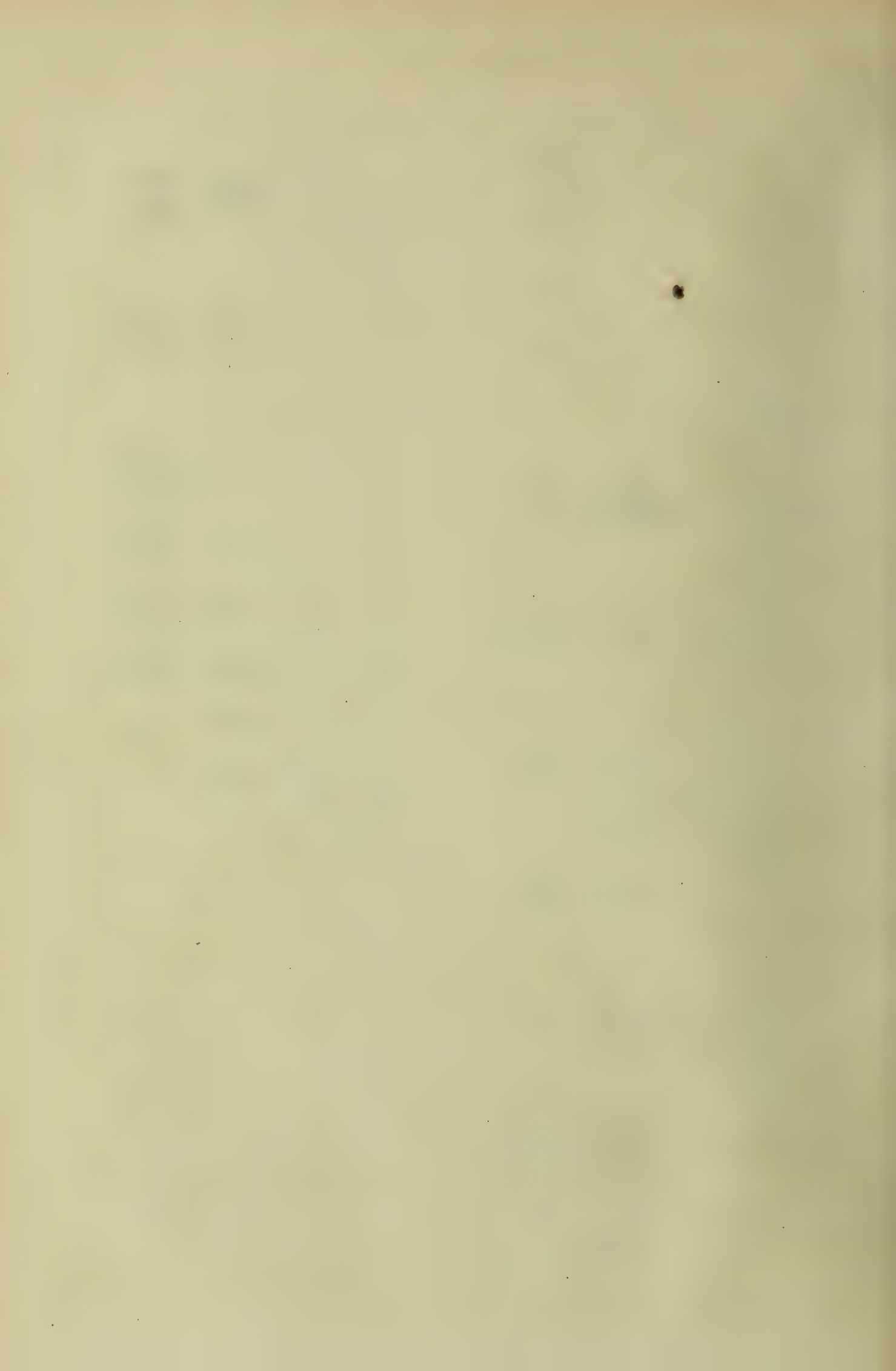


SCALE OF FEET



REAR ELEVATION

MAURICE & ADAMS.



ARCHITECTURAL ASSOCIATION.

At the ordinary fortnightly meeting of this Association, on Friday evening last, the President, Mr. J. Douglass Mathews in the chair, several donations to the library were announced, including Mr. Longman's recent work on "The Three Cathedrals of S. Paul," presented by Mr. E. B. Ferrey. Votes of thanks were given to Messrs. Moreland and Sons, and Messrs. Powell and Sons, for allowing the members to visit their respective works. Mr. Paice, Secretary, announced that the last visit of the session would be paid to-morrow (Saturday), to the Tower of London, by permission of Sir William Gomme.

The PRESIDENT stated that all the gentlemen who had passed in the Class of Proficiency in the Voluntary Architectural Examination (whose names we published last week), were members of the Association. The President also announced that the annual supper would be held at the Guildhall Coffee House on the 1st of July, at half-past seven.

Mr. F. CHAMBERS, F.R.I.B.A., then read the following paper on

THE POPULAR ESTIMATE OF ARCHITECTURE.

It is good sometimes to step outside ourselves and view ourselves as others see us, as the actor, in the intervals of his part, steps from the stage to the stalls, and endeavours to realise what was the effect of his art. We have an inevitable bias to think too much of ourselves; as old Burton hath it, "We brag and venditate our own works," and scorn all others in respect of us ("inflatu scientiâ," saith Paul), our wisdom, our learning; all our geese are swans, and we as basely esteem and vilify other men's as we do over-highly prize and value our own." I propose, therefore, to consider the present status of the architect with reference to the public—his clients—and also the knowledge and appreciation of architecture now enjoyed by the laity. There is some analogy between the profession of medicine and that of architecture. They profess to preserve a sound mind in a sound and healthy body; we, to fit the body with a dwelling suited to its wants, and to adorn it as far as it is capable of ornament. They aim at repairing the ravages of time and disease upon the earthly body; we desire to preserve and conserve the dwelling we have designed, that it shall endure and increase in beauty as in age. The doctor is an expert; he has inmost knowledge of the details of the construction he has to work upon. For us, also, a knowledge of the anatomy of the dwelling is still more necessary. The *Medicus* is not the chief workman; he deals with a thing created. The architect is, as far as man can be, a creator. The house, first conceived in the mind, grows into beauty at the touch of his wand,—a thing of beauty, perhaps, but possibly a Frankenstein, an aborted monster to hurt and pain him years after its birth, to remain an incubus upon him, haunting him, upbraiding him,—even in his dreams. He cannot scratch it out—erase it; not even a recording angel can blot it out, unless it fall of its own instability, or the merciful fire-spirit destroy it. The *Medicus* guesses where he cannot see, and if he makes a mistake he shifts the blame. The architect dare not guess: a false step once made is fatal to his fame. The doctor blunders, and stumbles in the dark recesses of *viscera* and *cloaca*; the patient dies, but the much-enduring Mother Nature bears the blame. Not so with us; for every incident that befalls a dwelling, it is the architect that is dragged prisoner to the bar. It is on our defenceless profession that the *furor* of the Press has especial tendency to burst, whether it be a question of snow melting on the roofs, percolating the slates and spoiling the newly-decorated drawing-room ceiling; of the pipes bursting from the frost and inundating the bedroom in the pleasant dawn of a dark December morning; or the swarm of salivatory parasites that detract from the midsummer nights' repose of Broadstairs or of Eastbourne. If the water supply be defective, or the gas flickers; if brick-walls on clay foundations crack, if the cook has caught cold from sleeping too soon in the new wing, or the groom has typhoid fever—probably from sleeping in an underground closet, about the size of a cistern—it is always the architect, that is transfixed by the spasmodic sentences of the irate paterfamilias. It certainly is the popular impression that every dwelling-house has been designed by an architect, and therefore that he is the proper victim to crucify for every evil that befalls a house. He it

is that stands, like an evil genius, behind the plumber mending a pipe, and guides his hand to give a dig at another near it that shall soon develop into a burst; he puts the pipes where frost assails them; arranges the roof to retain the snow as it melts in a sort of hopper, from which its only escape is through the ceiling, or imitates nature by contriving a series of slopes, to result in an avalanche on the conservatory, just as the azaleas are in bloom! It is the architect who places the nursery over the best bedroom, in order that the pattering of pink little feet may encourage in our visitors the good habit of early rising! He locates the kitchen so that the preliminary snuff of cookery may give the guests the general prophecy of the *menu* so provocative of appetite, and the water-closet so that its soft echoes resound in the boudoir, and its auræ add a perfume to the staircase! Whose fault but his that the coal-cellar is well-lit and ventilated, and the larder a veritable black hole?—that the kitchen makes a torrid zone of the kitchen?—that the staircase compels a single file? Now, these things have no counterpart in the profession of medicine. The doctor is accepted as a sort of priest; he is supreme—he dictates; if he is wrong in his diagnosis—alas! human skill is not omniscient—his did his best; who can avoid the inevitable? His position is firmly taken; he has respect; the supreme ignorance of the laity in physiology raises him; they look up to him, and his decrees have the force of a fiat. But everybody is the critic of the architect! Man is a building animal; the instinct of building is strong in him, as in the beaver or the ant; his earliest play in infancy is to build a mud-hut—his first toy a box of bricks; his latest aim, if he prospers, no matter what his occupation, is to build himself a dwelling. His enthusiasm takes the form of building, from the huge stones piled up in uncouth circles to mark the site of a battle won, or the spot where lies the body of the dead chieftain, to the college which commemorates Keble, or the gigantic sewer with which a transcendental admirer of Wellington proposed to make his name and fame immortal. Above all, religious zeal only fully satisfies itself in building a shrine, a temple, or a tomb. Sacrifice to God has done more to cover the earth with works of beauty than all other impulses to build. Destroy the temples, cathedrals, the churches, the shrines, and crosses in the market-place and by the wayside, and you may walk through the ruined cities as in a garden where the first frost of winter has swept each blossom from its stalk. And this religious zeal makes of its devotees students and art critics, with whom it is the fashion to assume a knowledge if they have it not—to affect the air of a connoisseur and vex and worry and goad the victim who has ventured to design the church or village school, until he envies the peaceful life and calm dignity of the parish beadle. The doctor has his assured position; the architect has none. He finds himself like Dean Swift where Macaulay describes him as the amanuensis of Sir William Temple: Let him wait in the hall; suggest that he wipe his boots; send him a biscuit and a glass of sherry in the library; bracket him with the rent-collector, the head keeper, the parish clerk, the picture-cleaner, or the man who winds up the clocks or comes to tune the piano. Your lines, perhaps, have fallen in pleasant places, and you know none of these things; but have you not suffered even more from the patronising air that so serenely snubs, the faint praise that so effectually damns? Have you the consciousness of having done your utmost for a client—of having really succeeded to your own satisfaction in fulfilling even the exactions of your own over-sensitiveness, and then, opening the letter which you blindly expect, is a little compliment thrown in as a make-weight to the hardly-earned commission? Have you never received such a letter as the following:—

"Dear Sir,—In the house which I have built at so much cost and trouble under your direction, I at least expected not to have been annoyed as I have been in the first month of my occupation. My cook complains of the great distance at which you have placed the dustbin, and of the draught in the larder, which gives her cold whenever she has to fetch the meat. One of the large plate-glass sashes in the drawing-room is smashed to atoms by the wind slamming the door. The water-closet on bed-room floor has been choked with a scrubbing-brush, which was accidentally thrown down it; but surely you should have guarded me against such a casualty. The painters' work is positively scamped. I find they have not touched the inside of the keyholes, and have left that part of the window-frames where the sashes slide, and which they supposed out of sight, without a trace of paint. I

certainly looked to you to save me these annoyances, and must confess to some disappointment. I hope you will at once come down, &c., &c."

Men do not write in this strain to their lawyers or their doctors. Why not? Let us examine the differences of their position, and it may help us to some better assertion of our own. Law and medicine are recognised as sciences—things to know and to be learnt, and when the man has learnt them to a certain point that fact is certified to the laity by a diploma or certificate of some corporate body in whom the public has trust. We have none of those things. Any one may chalk up "Architect" on his door or indulge in the luxury of a brass plate, and he is an architect from henceforth. He may have been an auctioneer, a speculating builder, or done a little in the undertakery line; these are mere varieties of the *pupa* from which the full-blown butterfly emerges. Who shall gainsay him? If he has two friends—architects like himself—and even Job had as many in his misery—and can pay £4. 4s. a year, he may indulge in the addition of five mystic letters to his name, and receive invitations to private views of international exhibitions, and other rich and rare treats. Formerly he actually had the privilege of shaking two fingers of a live earl once a year, but those glories have passed away. The example of a kindred society of men, less accustomed to what Wilkie called "the art o' boozing," and a stirring of conscience from within, saved them from the presidency of a noble lord. There is surely as much responsibility in the case of a man who professes to build our houses so that they fall not on us, our churches and theatres that people may enter and leave them without being crushed in the exit, law-courts and public halls where men may be stifled and poisoned, concert halls where one may not hear, and picture galleries where one may not see, as in the case of the lawyer, who deals only with property, or even the doctor, who could hardly kill even where he cannot cure? There have been efforts to insist on this diploma, and they have failed because the certificate is left to volunteers; it must and ought to be compulsory. A man who wants to build ought to have a State guarantee that the artist he employs has at least the training and knowledge requisite to protect his life against risk and his property against dissipation. A first step has been gained in the compulsory examination of District Surveyors. On this fulcrum take your stand until you obtain for the whole profession the same privilege. The barber-surgeons of the fifteenth century, and the notaries or attorneys of the time, were the stock-in-trade of the dramatist and the satirist. They were held in the same contempt as Ayrton holds the architect and market-gardener of to-day. But by careful training, by making an exact science of what was a diversion of quackery, by obtaining a hold on the fear and thence on the respect of the people, and by the force of diplomas sanctioned by the State, Dr. Sangrado has been superseded by Sir William Gull. But we have not progressed! On the contrary, we have retrograded. Architects then, as a class, were honoured; now they are dishonoured; and why? Because of their unrecognised status—their imperfect, irregular training, the want of appreciation on the part of the public of their art and of their services, the want of division of labour amongst them, and the contrast between the nature of the several distinct and very different works which they profess simultaneously to undertake. Let us consider their education. What can be more promiscuous, more uncertain, than the chance which directs most boys into that groove of which the architect's office is the first station? A friend of mine has well written: "There is an absence of differentiation in boys corresponding to what we know of the early development of mammals. We cannot at first say whether the little creature is going to be a cat or a monkey; and this doubtful state hangs about until it gets its teeth and nails and the rest of its means of working for its living, and then any one can see what it is." The calling which a man is trained to does require a growth of some of his faculties and tastes and a suppression of others. The mind is the scene of a struggle for existence of weeds and flowers, and education classifies those flowers which should in his future calling be of use, and checks the growth of weeds. But what decides the eventful question "Shall the boy be an architect?" Rarely the bent of his taste and fancy, more rarely some evident proclivity and aptitude; generally, much as a boy is made a priest

—because there is the chance of a living to be had; so the boy is destined to the T-square because there is a connexion dimly looming in the future, or because of the interesting drawings duly sent home at the holidays. Sweet studies of decayed barns and water-butts show such taste for drawing. Or: "My son has some fancy for carpentry, Sir; I have thought of making him an architect; there is not one in the family." A month's trial to see how the boy likes it. A new experience! Such fun in the office—the managing clerk a comical fellow who sings such capital songs when the "governor" is out; it is all fresh to him, and the work so smooth! He will be an architect, and the premium is paid and the thing done! Alas! will he be an architect? There's the rub. He will trace drawings and see them not; copy specifications, and no more read them than if they were sermons; go forth unto the buildings that are rising, and, as a traditional joke, say to the foreman of the bricklayers, "That's not bond"! He will see stock bricks and iron girders in all varieties, and to him they will remain stock bricks and iron girders, and nought beside. The principles of construction, the lifelong fight against the forces of nature, the balance of equilibrium he sees not—cares not to see. And the three or five years pass in pleasantries, and with perhaps a pretty drawing or two, and behold our architect-elect, apt, fitted to undertake the work—to build the houses, the churches, the theatres, the schools, of his generation! Now comes the sense of disappointment, of vocation mistaken. The square peg is not suited to the round hole. Too late he finds it has been all a mistake. Better, far better, had his friends taken the advice of Turner: "I think of making my son an artist, Sir." "Better make him a butcher," was the rough and gruff reply. He shifts about from office to office till designated ill-at-ease. Knowing no trade, without a calling, he adds another to the sad, increasing class of men relying upon their friends—the bad pennies for ever coming back—the black sheep which are always jumping over the family fences, till perhaps exile, or a snug appointment, teased out of the gift of friends too glad to be rid of a burden, gives the perturbed spirit rest. Terrible for him if, tempted by the sudden caprice of fortune—a country-house to build, or a warehouse in new street—he marries on the strength of this his first commission. Then cometh indeed despair, anguish hardly to be borne:—

"He seemed, as in a nightmare of the night,
To see his children leading evermore
Low miserable lives from hand to mouth,
And her he loved a beggar."

The first flush is not repeated. There is the office to be maintained as well as the home. He plunges into competitions. He has read the story of Elmes, who, at twenty-three, awoke to fame, and found his design the chosen one for St. George's Hall—the great municipal temple of Liverpool. He, too, may prove an Elmes; he takes his motto from Bulwer, "Dream on, O youth, manfully and nobly, and thy dreams shall be as prophets." In vain doubt of his fitness for his work, a cohort of petty cares—debt, perhaps, the darkest devil of all the crew—assail him, and he succumbs—subsides into a clerkship or a cigarshop. Would a better system of training alter all this? I venture to think so, if there was the same system in the nurture of that faculty which is to develop into the genius of the architect, which obtains in the culture of medicine or of law—if, in the first place, a year was passed in the builder's workshop, in the practical work of the operative trades, and the evening in the school of the art-designer; if periodical examinations took place under the direction of some recognised corporation; let the second year be passed in the actual superintendence of buildings in progress; the third year in the study of the practical requirements of each variety of building—the dwelling-house, the factory, the church, the school, the hospital, the hotel, the town-hall; let him study also those questions of jurisprudence which now disturb and hinder our every step—building acts, sanitary laws, rights of light, rights of adjoining owners. All through this curriculum let the fine art, the æsthetic element, be constant; let every pocket contain a pencil, and from the thumb-nail and the shirt-cuff let him every evening transfer his sketch of ornament or some quaint conceit to the sketch-book. Let the workshop be to him what the hospital is to the doctor; the office, the surgery; the building in progress the clinical studies by the bedside of his patient; he will, at the end of his probation,

have acquired a knowledge of the art of building; he will be fitted, for better or worse, to fill any of the many posts which the increasing demands of men for every variety of building are constantly creating. Not every young surgeon steps forth a Minerva armed at all points. The physician in full bloom is a slow and mature product: for one in flower there are a thousand young plants, healthy and thriving, but content with their green leaves. And the public know all this. They appreciate the fact that the architect is self-dubbed, imperfectly educated, untrained; that he is to be employed without guarantee, and therefore their patronage is the more to be valued. I approach a question of great uncertainty, and one on which I have formed an opinion, as yet plastic: Are architects lowered in the popular estimation—degraded, so to speak, from the high estate which of course we all think they are entitled to, by reason of the multiplicity of their calling—of their undertaking to do so many things so different, so contradictory, in fact, in their character and dignity? A man has his brain full of visions of the best form of ceiling for the hall; the wall surface of the new staircase; of the delicious bit of masonry which is to be the new drawing-room bay window. He receives a note like this:—

"Dear Sir,—The smell we have noticed once before in our library certainly increases. It is evident there is something wrong in the drainage. Knowing the multiplicity of your engagements, I hesitate to trouble you with this matter, but if you are unable to come down at once and thoroughly investigate the whole system of drainage, I must apply elsewhere for the assistance which I feel, &c., &c."

"P.S.—It is not the slightest use your sending Mr. — (your managing clerk). I cannot have that confidence in his judgment."

You all know what this means. It means that you must give up not one day, perhaps, but many days, to an interesting investigation of the ancient constructions of our forefathers in the shape of drains under a country-house, whose every owner for two hundred years has added a cesspool or two to the ring which, like the pearls around the emerald, encircle the ancient dwelling. You go down at every sacrifice, but with the certainty that you can never make a charge which will at all repay you for the work; that the end of it may be utterly disastrous and unsatisfactory: that the accursed smell—born, perhaps, of the devastation of rats—may elude you like the Will-o'-the-Wisp, and beaten in the library, reappear (horror of horrors!) in the nursery or the boudoir; and yet you must do it, or you may find some other man has slipped into your shoes. He will, under cover of the smell, proceed to throw out the bay window, to add the billiard-room, and the beautiful new staircase, and all those charming creations you had so happily carried out in prospective. And worse than that, in six months' time you read in the *City Press*: "We hear that Messrs. X. and Co. [X. being the drain-persecuted client aforesaid] have purchased a large plot of land in Queen Victoria-street, and are about to build new premises on a truly magnificent scale, which will form a great ornament to our city. We understand designs have been prepared by Mr. Malaria, the architect, whose sanitary investigations are so well known," &c., &c. Where are the limits of our knowledge to be fixed? An architect is indeed, in theory, the representative of omniscience; called upon to build a brewery, a printing-house, a college, a hospital, he must be primed at once with the varied requirements and internal organisation of each building; a fault in detail is a fault indeed. I built a large provision warehouse a few years ago. My client said: "I want my smoking-room to be the best in London." I thought at first—having a weakness that way—of parquet floors, and tiled walls, oak-bench ends, deep ingles, tile lined, and all the accessories that would tell up in presenting to my client the perfection of a smoking-room. Utterly wrong! It had never struck me that it was not a room for smoking, in his leisure hours, of Pastagas and Intimidats that the City merchant desired should excel all others, but for the smoking of bacon and hams. Hence a new study—an exploration of all sorts of haunts dim with the fumes of oak shavings and the scent of salt pork. How strangely these diversities accrue! You pass from an hour devoted to the choice of drawing-room papers with Madame, to take account of the dilapidations accrued to a dozen dens in Petticoat-lane. You climb down from the spire of one of Wren's churches, where

the rusting of iron cramps has necessitated the reinstatement of the columns of the lantern, and pass on to Powell's to select the stained-glass for the library windows of some country house, make an affidavit in Doctor's Commons of the injury to right of light of a scullery window, and run down to Southall to report whether so many thousand pounds can be lent on the security of the lease of a brickfield. It is impossible that any man can do all these things well. Michael Angelo designed palaces, carved statues, painted the ceilings. Can we fancy Michael Angelo giving evidence as to rights of light, investigating the origin of a drain smell, reporting on the mortgage-value of a brickfield? These multiplicities have originated from the complexity of our society, but they should no longer be encouraged. The excellence of attainment in one department is imperilled by the exigencies of all. The public say "This man is 'Jack-of-all-Trades, master of none.'" They laugh at our superficiality. They call in the specialists when they have done with us—the decorator to disfigure and contradict our work, the upholsterer to hide and cover it up. The architect should be the decorator, but he is too busy in his sanitary gropings, in his compensation cases. How does the doctor deal with the like difficulty? The body is divided, like the empire of Alexander. Dr. Gull has the stomach and intestines; Dr. Williams has the lungs; Dr. Brown Sequard has the brain and nervous centres; Dr. Barnes those parts *quæque fœmarum solve sunt*. The doctors range themselves under these several leaders, to occupy their several districts. They have done this in spite of continued opposition from the public and the press, compelled by the inexorable necessity of things—by the impossibility of human knowledge compassing such an ever-increasing range—by the constantly-extending area of science, and the force of the old motto—"Ars longa, vita brevis." And we must do likewise, or lose ground; have circulars sent us, informing us that architects have no knowledge or experience of iron construction—that if they have occasion to employ iron, they should send a brief, marked so many guineas, for consultation with a specialist who does; have men call upon us, introducing themselves—"Monsieur, Je suis l'architecte des architectes. I make the designs for many gentlemen of your profession; your time is too valuable to be taken up in designing and making pictures. Let me do that for you; you attend to the compensations, the valuations, the rights of light—all that sort of thing, which is so profitable." It is profitable; but there is truth in the old saying, "You cannot serve God and Mammon." There is enough for all if men did but honestly let those born and fitted for it follow art pure and simple, and not stoop to pick up the bits of fat that clog their digestion and impair the pure serene action of those higher faculties. Let those who follow art—but so very far behind it—drop it altogether and devote themselves to the more lucrative but less elevating branches; their increment of gold will well, in these times, balance the loss of fame. I touch upon the last part of my thesis—the knowledge and appreciation of architecture which the people have. If you are supposed to be a professor of the art of building, you will be called on frequently to answer a question put somewhat thus:—"That is a fine building! What style is it?" There is a hazy notion in the minds of most men that architecture is a science akin to botany, zoology, or conchology—that every building is of some definite species or variety; that it must fall under some fixed order or genus. Forty years ago the handbooks, treatise, and catechisms of art were all compiled on this principle. There were the "Five Orders," Tuscan, Doric, Ionic, Corinthian, and Composite. Everything in the shape of a building that could not be brought under one or the other of these categories was outcast—heterogeneous—a mere pile of rubbish. I remember an old school-mistress taking me (an invalid) round the Regent's Park, and examining me, *more suo*, as to the buildings we passed. "By the capital of the column ye should know them," and I named them to her satisfaction and the glorification of Nash, Ionic, Corinthian, Composite—the end of all things. Now and then a more tolerant guide would allude to what he was pleased to call a sixth style; he made a tentative recognition of what he was pleased to call a Gothic style. The self-sufficiency of the composer blandly smiled as he consigned to the limbo of absurdities the magnificent tombs and shrines of India, the temples of Egypt, the fairy-like stone-dreams of the Saracens, the fantastic Byzantine and

Romanesque churches, convents, and campaniles of Italy; the picturesque Mediæval castles, the quaintly-gabled palaces of the Tudors. To him the tomb of Akbar Khan, the Temple of Serapis, the Alhambra, the Basilica of S. Mark at Venice, Warwick Castle, and Burleigh House were heaped in one category with Walpole's folly at Strawberry Hill—as mere playthings, freaks of fancy unworthy to be called architecture or considered by the architect. We have changed all this; we are in the midst or rather the beginning of a revolution. The quiet undermining undertaken by a few thoughtful men has shaken down this prejudice, and the people see again the things of beauty that have been invisible for centuries. Like all great movements in national thought, we hardly can trace to whom the movement was due—who gave the impulse. Pugin and Ruskin were amongst the pioneers, but there had been a quiet steady force preceding them—as it were requiring them, and then supporting them—not with the aid of the profession of architects, but in spite of them; for of that race all held to the "Catechism" and to the "Five Orders" as the Romanists to the Seven Sacraments—a force generated by the interaction of many minds and lives of thought; by the effort that men have made throw to aside the crutches that were once thought indispensable to the safe pursuit of truth, whether of Art, Politics, or Religion. Doubtless we are still afar off: we see but dimly; but there have been some breaches made in the outworks, and the leaders of opinion who have headed the forlorn hope have not in vain risked obloquy and contempt in storming the citadel of error.

DISCUSSION.

MR. QUILTER, in proposing a vote of thanks to Mr. Chambers for his paper, said he did not think that in the matter of education, young architects could do more than avail themselves of the advantages now placed within their reach, which, he must say, were not sufficiently used at the present time. The means of acquiring knowledge at the disposal of young architects were ten times more abundant than in the days of their forefathers. Still, although a great deal had been done in the way of improving the education of the architect, much remained to be done. The want of division of labour amongst architects was, he believed, the great curse of the profession. It was impossible for any man to concentrate within himself all possible knowledge on all kinds of construction. He thought that the confidence of the public in architects would be increased if young architects were to devote themselves more than they now did to special or particular branches of the profession, and if the Institute could be induced to grant certificates of proficiency in these special subjects, instead of the merely general certificate now granted to those who passed the Voluntary Examination. As to the public, he thought their knowledge of architecture was increasing, and few buildings of importance were now erected without consulting an architect, except by the lowest class of speculating builders.

MR. BOYES, in seconding the proposition, said he thought it would be of great advantage to the profession if the Institute did not so limit its functions as to be a mere examining body; it ought to be an educational body as well. It was useless to set the students "stiff" examinations, which could only be passed by dint of "cramming." The students should be assisted and guided in their studies. It was almost useless to examine a student in any subject unless the examiners knew the method in which the student's studies had been pursued. He thought it would be a great advantage if the Institute would hold examinations of young architects as to their proficiency in special subjects. But any system of examination, to be good, must be combined with teaching. For this reason he regarded the Voluntary Architectural Examinations as of comparatively little service to the profession.

MR. POTTER said that before it said much about educating architects, the public should look to its own education, so that it might know what architecture was. The popular notion of architecture was that buildings were made by it to last out a ninety-nine years' lease and to comply with the requirements of the Building Act. Even architects themselves were too often disposed to be satisfied if all these conditions were met.

MR. CLARKSON did not think that architecture as a profession was wanting in public appreciation more than other professions—the legal profession, for instance. In every profession there

was a winnowing process continually going on, and, as a rule, those who deserved it obtained recognition and success whatever the profession. As to the quality of "omniscience" said to be required in an architect, it was, of course, absurd to suppose that he should be possessed of all kinds of knowledge—and no reasonable being would expect it. He (Mr. Clarkson) insisted on the necessity of architects standing shoulder to shoulder and cultivating a feeling of *esprit de corps*. The idea of having "consulting architects," which had been advocated over and over again, might be advantageously adopted by the profession. For instance, if one architect was known to have great knowledge and experience in the construction of a special class of building, there need be no objection to his being consulted by another architect with reference to the same class of work—he being paid by a consultation fee. If such a system as this were adopted, it would go a long way towards overcoming a deal of the difficulty which existed by reason of the multiplicity of the demands made on the architect's talents.

A MEMBER said that one great difficulty in the way of the younger members of the profession acquiring practical knowledge was that employers generally refused to allow their pupils the time to visit works in progress.

The PRESIDENT, in putting the motion, said there was no doubt that the public would appreciate architects more if architects would do their work thoroughly. One important distinction that should be drawn between the professions of Architecture and Medicine was, that in the former the client went to the architect with a more or less definite and preconceived idea of what he wanted, whereas the patient going to the doctor had merely to state his ailments and leave himself unreservedly in the hands of his medical adviser. There were so many branches of labour in building, and those branches were so subdivided, that it was almost impossible for an architect personally to supervise every branch of the work, and he was necessarily dependent in a great measure on his clerk of the works. He could scarcely agree with Mr. Clarkson that the public did not expect architects to know everything; his (Mr. Mathews') experience was quite to the contrary. He thought the suggestion as to consulting-architects a very good one, and one that, if adopted, would benefit the profession at large.

The motion having been carried unanimously, Mr. Chambers, in reply, expressed his gratification that his paper had led to so interesting a discussion. Of course in such a profession as architecture, there must necessarily be division of labour, and it was perfectly legitimate to consult the specialist where special knowledge was required. He urged his audience to emulate Ruskin and others to the best of their ability in fostering in the public a taste for art.

The meeting then terminated.

ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETIES.

ARCHÆOLOGICAL INSTITUTE.—At the meeting on June 6. The Chairman (O. Morgan, Esq.,) read an Account of Four Watches of the Seventeenth Century, which he exhibited, and which illustrated improvements made in watches by Dr. Hooke, an English mathematician, East, Markwick, and Tompion.—Mr. Burt read "Notes on some Original Documents selected from the Collection at Losely Hall, Surrey." The most important were two letters of the Privy Council to the Justices of Surrey, very shortly after the death of Edward the Sixth, in reference to the flight of the Princess Mary from Hunsdon, and condemning her supposed title to the throne. Mr. Nichols bore testimony to the interest of the MSS. exhibited.—Mr. J. H. Parker, C.B., gave a discourse "On the Architecture of the Eleventh Century," in which he vindicated the positions he had taken up in a Memoir on the Church of S. Mary, Guildford, in the *Journal* of the Institute which had been criticised in the *Saturday Review*.—Mr. J. J. Rogers sent for exhibition a bronze mirror, two glass beads, and some bronze rings of the Anglo-Saxon period, which had been found in a grave in the parish of S. Keverne, Cornwall.—General Lefroy, Governor of Bermuda, sent a rubbing of a large brass dish, and a photograph of work in wax on panel, which had been recovered from the wreck of a vessel going from Leghorn to America, in which the collection of an antiquary had been shipped.—Miss Ffarington brought four drawings of painted glass, now at Worden, which are said to have

been taken from Lathom House when it was despoiled by the Parliament. In them were some heraldic combinations, not quite intelligible; also a key, with good floriated handle, belonging to a seventeenth-century farmhouse in the parish of Leyland.—The Chairman also exhibited two Mediæval rings and some articles of jewellery; and Mr. Parker showed several plans and sketches of architectural subjects in illustration of his discourse.—Mr. Nightingale sent a photograph of an early arch lately found in the nave of Britford Church, near Salisbury. It was formed of thin Roman bricks, with the sides ornamented with stone, carved in foliated scrolls and interlaced work, on which were remains of colour.—It was announced that a special excursion would be made to Berkhamstead in the early part of July, when Mr. Clark and Mr. Parker will give discourses upon the Castle and Church, as at Guildford last year.

OXFORD ARCHITECTURAL AND HISTORICAL SOCIETY.—The concluding excursion took place on Saturday week, when the members went to Reading and Silchester. A portion of the party left the Great Western Station by the 9 a.m. train, and on arriving in Reading they proceeded direct to Grey Friars' Church, where they were met by Mr. C. Smith, architect, and Mr. F. Albury, the Secretary of the Reading Architectural Society. Mr. James Parker pointed out the distinguishing features of the church, namely, its small chancel, now destroyed, very large and wide nave, and exceedingly narrow aisles. They might fix the date of the Church at about 1300, which date would correspond with the style of architecture. This church was confiscated in Henry the Eighth's reign; the land was sold to Robert Stafford for the sum of £30, but the fabric was given to the Corporation of Reading to make a Town Hall, which, however, was not done. In Elizabeth's reign, another grant was made to the Corporation, in which it was stated that they might do what they liked with the building, and they turned it into a common workhouse for the different parishes. The next place visited was S. Lawrence's Church, where the party were received by the curate and Mr. Smith, who stated that the tower was considered very beautiful in its proportions, the tower arch very fine, and the south doorway peculiar and striking, being Early English. After pointing out several other features in the church, he said that when a portion of it was restored in 1867, the south doorway was found to be blocked up with stone figures, which were, however, not very valuable, being probably carved for tombs, but one was discovered, on examination, to be a representation of S. Lawrence. The next place visited was the Old Abbey Gateway and the Roman Catholic Chapel, where the party minutely inspected an old font—made up of material of twelfth century work. The Rev. Canon Ringrose, who conducted the party over the ruins, exhibited an ancient key, which belonged to the place in which the vestments were kept, and a seal, the property of one of the Abbots. He also exhibited some small pieces of stone-carving, found in the Abbey ruins, and afterwards gave a minute account of the font, the work of which, he said, could not be fixed later than the year 1164, when the Abbey Church was consecrated by S. Thomas à Becket. On visiting the ruins, Mr. Jas. Parker gave a short history of the Abbey. Mr. John Henry Parker, C.B., asked them to notice, before leaving, that the Hall of the Abbey, which was of the late Norman character, had been covered by one enormous vault, which was of very remarkable size. A visit was then paid to S. Mary's Church, and here the party were received by the curate. The roof of the edifice is of the Late Decorated style, and dates from about 1320 to 1330, and was thought by some to have been brought from the Abbey. On returning to the station, the members were joined by the remainder of the party, and the whole left Reading by special train, which took them to a point on the line between Mortimer and Basingstoke, near to Silchester. What they saw at Silchester was fully described by us last week.

YORKSHIRE ARCHITECTURAL SOCIETY.—The members of the Yorkshire Architectural Society paid a visit to Doncaster and the neighbourhood on Tuesday. Leaving York at ten a.m., they arrived at Doncaster about half-past eleven o'clock. From Doncaster the members were conveyed by carriages to Kirk Sandall, Barmby Dun, Kirk Bramwith, and Fishlake. They then returned to Doncaster, through Hatfield, and after luncheon at the Angel Inn, paid a visit to the parish church.

Building Intelligence.

CHURCHES AND CHAPELS.

INCORPORATED SOCIETY FOR PROMOTING THE ENLARGEMENT, BUILDING, AND REPAIRING OF CHURCHES AND CHAPELS.—This society held its usual monthly meeting (the last but one for the present session) on Monday. Grants of money were made in aid of the following objects, viz.:—Building new churches at South Eston, All Saints, near Middlesbrough; and Walsall, S. George. Rebuilding the churches at Broughton-in-Furness, Lancashire; Bourton-on-the Water, Gloucester; and Eltham (parish church), Kent. Enlarging or otherwise increasing the accommodation in the churches at Ashmore, near Shaftesbury; Barton S. David, Somerset; Capel-le-Ferne, near Folkestone; Healing, near Ulceby; Llandyssul, Cardigan; Michel-Troy, near Monmouth; Panteg, near Pontypool; Plumstead, Norfolk; and Reddingfield, near Eye, Suffolk. Under urgent circumstances, the grants formerly made towards building S. Mark's Church, Walworth, Surrey; and towards enlarging and restoring the Priory Church at Dunstable, Beds; and towards reseating the churches at Botus Fleming, near Hatt, Cornwall; and Eynsford, near Dartford, Kent, were each increased. Grants were also made from the school-church and mission-house fund towards building, &c., school or mission churches at Acol, near Margate; Fishponds, near Bristol; Goose-green, in the parish of Pemberton, Lancashire; Wardlow, in the parish of Tideswell, Derbyshire; and Woodcocks Well, in the parish of Odd Rode, Cheshire.

MARSTON.—The foundation-stone of a new church dedicated to S. Paul has been laid at Marston. The plans are designed by Mr. John Douglas, architect, of Chester, under whose direction the work is being carried out by Messrs. J. and J. Boswick, builders and contractors, of Knutsford. The church is intended to contain 310 sittings. It is to be built in the Early Gothic style of architecture, consisting of nave, north aisle, chancel, organ-chamber, and vestry, the entrance porch being on the north side, and a low tower at the west end, with a baptistery underneath. The building will be of bricks, moulded ones being used for the piers, arches, windows, and doorways. The whole of the structural timbers of the roof will be dressed and exposed to the church, the exterior being covered with small pink-coloured slates. The nave is separated from the north aisle by an arcade of four arches executed of bricks. The floor will be boarded, and the aisles paved with small red tiles.

NOTTINGHAM.—The memorial-stones of the new Wesleyan Chapel in Tennyson-street were laid on Monday last. The building will be in the Italian style of architecture, and will be carried out with red bricks, having Hollington stone dressings, the plinth or sub-story being formed with rock-faced Bulwell stone. The principal entrances will be in the centre of front, and will be approached by a broad flight of terrace steps. The interior dimensions of the chapel will be 100ft. by 59ft., and there will be a spacious vestibule and wide corridor at the entrance, also minister's vestry with every convenience at the rear. The seats will be arranged in the amphitheatre form, the pulpit being the centre from which the radius is struck; the ground floor will seat 800 persons, besides which there will be a gallery over the entrance for orchestra and children (200). The ceiling will be panelled and enriched, having deep cove. The basement will contain large school-room, band-room, four vestries, &c., with wide area all round. The architect is Mr. John Collyer, and the builder, Mr. Henry Vickers, who has taken the contract for the sum of £24,640; this is exclusive of the boundary walls and other matters, which will make the entire cost about £5,000.

OXFORD.—On the feast of the Patron Saint, a new altar was inaugurated in the church of S. Barnabas, Oxford. It occupies a prominent position in the northern chapel, and the principal subject is the Crucifixion, with S. Mary Magdalen at the foot of the cross. On each side are panels containing figures of S. John the Baptist, S. Paul, S. Barnabas, and S. Luke. The woodwork was executed by Mr. Capel, of London; the ornamental ironwork by Messrs. Hart and Son; and the painting by Messrs. Heaton, Butler, and Bayne,

of London. The whole was designed and carried out under the superintendence of Mr. Blomfield, the architect of the church.

S. CHARLES, OGLE-STREET.—A new high altar and reredos were lately consecrated in the (Roman) Catholic Church of S. Charles, Ogle-street. The whole of the wall-surface as far as the wall-plate is divided into three equal divisions or tiers, giving one to the altar and its dossal, the second to an arcading of five pointed and foliated arched panels, and the third or uppermost tier to five trifoliated panels, the whole terminated with a cornice of goodly dimensions pierced and carved with foliage, and above this a line of gilded fleure-de-lis. Behind the altar two flights of steps of stone form an approach to the throne above the tabernacle. The stalls of the sanctuary are of walnut-wood, neither polished nor varnished, and the floor is paved with encaustic tiles, a few, and only a few, bearing a device. The altar-rail is of marble of a greyish hue, panelled in quatrefoils of pure alabaster, the gates of metal gilt. The altar-slab sides and graduals are of serpentine marble, and the dossal of the same, but charged with a fleur-de-lis deeply cut into the material and each gilded. The frontal of the altar, the angle buttresses of the dossals, and framework of the reredos, are of alabaster. The altar frontal has two quatrefoils and the backgrounds gilded; on each are painted two subjects, types of sacrifice; on one Abel and Melchisedech, on the other Noah and Abraham; these are balanced by coloured marble of a dark red which is carried from the altar-frontal to the back, and forms a hollow or concave on either side, leaving the altar-slab exposed without support, excepting a small marble shaft of green marble, which supports the angles. Above the altar is the tabernacle of pure alabaster, having in the tympanum two angels each censuring, with its door of copper gilt, charged with an enamelled figure of Our Lord enthroned as Priest and King, showing the Five Wounds. Above is the throne, with its two slender shafts of coloured marble, each shaft surmounted by an angel, with a disc. Over the tabernacle is an arcade of nine panels arched and foliated, the centre bearing a painted fresco of a Madonna and Holy Child, and over this is another arcade, but only of five panels, trefoiled, the centre one bearing the Crucifixion, and to the left and right of each respectively are painted frescoes of S. John, S. Francis, the Mater Dolorosa, and S. Charles, S. Joseph, S. Augustine, S. Peter, and S. Edward. The wall space at the side of the altar, up to as far as the line of the dossal, is faced with encaustic tiles, ornamented with figures of the lion and the dove, each placed chevronwise, and bordered at top with peacocks and vases; above this the wall has two arched and foliated panels, alternately charged with a plain and ornamented tile; this is finished with an embattled cornice, and the whole wall space above is diapered in stars, &c., on a blue ground. Mr. Bentley is the architect of the new altar, Mr. W. H. J. Westlake executed the beautiful fresco paintings.

SOUTHWARK.—The Borough-road Congregational Church has just been reopened, after extensive alterations and repairs, including the provision of new schoolrooms, minister's vestry, &c., the total cost being about £1,500. Messrs. Searle & Sons, architects, of Bloomsbury-place, Holborn, have had the supervision of the work; the building contract was given to Messrs. Staines & Sons (£889); Mr. Beaumont undertook to do the painting for £178; and gas-fittings, &c., were entrusted to Mr. Biggs, of the Borough-road (£61).

TOWYN CHURCH, ABERGELE, NORTH WALES.—On Tuesday last, June 17th, the Lord Bishop of S. Asaph consecrated the newly-erected district church of Towyn, Abergale. The church, parsonage and schools have been erected entirely at the expense of R. B. Hesketh, Esq., of Gwyth Castle. The church has a nave, an aisle, a central saddleback tower above the choir, with groined ceiling in Bath stone, ringing-chamber and belfry; the chancel has a reredos representing the Crucifixion and stained-glass windows; the large east window representing the Son of Man in His glory, surrounded by saints and angels. A tracery oak screen separates the nave from the choir, and the choir from organ-chamber. The commodious vestry is connected by a cloister with the study of parsonage-house. The stone dressings of the church and parsonage are of Bath stone, those of the schools of Cefn stone, and the whole of the walling is of native limestone, built irregularly. The style of the windows are Early Geometrical;

the roof and the nave seatings are of pitch-pine; the choir-stalls, altar, and doors are of oak, and there is accommodation for 250 persons. The schools will accommodate 130 children, and with master's house, cost over £2,000; the cost of the church and parsonage about £8,000. The whole have been executed by J. Rhydydd Jones, builder, of Rhyl, from designs by G. E. Street, Esq., R.A.; the reredos and carving was done by Mr. Earp; the altar-rail and ornamental iron-work by Mr. Leave, of Maidenhead, the stained-glass windows by J. Hardman and Co., and the encaustic tile pavements by Mr. Godwin. The whole was superintended by Mr. Chapelow, Clerk of Works. The organ, coronæ, altar-cloth, and every other requisite, have been handsomely given by Mr. and Mrs. Hesketh.

YARMOUTH (ISLE OF WIGHT).—The parish church of S. James, Yarmouth, Isle of Wight, was reopened on Tuesday week, after restoration. The church is of Gothic architecture, consisting of chancel, nave, tower, and large gallery. The present church was built about 1543 on the site of one of the churches which were destroyed by the French about that date. Its partial restoration was effected by the rector in 1868, when the old plain east window was replaced by a stained-glass one, and a new wooden roof was put to the chancel. The organ has been removed from the body of the church into the chancel. The altar and the entire fittings of the chancel are of new material, from the designs of Mr. William Stratton, architect, of Newport.

BUILDINGS.

FITZROY.—A new town-hall is about to be erected in Fitzroy, Victoria, from the design of Mr. W. J. Ellis, architect, of Melbourne. The new buildings will consist of a large public hall, 102ft. long, 47ft. wide, and 33ft. in height; and the intervening space between the wall and the court-house will be occupied by the present offices of the council, together with a new council-chamber, a library, and several other apartments. The principal facade will comprise a lengthy verandah, or loggia, and a high tower with clock. The total length of the Napier-street facade will be 175ft., and that to Moor-street 136ft. The cost will be £8,205. Messrs. Nation & Co., of Melbourne, are the contractors.

SCHOOLS.

FARINGDON.—A new British School was opened at Faringdon on Thursday week. The work has been well and satisfactorily carried out by Mr. Williams, of Abingdon, from the plans of Messrs. Lansdowne and Shopland, of Swindon. The entire cost has been about £800. The style is Early Gothic, and there are two entrances—one for boys and one for girls—and two separate playgrounds. The building has been erected in the form of the letter T, and it is well lighted and ventilated. The roof is opened, timber-stained and varnished. The school is built of local stone, with Bath stone dressings.

LEEDS.—The plans for three more new Board Schools, in addition to the three in course of erection and the three whose foundations will soon be laid, have been approved by the Education Department, and the necessary preliminary steps are being taken for the letting of the contracts. They are Green-lane School (the largest school yet arranged for), Cross Stamford-street-School, and Saville-green School; the two latter being the design of Mr. Adams (Adams & Kelly), the appointed architect to the board; and the former the design of Mr. G. Corson, Cookridge-street, Leeds, the architect of the Bowerley-street School, Hunslet, now nearly finished. The Green-lane School will be of four departments—boys, girls, mixed juniors, and infants—accommodating in all 1,000 children. The masonry of the buildings will be of brick, with stone dressings, and the cost is estimated to be upwards of £9,000. The plan of Cross Stamford-street School is in the form of the letter L. Accommodation is required here for 600 children, and the school will be in three departments—boys, girls, and infants. The style of the building will be Gothic. Saville-green School has been projected to provide for 400 children, in two departments—viz., mixed and infants.

TUEBROOK.—On Thursday week the foundation-stone of a building, intended to be used as day and Sunday schools, in connection with the Church of S. John the Baptist, Tuebrook, in Liverpool, was laid. The new schools are intended to accommodate 500 children. They

consist of an infants' schoolroom, 50ft. by 27ft., and girls' and boys' schoolrooms of the respective dimensions of 71ft. by 20ft., with classrooms and cloakrooms attached, and playgrounds outside. The rooms are all on one floor. The total length of the frontage of the building is 209ft., and in the centre there is to be a spire with a bell turret. The style of architecture is to be Gothic, and the building is to be constructed of bricks, with timber gables. The total cost will be about £3,700. The architects and builders are Messrs. Haigh and Co., Fraser-street, Liverpool.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

To OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line, of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 9d. per line.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance. Back numbers can only be sent at the rate of 7d. each, the postage charged being 3d. per copy. All foreign subscriptions unaccompanied by an additional remittance to cover the extra cost of forwarding back numbers are commenced from the next number published after the receipt of the subscription.

Subscribers receiving their copies direct from the office are requested to observe that the last number of the term for which their Subscription is paid, will be forwarded to them in a coloured wrapper, as an intimation that a fresh remittance is necessary, if it is desired to continue the Subscription.

Cases for binding the half-yearly volumes, 2s. each.

SPECIAL NOTICE.

COMMENCEMENT OF NEW VOLUME.—The large increase in the circulation of the BUILDING NEWS since its enlargement at the commencement of the present year caused a more than ordinary demand for the early numbers of the volume, many of which are out of print. We regret the disappointment of those who have been unable to complete their sets, and would remind intending subscribers that the commencement of a new volume with the quarterly number, which will be issued on July 4, will afford a favourable opportunity for commencing subscriptions.

RECEIVED.—A. T. R.—E. T.—H. C. W.—H. T. W.—H. and Son.—C. S. J.—T. W. R. and Co.—H. F. H.—C. W. D.—R. J.—W. S. and Co.—B. and Co.—E. B.—H. C. W.—W. G. G.—P. E. M.—E. and E. S.—J. H. C.—C. B. A.—E. S.—C. and H.

B. B.—Write as fully and intelligibly as you can.

H. Y. WALKER.—Drawing to hand.

SHINGLE.—We do not know.

C. W. F. (Carnarvon).—The "Form of Building Contract" was published in the BUILDING NEWS of April 9, 1869. The number is still to be had. The book mentioned is not a very good one.

Correspondence.

BURLINGTON HOUSE.

To the Editor of the BUILDING NEWS.

SIR,—Of all the unfortunate chances and changes to which buildings are subject, I have seen nothing so deplorable as the alteration to Burlington House.

Originally, it was a graceful and charming example of the style, most deservedly admired, and it is to be regretted on all accounts, for the sake of the original architect, the present one, and the Royal Academy, that the building had not been raised to the ground instead of suffering

the deforming transformation it has been subject to.

The exaggerated height of the top story and the stunted dwarfishness of the arcade added to the ground floor, make a preposterous and ugly contrast; both deformities. As to the row of niches, what can be worse? After the abuse bestowed on this fault in the case of the National Gallery, one cannot understand the same thing being done here, unless as a defiance to taste and principle. If the deliberate intention had been how most to spoil Burlington House, I do not see how more thoroughly the thing could have been accomplished than by the late alterations, and this too by a R.A.! As a minor defect, I notice that the extravagantly stilted arches to the openings in wings give them the appearance of being of horse-shoe shape. This, however, is a comparatively small matter. In designing a new building, it is the architect's duty to see that both the exterior and interior are equally good. But in adding to a building which possesses a reputation for beauty, it is imperative, it seems to me, that the exterior should have the first consideration. That being settled satisfactorily, the inside should be adapted as well as may be. At Burlington House, the reverse of this seems to have been the course adopted, and the result has been, instead of a beautiful building, we have a hideous deformity.—I am, Sir, &c.

P. E. M.

DESTRUCTION OF PUBLIC BUILDINGS.

SIR,—Apropos of the destruction by fire of the Alexandra Palace, through the carelessness of the workmen employed thereon, it is said that our Metropolitan Cathedral, St. Paul's, has been, within a few days, exposed to a similar danger. This should be strictly inquired into.

Considering how frequent such occurrences are, and the irreparable injury thereby sustained, I think it is clear that whenever works are carried on at any building of importance, there ought to be special precautions taken against fire. There should be firemen—trustworthy persons—always on the watch, attending only to this matter; to see that the workmen have neither pipes nor matches about them, that water is always ready at hand wherever plumbers are at work, and that every possible means be taken as a safeguard against fire. What do these men who cause the mischief care for artistic beauty, or the historical interest of a building? Their miserably selfish maxim, "It's all good for trade," renders the destruction of a fine building rather a subject for gratulation than otherwise to them. That buildings like St. Paul's should be in the hands of such people without their being watched carefully, appears to me extraordinary carelessness in the legal guardians of such structures—an absolute trifling with danger, and that of the most imminent kind.—I am, Sir, &c.

M.

ARCHITECTURAL COMPETITIONS.— CHESTER NEW WORKHOUSE.

SIR,—I enclose you cutting from the *Chester Courant*, June 11th, showing what estimate they form of the profession itself as illustrated by Mr. R. W. Bardon and Co. I consider, and have done for many years, that architects have brought about by their own conduct in competitions all the evils they so woefully at times bemoan. Feeling an interest in this case induces me to write this. I enclose card, and am an old subscriber.—I am, Sir, &c.

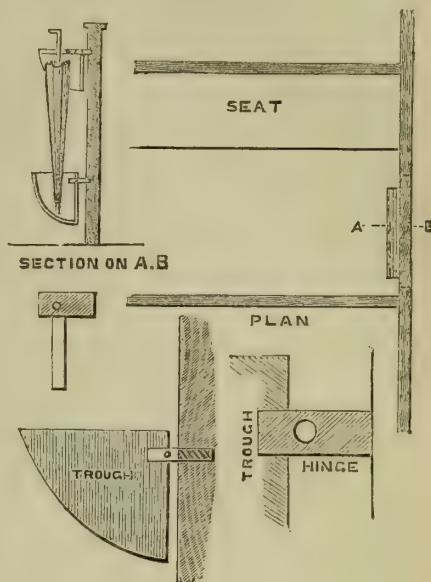
M. G.

"Two or three matters of interest came before the Chester Board of Guardians at their meeting on Saturday A letter from Mr. Bardon, author of one of the designs for the new Workhouse called 'Cestria,' asking for permission to wait upon the Board, in company with two other selected architects, in order to explain the several features of their designs, was referred to the building Committee. Without expressing any opinion either as to the convenience or propriety of sanctioning such a mode of advocating the merits of those designs, we are decidedly of opinion that no partiality should be shown to any party, but that whatever course was adopted with regard to one should be pursued with regard to all. But is not the mode proposed by the author of 'Cestria' a little unprofessional?"

THE "CHIMNEY-POT HAT."

SIR,—In inference to the letters on chimney-pot hats, I beg to inform you of a system for wet umbrellas used in the chapels at Halifax. On the other side I have shown a sketch of same. A zinc trough is at-

tached to the bottom of the door, and at the top is fixed on hinges a piece of strong wire, which, when the



umbrella is taken out, falls down. With these few remarks, I think you will be able to understand the system.—I am, &c., W. H. HOPKINSON.

Intercommunication.

QUESTIONS.

[2887].—To Mr. Banister Fletcher.—I should feel obliged if "B. F." would inform me the solution of the following queries:—What marks the proprietorship in the fence to a house? I have always understood that the side from which the boards are nailed against the uprights—such uprights being in the ground of an adjoining house—would be the side belonging to the property. Are not marble slabs tenant's fixtures? If such is correct, cracked marble slabs would not be liable to reinstatement as dilapidations at the termination of a lease.—J. E.

[2889].—Polishing Alabaster and Marble.—Will some one kindly inform me what things are best, and how used, to polish alabaster and marble?—A. CONSTANT READER.

[2890].—Summer Sketching.—Can any subscriber let me know how much per diem it costs to go on a sketching tour in England, walking from village to village, including all such expenses as getting into churches, tips, &c.—PENCIL.

[2890].—Concrete Building.—Will some reader give me particulars of the best method of making concrete for walls and the cost of same; also a method of ornamenting the external face of walls without using Portland cement in the ordinary way?—L.

[Methods of making concrete have been again and again described in the BUILDING NEWS.—ED.]

[2891].—Concrete Buildings.—In "Intercommunication" of the 16th May, I asked some reader for proof of the durability of Portland cement concrete buildings (Question 2852). I got no answer, which has astonished several people here who advocate concrete buildings. The stone-layers now rejoice, and say that if an answer could be given it would be by Messrs. Tall, Drake, and others who have an interest in concrete building.—FRANCIS NUNAN, Killarney.

[2892].—Roots of Trees in Sewers.—How can I prevent the roots of trees from entering the joints of a 15in. pipe sewer?—J. F.

[2893].—Cement Sewer-Pipes.—The comparative cheapness of stoneware and fireclay pipes years ago drove cement sewer-pipes out of the market, but I believe there is little doubt as to the vast superiority in many points of cement pipes above all others. Can any one give any particulars of their manufacture and cost at the present time in Germany, where I believe they are extensively used?—H. R.

REPLIES.

[2880].—Dilapidations to Small Houses.—In reply to "Rhus Tox," I know of no book specially devoted to this class of dilapidations. Small houses are treated similarly to large, the only difference, I believe, being in the amount of decorative treatment that can be claimed. Your correspondent is evidently one of the large number who have recently become subscribers to your paper, owing, doubtless, to the facilities offered for acquiring knowledge from the practical papers contained therein, and also from the increased illustrations, and consequently did not read the valuable papers on the subject of Dilapidations by Mr. Banister Fletcher, which appeared in your columns anterior to your enlargement. These papers were subsequently published, with considerable additions and cases, and form, I believe, the most concise, and at the same time cheapest, treatise on the subject. Messrs. Spon, of Charing Cross, are the publishers.—W.

[2884].—S. Simeon Stylites.—The "pillar-saint" was a Syrian monk (b. 398—d. 451). He was the inventor of an entirely new way of doing penance. He lived on

a pillar only 6ft. in circumference for nine years, and is said to have mounted a column not less than 60ft. or 80ft. high, on the top of which he remained for thirty years more. When the inhabitants of Mounts Libanon and Antilibanon were dreadfully persecuted by wild beasts, they implored the assistance of the famous Simeon the Stylite, who advised them to abandon the superstitious worship of their ancestors, and substitute the Christian religion in its place. They followed his advice, and the wild beasts disappeared at once, as if by a miracle. (See Dr. Mosheim's "Ecclesiastical History.") Simeon used to pray in different positions. Sometimes he stood erect with outstretched arms, forming the figure of the cross. His most usual practice was that of bending his emaciated body from the forehead to the toes. A spectator is said to have counted 1,244 such bows. Crowds of pilgrims came from Gaul and India to do honour to the divine pillar of Simeon. The tribes of Saracens fought for the honour of his blessings. The Queens of Arabia and Persia acknowledged his supernatural virtues. Theodosius the younger consulted him constantly in worldly as well as spiritual matters. This saint was said to have cured diseases by the mere touch of his hand, or even by a single word. Many letters written by Simeon are said to have been in existence. He was canonised immediately after his death with great pomp at Antioch by the Master-General of the East, in presence of six bishops, twenty-one counts, and 6,000 soldiers. The Christian Anchorites and Stylites took their origin in the religious dogmas and the mode of worship of the Indians and Egyptians. There were from time immemorial Brahmanic as well as Buddhistic and Egyptian ascetics, and the monks are mere secondhand editions of the more southern saints of Asia and Africa. Already in the "Ramayana," a "Wood-Hermit" (*Vanaprastha*) is mentioned, whose course or blessing worked miracles. The *Sun-yüsti* was of a higher degree in sanctity. In this old Sanskrit poem, *Urdhvanakhs* are mentioned who used to sit or stand with uplifted arms between fires, whilst the sun sent down his scorching rays, or as mentioned in the *Sakuntala* (a drama written by Kalidasa one century B.C.) they were covered with ant-hills and birds' nests around their shoulders. Some of these devotees used to stand motionless for years gazing at the sun; others passed their lives on couches of pointed nails. Of Sokrates it is mentioned that he used to practice patience by standing upright for days with his eyes fixed on one spot. (See Plato and Gellius.) The principle taught by the Indian religions of looking upon the body as of evil, produced these self-tormentors, and a misunderstood Christianity propounding the same doctrine, called forth Anchorites, Cenobites, hermits, monks, nuns, and ascetics in great numbers, culminating in the *Boerks*, or grazing monks, so called from their humble custom of feeding with cattle on grass and water. For further information refer to the life of Simeon by Theodoret and Antony, and to Charles Kingsley's "Hermits."—PROFESSOR.

[2884.]—S. Symeon Stylites.—The Egyptian saints of the desert were either (1) monks, (2) anchorites, or (3) pillar-saints. The pattern of the latter was S. Symeon, who lived in the fifth century, and was called Stylites, because he lived on a pillar, which was four cubits high; then he raised it to twelve cubits during twelve years, and for another term of the same duration to thirty cubits. According to the legend, the arch-fiend, in disguise as an angel of light, came to proffer him translation with a chariot and horses of fire; he raised his left foot in order to mount, but added the sign of the cross, when the unholy pageant vanished, and he remained standing on one leg for a whole year until mortification set in. According to his life, written by his friend Anthony, he fed only once a week, and died in prayer. Song-birds came to lament around his grave. In Germany, in the sixth century, an attempt to imitate this strange enthusiast was suppressed. A church was built round S. Symeon's pillar. Theodoret ("Hist. Eccles.", lib. i. c. 13) mentions that he was the first pillar-saint. Tillemont ("Mem.", tom. v., p. 350) gives A.D. 388 as the date of his birth, in a village on the confines of Cilicia and the valley of the Euphrates. The former author assigns the cause of his ascent of a pillar, which he made his pulpit, to the inconvenience suffered by Symeon owing to the continuous resort of crowds to his lonely hermitage at the foot of Mount Tellaessa; then followed the desire of a material approach nearer to heaven. Evagrius, John Moschos, and Rosweide may also be consulted. Gregory of Tours, says the Bishop of Treves, compelled a deacon of his diocese, Vulfric, to leave a pillar ("Hist. Franc.", lvi. sec. 15), and according to Surius, Alipius, Bishop of Hadrianopolis, became a dweller on a pillar.—MACKENZIE E. C. WALCOTT.

[2884.]—S. Simon Stylites was a Syrian shepherd who, in the year 408, at the age of thirteen years, left his flocks and joined a monastic community. He afterwards withdrew himself to a mountain some forty miles east of Antioch, and there confining himself by a chain within a mandra, or circle of stones, proceeded at last to take up his residence on the top of a pillar, which was gradually raised from the height of 9ft. to 60ft. He died A.D. 451, having, it is said, existed for thirty years at the last-mentioned elevation. According to Gibbon, "Habit and exercise instructed him to maintain his dangerous situation without fear or giddiness, and to successively assume the different postures of devotion. He sometimes prayed in an erect attitude, with his outstretched arms in the form of a cross, but his most familiar practice was that of bending his meagre skeleton from the forehead to the feet, and a curious spectator, after numbering 1,244 repetitions, at length desisted from the endless account." This strange pious practice, which gained for the saint his distinguishing appellation (from the Greek *stylos*, a pillar) does not seem to have found many imitators. Among the few who thus emphatically were "pillars of the church" the most famous are another Simon, styled the Younger, who is said to have acted as his own statue for 63 years, and one Alipius, who left the bishopric of Adrianople for this more elevated position, and there at all hours of the day and night sung psalms and hymns for 70 years, "a choir of monks and two choirs of virgins below swelling the strain." One ought hardly to jest about such things in these days, when men and women are but too ready to find excuse for the absence of all efforts of self-denial and mortification in the extravagances of those who in the early days of the Faith sometimes so strangely manifested the burning zeal which filled their hearts; but I do sometimes feel tempted to wish this order of monachism could be revived and extensively followed now; one knows so many people whom one could so comfortably see rele-

gated to the tops of pillars 60ft. high for the rest of their lives, where under more favourable circumstances they might sing their own praises, with which, even at a lower altitude, they so continually fill our ears. With what dignity and resignation, for instance, might a body of disappointed competing architects so retire to their pillars, forming a sort of colonnade in front of the building erected by their more favoured rival, with their rejected drawings displayed like the glories of France on the Vendôme Column.—KAPPA.

STAINED GLASS.

BRIDGNORTH.—A stained-glass memorial window was fixed in S. Leonard's Church, Bridgnorth, on Saturday week, by Mr. William Done, of Shrewsbury. The window consists of three openings, with pierced tracery. The subject chosen for the centre opening is the Good Samaritan. There is a light canopy over the subject, and a richly coloured border all round. The two side openings are filled with light grisailled glass, the relief to the pattern being given by lines, not opaque colour.

THE LATE DR. NORMAN MACLEOD.—The parish church of Crathie, Balmoral, is being enriched with a monument of the late Dr. Norman Macleod. It is a two-light window, each light 9ft. 6in. by 2ft. 5in. The nimbus of the left-hand figure is inscribed "David Rex." "Sanctus Paulus" is the name upon the nimbus of the right-hand figure. The apostle is clad in rich blue, soft green studded with stars, and greenish yellow, and stands out against a white-bordered background of ruby on blue. This tribute to the distinguished Court chaplain has been designed and executed by Messrs. Cottier and Co.

STATUES, MEMORIALS, &c.

DUNDEE.—The Commission for the Carmichael statue at Dundee, which is intended to occupy a prominent position in front of the Dundee Exchange, was intrusted; after a competition, to Mr. John Hutchison, R.S.A. The design on which the selection proceeded is under life size, and, as the work is intended to be executed on a colossal scale. The artist is now about to commence the large model from which the bronze castings will have to be made. In representing the old engineer, Mr. Hutchison has reproduced him in such attire as he was accustomed to go about in, and in connection with objects suggestive of his special claims to public recognition. A characteristic feature in the way of costume is the dress coat—a garment in which many gentlemen of the old school are accustomed to go about their usual avocations; but the formality of this is relieved by the introduction of a loose overcoat, of which the artist has availed himself to secure some flowing lines in both the front and the back view of the figure. The head, with its short hair combed straight down over the brow, is said to present a capital likeness. The statue is to be placed on a pedestal of red granite.

EDINBURGH.—The work of erecting the Prince Consort Memorial at Edinburgh is about to be commenced. From the nature of the ground in Charlotte-square, it will be necessary to go some 11 or 12 feet below the surface, and to put in a mass of substantial masonry in order to secure adequate support for the superincumbent weight. The pedestal itself has been for some time in course of formation at Macdonald's Granite Works, Aberdeen. It will consist of enormous blocks of polished red granite, some of them, we believe, the largest ever produced from the works in question. The granite, duly shaped and polished, is to be delivered in October, by which time, it is expected, the substructure will be ready for its reception. The erection of the sculptures will follow in due time. The subsidiary groups and bas-reliefs have long stood complete in the bronze. In view of the delay arising from circumstances above referred to, Mr. Steell has lingered long touching and retouching, over the great equestrian statue which is to form the centre piece of the memorial. He expects, however, barring accidents, to be ready with this figure as soon as the pedestal is ready to receive it.

THE BRADFORD TOWN HALL STATUARY.—The statues of the kings and queens of England, which have been executed by Messrs. Farmer and Brindley, of London, are now on view in one of the ground-floor compartments of the new building. All the figures are of colossal size, and each is carved from a block of stone from Cliffe Wood Quarries, Bradford, each original block weighing not less than three tons.

THE VENDÔME COLUMN.—The works for the reconstruction of the Vendôme column in Paris are about to commence, and are expected to last for three months. After rebuilding the staircase in stone, it will have to be faced with bronze. That metallic coating consists of 370 distinct pieces with bas-reliefs in a spiral form, the whole making 22 revolutions, of the length of 200 metres (3 feet 3 1/2 in. each). The principal difficulty of the operation lies in the adjustment of those pieces.

THE STATUE OF THE LATE PRINCE CONSORT.—The statue of the late Prince Consort for the Albert Memorial Chapel, Windsor Castle, has arrived at Windsor. It is a white marble figure by Baron Triqueti, representing the Prince in full armour in a recumbent position. Angels support the head, and a favourite dog is at the feet. The inscription is "Albert the Prince Consort, born August 26, 1819—Died December 14, 1861—buried in the Royal Mausoleum, Frogmore. 'I have fought the good fight. I have finished my course.'"

WATER SUPPLY AND SANITARY MATTERS

DUNDEE.—THE NEW WATER SCHEME.—At a meeting of the Dundee Water Commission a fortnight ago, it was agreed to carry out the construction of certain new water mains, in order that there might be a fuller and better distribution of water throughout the whole town. A report was laid on the table from the engineers of the new water scheme, in which they reported, in answer to questions put to them, that a regulating or equalising reservoir on the line of pipe track between Newtyle and Dundee, though not absolutely necessary for the due supply of the town, would still be attended with many advantages, and that it would be advisable, while laying out the pipe track, to make provision for its future construction. The site proposed was at Clatto Muir, a little to the south of Baldrigon Station. The reservoir should be capable of holding a week's supply, and would cost £15,000. It was resolved to ask the engineers to lodge separate estimates for the whole works proposed to be altered, if these works were considered necessary.

RAVENSTHORPE MAIN DRAINAGE.—An inquiry was recently held at Ravensthorpe by Mr. Robert Morgan, C.E., for the purpose of receiving evidence as to a proposal for putting into force the Lands Clauses Consolidation Act, with reference to taking about 1 1/2 acres of land for sewage outfall purposes. The scheme adopted by the Local Board comprises the complete main drainage of the district into a receiving tank, whence the sewage will be pumped with an ultimate view to utilisation by irrigation. The natural difficulties caused by the low level of the ground, and liability to floods from the river Calder, have hitherto deterred the Board from undertaking the work. The cost of the scheme, including land, main outfall sewers, tank, overflow and pumping works, is estimated at £6,700. The engineer is Mr. Malcolm Pater-son, of Dewsbury.

THE SANITARY STATE OF WALES.—Mr. Andrew Doyle, one of the inspectors of the Local Government Board, has presented a report to that authority, which makes some startling revelations as to the sanitary state of certain towns and villages in the Principality. A country which has few rivals in natural beauty is here shown to contain holes and corners which, for dirt and general sanitary neglect, and obliviousness to the consequences of such neglect, have, it is to be hoped, fewer rivals still:—"There is, says he, not a county, nay, there is hardly a union in the district, from which even the limited number of these reports that are printed, imperfect as some of them are, do not supply overwhelming evidence of the existence of nuisances of the very worst description. It is not easy to picture anything more deplorable than the state of the towns, villages, hamlets, and cottages as they are represented in these reports, represented more strongly, perhaps, in those that are withheld than even in those that are printed. Water supply insufficient or poisoned with sewage and other filth; drainage wholly neglected, not of cottages and detached houses only, but of villages, and streets of towns; dwellings occupied by large families that are declared to be 'unfit for human habitation,' cases of overcrowding, the details of which can with difficulty be credited; thousands of houses without any privy accommodation or means of ventilation whatever; pigsties and privies so built that the filth from them is often found oozing through the rubble wall into the cottage. Such is the general character of the statements that I find in page after page of the reports that are sent to me from the several unions, accompanied in many cases by the deliberate opinion of medical men that such a state of things might be easily remedied, and that not being remedied it is the fruitful source of sickness and death."

VENTILATION OF SEWERS IN LIVERPOOL.—The question of the ventilation of the Liverpool sewers has been recently under the consideration of the Borough Surveyor, and at the meeting of the Health Committee on Tuesday, the following recommendations were adopted:—"That the system of drainage having been put into good condition, gratings be fixed on the man-holes in the streets, or in the absence of manholes that ventilating shafts in the streets be constructed at distances not greater than 100 yards; that advantage be taken, where practicable, of any tall shafts as upcast shafts; that in very confined places where, owing to special difficulties in connection with the condition of the sewer, mephitic air is expected to accumulate unduly, archimedean screw ventilating shafts of the largest size, or similar shafts without the screw, be used if practicable; that manufacturers be required to abate the nuisance arising from the discharge of hot water into the system of sewers in question, and that manufacturers be prohibited from injecting steam into the sewers, and be required to turn it into the air; that immediate consideration be given to the practicability of requiring owners of existing property to ventilate their drains by pipes carried up to the tops of houses; that the regulation with respect to compelling owners of property about to be built to wet-trap their drains, and thus cut off air communication with the sewers, if they refuse to ventilate them, be added to the form of permission for drainage at present in use; that, in conjunction with the removal of all drains from the interior of cellars in court houses, and the change from intermittent to constant water service, the drains in cellars of front houses adjacent to such courts be cut off, when the owners are willing to dispense with the water supply within the cellars."

WATER SUPPLY OF MONTREAL.—A proposal has been made by the Water Committee of the city of

Montreal for the construction of a large canal from above Lachine Rapids, which should join and cross the existing aqueduct, and eventually discharge into a large subsidiary reservoir, to be of sufficient capacity to give the city 30,000,000 gallons per day in winter, while in summer the two together would supply 100,000,000 gallons per day. The committee further propose to establish a storage reservoir on the slope of the mountain, capable of containing a month's supply of water, and also a smaller one at a much higher level, to supply the portion of the city above Sherbrooke-street. The capacity of the pumping mains will on this account be necessarily increased. Two new ones of 30in., and one of 16in. diameter, will be needed, besides a 6in. main, to distribute the water on the high level. The whole cost of the proposed works is estimated at 3,682,972 dollars.

LAND AND BUILDING SOCIETIES.

HANLEY FREEHOLD LAND SOCIETY.—The general annual meeting of the above society was held on the evening of the 6th inst. The statement of accounts and the report of the committee, which were read by the secretary, showed that the subscriptions of members had amounted during the year just closed to the sum of £632 13s. 6d., and that other receipts from incidental sources had amounted to £39 18s. 6d. There had been paid on account of the purchase of land at Upper Hanley £275, and interest £84 13s. 9d., while the working expenses had been £22 16s. 3d.

HINCKLEY.—The third annual meeting of the Hinckley and South Leicester Permanent Benefit Building Society was held at the Town Hall, Hinckley, on the 5th inst. From the annual report it appeared that 115 new shares had been taken up, number on the books (after deducting withdrawals and paid-up shares) being 322½—a clear increase of 53½ over the previous year. Interest amounting to £14 3s. 6d. had been paid upon shares withdrawn, leaving to the society a balance of profit upon such shares of £14 3s. 6d., arising out of the reverted bonuses. In making up the accounts the directors found, after making a slight addition to the reserve fund, they could declare a dividend of 1s. 11d. in the pound, upon all sums standing to the credit of investing members—a larger than on any previous year. It appeared the receipts for the year, including a balance of £73 13s. 1d. (at the commencement) amounted to £1347 1s. 6d. The interest paid upon advanced shares was £79 18s. 11d., premiums £55 10s., reverted bonuses £24 15s. 5d. The balance of profits on the transactions of the year, all expenses being deducted, was £124 15s. 6d.

STAFFORD MUTUAL INVESTMENT AND BUILDING SOCIETY.—The thirteenth annual meeting of this society was held in the Guildhall, on the 30th ult. Alderman Austin presided. The Secretary read the report of the directors, and the annual accounts, which had been duly audited, and also a general balance-sheet, showing a balance of profit amounting to £3,102 15s. 9d. In addition to receiving compound interest at 5 per cent., each unadvanced original share will be paid a bonus of £6. 10s. a share.

LEGAL INTELLIGENCE

CARRYING AWAY FREEHOLD PROPERTY.—At the Worship-street Police Court, on Tuesday, the London and Suburban Land and Building Company (Limited), by their secretary, Mr. Taylor, came before Mr. Hannay to support a summons taken out against a person named Wilson, charging him with wilful and malicious damage to freehold property. The damage complained of, it appeared from the statement of the prosecuting solicitor, was the removal by the defendant, or under his direction, of a quantity of gravel, sand, &c., from the roadway in Glenarm-road, South Hackney, where the Company have an estate. Holes were left in the roadway, and the pipes of gas or waterworks were left exposed. The solicitor for the defence showed that the defendant was a freeholder on the estate, and that it was a common practice for freeholders to remove sand and gravel. It was admitted by the witness who dug the gravel that the estate was dug by many persons; and it was stated that, although this was a roadway, it was not yet dedicated to the public. Mr. Hannay said that the Act did not extend to any person who had a reasonable belief that he had a right to do the thing complained of; and in this instance it was shown to be a common practice. The summons would be dismissed, but in any future case on the estate he should convict.

PROCEEDINGS AGAINST THE LONDON SCHOOL BOARD.—Vice-Chancellor Malins recently granted an injunction to restrain the London School Board from building within four feet of a dwelling-house, whereby the access of light and air would be greatly impeded. On behalf of the School Board it was contended that they had a right to proceed with the erection of a schoolhouse, and that for any damage which might be done to the plaintiff's interests he could hereafter obtain compensation. His Honour, however, declined to admit the force of this plea.

PROFESSOR HUXLEY'S DRAIN.—*BROAD V. HUXLEY.*—This was an appeal from a decision of Vice-Chancellor Malins, before the Lords Justices, on Tuesday week. The plaintiff is a retired tradesman residing at No. 12a, Blenheim-terrace, S. John's-wood, and letting a portion of his house in lodgings, and the defendant, Professor Huxley, is the owner of a house and garden,

No. 4, Marlborough-place, to the rear of, and adjoining on the south, the plaintiff's house. Professor Huxley's premises are at a higher level than the plaintiff's house, from which the ground slopes upwards. The plaintiff's case was that certain improvements which the defendant commenced in November last, and which consisted in raising the general level of his garden so as to form a croquet lawn, making an embankment at the rear of the plaintiff's house, and planting it with trees and draining the surface water from his garden into a cesspool 22ft. from the plaintiff's house, had had the effect of darkening the plaintiff's premises and rendering the basement of his house so damp as to be uninhabitable. The plaintiff's bill prayed for an injunction to restrain the defendant from draining his premises so as to cause injury to the plaintiff's house, from permitting the embankment to damage the plaintiff's party wall, and from allowing the trees thereon to darken his premises. The Vice-Chancellor was of opinion that the plaintiff had not made out his case, and dismissed the bill with costs. The plaintiff appealed. Their Lordships agreed with the Vice-Chancellor's view of the evidence, and dismissed the appeal with costs.

THE NEW CORN EXCHANGE AT CAMBRIDGE.—THE ATTORNEY-GENERAL (AT THE RELATION OF FREDERICK BAILEY AND OTHERS) V. THE MAYOR, ALDERMEN, AND BURGESSES OF THE BOROUGH OF CAMBRIDGE.—This was an appeal to the House of Lords from the order of the Lords Justices, dissolving an injunction granted by Vice-Chancellor Bacon, restraining the respondents from accepting any tender or entering into any contract for the erection of a proposed new Corn Exchange for the borough of Cambridge, and from applying any part of the borough fund for the purpose of the purchase of a site for such a building. The question turned upon the construction to be placed upon the Cambridge Corporation Act (1850) which authorised the enlargement and improvement of "the market-place" of the borough by the Corporation, and the point involved was whether such authority extended to the erection of a new Corn Exchange. Their Lordships held that the terms of the Act were sufficiently wide to include the erection of the proposed building, and dismissed the appeal with costs, thus affirming the judgment of the Lords Justices in favour of the Corporation. Judgment affirmed.

RECENT PATENTS CONNECTED WITH THE BUILDING TRADES.

Including Brick and Tile Machines, Bricks, Tiles, Drain Pipes, and House Fittings, Warming, Ventilating, &c.

3542. J. A. FORREST and W. W. HAYES, Liverpool, "Water-closets."—Dated 26th November, 1872.

Dispensing with the air chambers, such as those used in ordinary pan and valve closets, in which the noxious gases are generated. An arrangement to ensure a perfect cleansing after each operation, and to prevent the possibility of a return draught from the soil pipe. And, lastly, an improved time valve for regulating the after supply and flushing.

3557. J. J. BODMER and L. R. BODMER, London, "Bricks, blocks, &c."—Dated 26th November, 1872.

These improvements consist in subjecting the bricks, blocks, or other articles made of blast furnace slag, with or without admixtures, to heat, and thereby burning or calcining the same.

3570. E. ENSOR, Leicester, "Drying bricks, tiles, &c."—Dated 27th November, 1872.

This invention consists in the combination of a number of drying chambers on the roof of annular or continuous action kiln, the said chambers being supported on brick arches, independent of the kiln itself; these drying chambers receive the hot air from those compartments of the kiln which contain cooling goods, and consequently the otherwise waste heat therefrom is utilised.

3574. W. YOUNG, London, "Furnaces, grates, &c."—Dated 28th November, 1872.

The fuel is fed or raised into the fire-place by means of a screw, which is corrugated on both sides, in order to form direct passages for the air into the fire on each side of the screw. In some cases the grate is made of fire clay enclosed in front, except at the opening for the screw and the bottom bars of the grate.

3589. E. BURSTOW, Horsham, Sussex, "Window sash fastener."—Dated 29th November, 1872.

The novelty of this invention consists in the arrangement of parts by which the act of shutting the window causes a stud on the outer sash to come in contact with and lift an arm on the inner sash by which a bolt is thrown forward, and a tumbler falling behind it prevents its return, and the sashes are thus securely fastened substantially as described in the accompanying provisional specification.

3603. A. F. GARROOD, London, "Furnaces and ovens for baking."—Dated 30th November, 1872.

Furnaces for heating ovens and other purposes are arranged in accordance with these improvements, so as to rotate or partially rotate within a chamber below the oven, the grate or chamber containing the fuel being carried by a central hollow axis, through which the air for supporting combustion is conducted. The weight of the furnace is balanced by a weighted arm, the furnace being caused to rotate by means of a toothed wheel and pinion, or by other suitable mechanical means. Ovens arranged in accordance with this inven-

tion are supported within a chamber above the furnace in such manner as to leave a space entirely around, above, and below it, except at the front end, where the door or entrance is situated. The heat end products of combustion circulate below, around, and above the oven, finally escaping by a chimney placed in the roof or arch over the oven.

Our Office Table.

BRIDGE OVER THE NEVA AT S. PETERSBURG.—The competition for the designs of the Neva Bridge at S. Petersburg is decided; eighteen designs were sent in. The Commission have awarded the first premium, 6,000 roubles, to "Westminster;" second premium, 3,000 roubles, to a design by R. M. Ordish, "Max am Ende;" third premium, 1,500 roubles, to "B. S." (a Russian).

GLASGOW INSTITUTE OF ARCHITECTS.—A meeting of the Council was held on Friday, the 13th inst., Mr. George Bell, president, in the chair. Mr. Campbell Douglas intimated that Mr. John J. Stevenson, a member of the Institute, formerly of Glasgow, now residing in London, has offered three prizes of £10, £7. 10s., and £5 for the best original sets of drawings from actual measurement of ecclesiastical or secular buildings in Scotland erected prior to the eighteenth century—the competition to be limited to young men in the offices of members of the Institute. On the motion of the President, Mr. Stevenson's offer was accepted, and the thanks of the Council were given him. Mr. Stevenson was formerly partner with Mr. Douglas.

THE INSTITUTE PRIZES.—In our report last week of the proceedings of the Royal Institute of British Architects, we regret that our reporter has committed several mistakes as to the names of the gentlemen to whom prizes, &c., were awarded. To rectify these errors we give a copy of the official list:—*Royal Gold Medal*: Mr. Thomas Henry Wyatt. *Sonne Medallion*: Mr. W. Frame; Medals of Merit to Messrs. F. C. Deshon and J. H. Eastwood. *Institute Silver Medal for Measured Drawings (with 5 guineas)*: Mr. A. H. Kersey; Medals of Merit to Messrs. Thomas Garrett and Arthur Hill. *Pugin Travelling Studentship*: Mr. Aston Webb; Medals of Merit to Messrs. Philip J. Marvin and R. C. Page; Honourable Mention to Messrs. J. Garrard and Walter L. Spiers; also a Medal of Merit to Mr. Alfred Jowers, for his essay.—In reference to the same report Mr. William Frame writes:—"Will you please correct a slight error that appeared in your last week's paper? I am not a pupil of Mr. Burges, but was formerly one of his assistants. For the past ten months I have not been engaged in his office."

STREET-SWEEPING IN PARIS.—A French paper gives the following particulars regarding street-sweeping in Paris. A superficies of 11,320,000 metres to be swept daily, at a yearly cost in labour of 295fr. per metre. 3,550 persons are employed in this work, among whom are 1,750 women, who receive 1fr. 28c. a day. The day's work begins at three o'clock in the summer and at four o'clock in winter, and ends at four in the afternoon; the half-day ends at ten o'clock. The sweepers work in brigades. Forty-one of these, each composed of a chief and thirty men, work for a whole day, and seventy more, each composed of a chief and twelve sweepers, are employed for half the day.

DISCOVERY OF ANCIENT WATER-COURSES AT WINCHESTER.—An interesting discovery has been made in the lower parts of the High-street Winchester, on the site of the City Arms Inn, which is being built from the designs of Mr. T. Stopper. In the excavation for foundations, two long water-courses have been discovered. These are, undoubtedly, of great antiquity, being constructed of massive oak planks, about 2ft. high, the bottom being also oak, and the covering slabs too, these latter, from their mortises and tenons and other marks of carpentry, being evidently brought from old buildings at the time, for coverings of the channel, which is nearly 3ft. over. The direction in which they run is south-west, and it is somewhat interesting to know from competent authority that although the surface level of the existing water-course a few feet to the east of these ancient aqueducts is 6ft. higher than the latter, yet that these wooden troughs have ample fall to carry water off into the "Old Barge" River, constructed nearly 700 years ago by Bishop De Lucy, when he made

the reservoir at Alresford, and the system of navigation to Southampton, the "royalty" on which he and his episcopal successors have ever since enjoyed. Various surmises have been made as to the age and use of these oaken water-courses. S. Ethelwold, Bishop of Winchester, and a native withall constructed various water-courses in the lower part of the city during his episcopate, inclusive of the Lock Burn in the Close, and probably these acqueducts just uncovered formed part of his system of water-supply to the conventual, monastic, or royal establishments surrounding his Cathedral, in the crypt of which he was buried, and through which a brook of water runs to this day. Probably these are of his time, and thus approach an age of 900 years.

THE FIRE AT THE ALEXANDRA PALACE.—The architects of the Alexandra Palace, Messrs. Meeson and Johnson, have published a defence, showing that the palace was provided with a connection with the new river reservoir, pumping engine, pipes, hydrants, hose, fire-engines, buckets, and cisterns, and that the cisterns were full at ten o'clock on the morning of the fire. But all these provisions were inapplicable, because water could not be thrown on the dome, where the fire broke out. The architects say, "Had the fire originated in any probable place of ignition, it would have been immediately extinguished." The same thing we suppose might be said if any other fire that ever happened. In this instance, the dome ought to have been considered a "probable place of ignition." The terrible rapidity with which the flames communicated themselves from it to main body of the building should have been anticipated, and in some degree guarded against. If Messrs. Meeson and Johnson really believe it to have been impossible to protect the dome from fire, we seriously advise the omission of that feature from any intended restoration of the building.

SOCIETY OF ANTIQUARIES.—Last night an interesting paper was read by the Rector of Strathfieldsaye, the Rev. J. G. Joyce, F.S.A., containing an account of further discoveries at Silchester. The excavations on this interesting site have been conducted with a thoroughness creditable to all, and especially to his Grace the Duke of Wellington. Mr. Joyce, as an accomplished draughtsman and able antiquary, has done good service to the cause of Roman archaeology in this country.

NEW TOWN-HALL FOR MIDDLESBROUGH.—At the last meeting of the Middlesbrough Town Council the report of the Public Buildings Committee was passed, recommending the council to vote for plans for a building to be constructed on this site to contain:—Town-hall, corporation building courts, council-room, two committee-rooms, town clerk's offices, borough surveyor's offices, borough accountant's offices. Police-court, with retiring-room and offices, attorneys' rooms, witnesses' rooms, offices for police and 12 cells, drill-ground, or court; free library and committee-room, school board meeting-room and offices. The subject of obtaining a design for the buildings was fully considered, and two propositions were made, the one that Mr. Waterhouse, or some other eminent architect, be alone asked for a design; the other that designs be asked for in competition, a prize being given for the best, the result being that the majority were in favour of the former proposition by 4 to 3.

RAILWAYS IN EUROPE.—There are 18,100 miles of railway in Europe, which have cost a sum total of about £530,000,000, and are apportioned as follows: United Kingdom, 7,670 miles, costing about £330,625,000; France, 2,519 miles, £80,000,000; Prussia, 2,370 miles, £33,125,000; Germany (various states), 2,175 miles, £31,250,000; Austria, 1,490 miles, £18,750,000; Russia, 712 miles, £4,375,000; Belgium, 560 miles, £12,502,250; Italy and other states, 610 miles, £4,375,000.

CHIPS.

The Institute Dinner will (as previously announced) take place to-morrow (Saturday) evening at Willis's Rooms, S. James's, Sir Gilbert Scott, R.A., President of the Institute, in the chair. We believe that several distinguished guests are expected. We shall give a report of the proceedings in our next.

The new buildings for the National Museum of Natural History, at South Kensington, have been commenced, and the contractors, Messrs. Baker, have arranged to complete them within three years.

It is understood that the Marquis of Lothian, acting on the recommendation of Mr. Anderson, architect, Edinburgh, has resolved to remove the belfry from the tower of Jedburgh Abbey, for the safety of that part of the building, and it is expected that buttresses will be put up to support the north wall of the tower. The octagonal part of the belfry is of a much earlier style of architecture than the greater portion of the tower, and seems not to occupy its original position.

In reference to the New Town Hall, Bolton, we are asked to correct an error in the description of this hall given in our issue of the 6th instant. It was then stated that Mr. Woodhouse, architect, of Bolton, had acted as *quantity surveyor*, as well as resident architect. The facts are that Messrs. Taylor and Son were the quantity surveyors for contract B, which included the principal stories, roof, &c. The quantities for the basement story, for the joinery and other internal finishings, plastering, painting, &c., were taken out by Mr. Isaac Barrow.

A new lecture-hall has been opened in connection with the Presbyterian Church, Cardiff. The building was designed by Mr. P. Whyte, and erected by Mr. Shepton, builder, at a cost of £1,000.

Trade News.

WAGES MOVEMENT.

OLDHAM.—The stonemasons' strike at Oldham, which had continued for several weeks, is now at an end. The men sought for an advance of 3s. per week, making a total of 33s. The masters offered 1s. 6d. per week now and a further advance of 1s. 6d. in August next. At a meeting held on Thursday week the operatives agreed to the terms proposed by the masters.

LONDON.—A large meeting of master builders from all parts of the country was held last week at the Westminster Palace Hotel, London, to consider the propriety of forming a new association to resist the men's demands for an additional halfpenny per hour. Mr. Hannen presided. Some of the employers urged that any partial strike should be met by a general lock-out throughout the country. It was resolved to hold another meeting in about a fortnight. Meanwhile several meetings of the men will be held.

LEICESTER.—The bricklayers' labourers at Leicester are agitating for an advance of 3d. per hour, and threaten to strike if it be not conceded. The masters, however, strongly resist the demand.

LONDON.—On Tuesday night an aggregate meeting of the carpenters and joiners of London, including both society and non-society men, was held at S. James's Hall, for the purpose of receiving a report from the Advance of Wages Movement Committee, and of deciding upon the final steps to be adopted by the trade in reference to the memorial now before the Master Builders' Association, claiming an immediate advance of 3d. per hour on the existing rate of wages, or from 8d. to 9d. per hour. The Chairman, in opening the proceedings, said it was generally admitted throughout the trade that the settlement of last year's dispute was very unsatisfactory, inasmuch as the main point of the memorial then sent in, for 9d. per hour, had not been conceded. Since that period the prices of all the necessities of life—food, clothing, fuel, and house-rent—had still further increased, and the trade thought they were fully justified in consequence in seeking at the present time to obtain the extra 3d. per hour refused last year, and which would make the wages 9d. per hour. The trade was now called together to finally decide whether they would accept the offer made by the Masters' Committee to pay 9d. per hour on the 1st of March, 1874, coupled with the abolition of the rule relating to extra payment for overtime, and the alteration of the hour for leaving work on the Saturday from 12 until 1 o'clock, and whether they would abide by the terms of the memorial sent in last March for the immediate advance of 3d. per hour. He, for one, was not prepared to give up the great boon of leaving work at 12 o'clock on Saturday. He was not prepared to give up the extra pay for overtime. But he was prepared to do his utmost to obtain the 3d. per hour advance. He hoped by their decision that evening the trade at large would show they agreed with him in his opinion. He concluded by requesting that a fair hearing should be given to any man who might feel inclined to support the offer of the employers, if there was such a man at the meeting. Mr. Charles Matkin, the secretary, then read a copy of the memorial sent to the Master Builders' Association, requesting an immediate advance in wages to the extent of 3d. per hour, and a revision of the code of working rules; also expressing the willingness and desire of the committee of the men to appoint a deputation to meet an equal number of employers to discuss the terms of the memorial in an amicable manner. He also read the reply of the Employers' Committee, positively refusing to concede the 3d. advance this year, or to receive any deputation from the men on the question, but offering to give the extra 3d. per hour in March, 1874, coupled with the condition that from the same date the existing rule for extra payment for overtime should be abolished, and that 1 o'clock should be the hour for leaving work on Saturdays instead of 12 o'clock as at present. Mr. Davis then moved the first

resolution as follows:—"That this meeting of carpenters and joiners of London, after hearing the correspondence between the Committee of the Employers and the Advance of Wages Committee, in reference to our memorial for an advance of 3d. per hour on the present rate of wages, is of opinion that we cannot accept the terms offered by the Master Builders' Association, including the alteration of the overtime clause and the reverting to 1 o'clock as the hour for leaving work on Saturday, considering such terms degrading to us as workmen; and we cannot entertain the idea of giving up what we struggled so hard to obtain last year." He supported the resolution in a speech of some length, contending that the purchasing power of the money they received as wages had decreased at least 25 or 30 per cent. within the last few years. Mr. Tilley seconded the resolution, which was carried unanimously, followed by great cheering. Mr. Crook then moved the following resolution:—"That this meeting, while viewing with regret the unwillingness of our employers to meet us in conference, as requested by our committee, to effect an amicable arrangement of our claims, are still desirous to avoid a struggle; therefore we are yet prepared to meet by a deputation, consisting of any number that may be mutually agreed on, and in the event of our employers still refusing to meet us, our committee is empowered to take action to enforce the claim of our memorial on the first Saturday in August." He was not a strike advocate; he would avoid a strike if possible; but if the employers would not meet them in conference, then the strike must and would assuredly occur. Mr. Wright seconded the resolution. Mr. Upshall moved as an amendment, "That if the employers concede the 9d. per hour unconditionally in March, 1874, such offer be accepted by the committee." Mr. Graham seconded the amendment, which was negatived by an overwhelming majority amid loud cheers. Some objections were raised that the time specified for taking action on the resolution was too late in the season, but on the vote being taken the resolution as proposed was adopted almost unanimously, followed by loud and long-continued cheering.

ASHTON & GREEN,

Slates, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor, Blue, Red, or Green, Blue Portland and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.			
24 by 12	22 by 12	20 by 10	18 by 10
377s. 6d.	332s. 6d.	257s. 6d.	215s.
16 by 10	16 by 8	14 by 10	12 by 8
192s. 6d.	145s.	170s.	117s. 6d.

Per m of 1,200 Slates. Marble and Enamelled Slate Chimney Pipes, Inscription Tablets, &c. Slates, Bangor, and Builders' Ironmongery. A & G's Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BEDS.—For new roof and fittings to stables at Milton Ernest Hall, for Mr. Thomas Bagnall. Mr. John Usher, architect.

Freshwater	£607 0 0
Cunvin	585 0 0
Hull	559 0 0
Foster	510 0 0
Carter (accepted)	478 17 0

BUCKS.—For re-seating, &c., at the Union Chapel, High Wycombe, Bucks. Mr. Arthur Vernon, architect.

KENTISH TOWN.—For manager's house and stabling &c., at Messrs. John Brinsmead and Sons' Pianoforte Manufactory (second contract). Mr. Charles E. Evans, architect.

Revised Estimate.

Manley and Rogers (accepted)	£1,500 0 0
LONDON. —For alterations and additions at "Duke of York," Homerton. Mr. H. J. Newton, architect, 16, Bessborough-street, Piccadilly.	
Brindle	£680 0 0
Shurmer	644 0 0
Taylor	477 0 0
Hockley (accepted)	470 0 0

LONDON.—For repairs, &c., at "Compasses," Ebury-street, Piccadilly. H. J. Newton, architect, 16, Bessborough-street, Piccadilly.

Shurmer	£174 0 0
Brindle	166 0 0
Taylor	153 0 0
Hockley (accepted)	140 0 0

SOUTH WALES.—For alterations and additions to the rectory house, stables, &c., and new labourer's cottage, Llangunder, South Wales. Mr. Andrew Edwards, architect, 13, York-buildings, Adelphi, W.C.

Watkins (accepted) £425 0 0

SUFFOLK.—For Church Cottage, Yaxley. Mr. E. Bays, architect, 27, Villiers-street, Strand, W.C., and Cambridge.

Day	£655 0 0
Grimwood	625 0 0
Taylor	568 0 0

YORKS.—For an 80qr. malt kiln at Beverley Station, for Mr. Wm. Glossop. Mr. Robert Clapp, architect, Hull.

Excavator, Bricklayer, and Plasterer.	
Evington	£1,640 10 0
Suddaby	1,665 0 0
Barrett	1,615 0 0
Berry	1,600 0 0
Pape	1,505 0 0
Dalton (accepted)	1,434 16 6

Slater.	
Dauber	£255 6 0
Wyde (accepted)	280 17 6

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 27, 1873.

THE PRESENT SUSPENSION OF TOWN-IMPROVEMENTS AND WATER AND GAS SUPPLY.

THE ex-Lord Chancellor, when a member of the House of Commons, produced a profound impression by the manner in which, upon one occasion, he urged upon his constituents the supreme importance of maintaining the municipal rights and privileges of this country. More than twenty years have elapsed since Lord Hatherley endeavoured to arouse a defensive spirit on the part of local governing bodies to check the aggressive tendencies of the central controlling authorities, who, both in name and in fact, have been quietly establishing an entirely novel estate in the body politic of this country, under the loose, popular term of "the Government," which "Government," in reality, consists of a small number of irresponsible, permanent officials. Their aggression has been steadily progressing since the time when Lord Hatherley spoke, until, at length, their foot has been pressed too completely upon the neck of the local municipal authorities, and resistance can no longer be postponed.

An organisation for the protection of the privileges and prerogatives of corporations, and other local governing bodies, has been established, called the "Municipal Corporations Association," of which the Lord Mayor of York is the President; the Lord Mayor of London, the Treasurer; and the Town Clerk of Manchester, the Secretary. To the general public the objects of this organisation are only associated with the recent banquet given by the Lord Mayor of London to his provincial colleagues. To nine-tenths of the building community, whose interests are specially involved, it may be information to state that the "Municipal Corporations Association" has been formed because the carrying out of any proposed town-improvements—the prohibition of any "gigantic, or other nuisance"; the improvement of rivers, lands, or buildings; the formation of new water-works or gas-works by public governing bodies, are, at this moment, virtually suspended in England, Scotland, and Wales by an Act of Parliament. The metropolitan area is excepted.

This monstrous legislative blunder, or worse, is called the "Municipal Corporations (Borough Funds) Act," 35 and 36 Vict., c. 91, and was passed in August last year.

The Act was introduced to meet the exigencies of cases corresponding to one which occurred at Sheffield. In July, 1869, the Sheffield Water-Works Company, incorporated by Act of Parliament (at that time supplying the greater part of the town with water), were required by the Corporation of Sheffield to establish a constant, instead of an intermittent, supply for the benefit of the inhabitants. The Corporation, under the Company's Act, had powers to enforce that condition. The Company assented, but made new regulations for their customers so onerous that the Corporation opposed them, effectually, before the justices. The Company then promoted a new Bill, which the Corporation opposed, and it was withdrawn. Between £2,000 and £3,000 expenses were incurred in the opposition to the Company before the justices and in Parliament, which the Corporation paid out of a Borough-rate. Thereupon, two directors of the Company, being ratepayers, successfully prosecuted an action against the Corporation for misapplication of the borough funds, and the individual members of the Corporation had to pay the whole of the costs incurred out of their own pockets. There was yet another dilemma for the Cor-

poration. They promoted a Water-Works Bill of their own, which had to be withdrawn in consequence of an injunction from the Court of Chancery against the application of their Corporate funds for its promotion.

In the adverse decision, it was admitted that the opposition of the Corporation was meritorious, in the true interests of the borough, and they were not to blame; but, as the expenses had been paid out of a borough-rate, and not out of a surplus fund (although for the benefit of the inhabitants of the borough), such payments did not come within the terms of sec. 92 of the Municipal Corporations Act (5 and 6 William IV. c. 76), which provides for the payment of expenses necessarily incurred by Corporations.

To meet the difficulties presented by this case, a Bill was prepared by Mr. Leeman, M.P. for York, with the intention of protecting the members of Town Councils, Boards of Health, Local Boards, Commissioners and Trustees for Paving, Lighting, and Cleansing, by giving them extended powers to apply the corporate funds under their control. This Bill is now, through the perversion of Parliament, the Act which has aroused the municipal mind.

With a startling audacity that must surprise even the framers of the provision, this Borough Funds Act makes a clean, unconscionable sweep of such questions as those raised at Sheffield, by enacting "That nothing in this Act contained shall authorise any governing body to promote any Bill in Parliament for the establishment of any gas or water works to compete with any existing gas or water company established under any Act of Parliament!" Such a thoroughgoing clause as this must be read with amazement! Is the London water so pure—the Edinburgh water so plentiful? Are the hundreds of towns in Great Britain as near perfection in their water-supply as Glasgow, with its sparkling stream from Loch Katrine? Are there no towns paying an exorbitant price for bad gas?—no private gas companies reaping enormous profits through evading the restrictions in their Acts as to the percentage of profit upon their capital, by payments of "bonuses" to their shareholders? Have the supplies of water and gas fallen into such good hands that the time has come for endorsing their labours in the imperial statutes? Where is the sanitary wisdom of Parliament, and where is the limit to the parliamentary influence of the great water and gas companies?

The public voice will be in most entire accord with the opinions expressed upon this gas and water clause by the Corporation of Leeds. They say that it "is as unjustifiable as it is believed to be unprecedented in legislation." "It is calculated in some instances to create or perpetuate an injurious and indefensible monopoly; and to deprive governing bodies, *even when the sanction of the Government is given*, of possibly the only means by which the interests of the inhabitants whom they represent can be protected, or by which a due compliance with the Parliamentary obligations imposed on existing gas and water companies can be enforced." The phrase in the above quotation from the Leeds petition to the House of Commons against the Act—even when the sanction of the Government is given—is one that clearly shows, as before remarked, that both in name and in fact, a silent revolution in the management of our public affairs has been accomplished. The climax of this revolution has been reached in the Borough Funds Act. Before showing what this new Act will do, it is worth while to first consider what has been accomplished without it.

During the last few years all the leading towns have been successfully carrying out street and other town improvements, under special Acts of Parliament. Bristol has done a great work in the construction of the new Victoria-street from the railway station to the centre of the city; Derby has its Irongate improvements; Manchester and Salford are each carrying grand thoroughfares over the sites of

wretched property; Bradford has been remodelled and provided with a new Market-house; in the new Boar-lane and New Briggate, Leeds has principal thoroughfares already made: while throughout the town there are numerous street improvements in progress, as well as a new town bridge. Newcastle has constructed new water-works, and pulled down old property to form a continuation of Grainger-street to the Central Railway Station; Edinburgh has cleared away acres of foul closes and wynds to render the Old Town a fitting and clean counterpart to the New; Dundee has doomed its dens, improved its street-levels, and provided a Public Park; while Aberdeen has emulated the few large towns in the completeness of its water-supply. The diverse improvements enumerated in these, as well as similar works in other towns, were projected and undertaken by the several municipal authorities before the passing of the Borough Funds Act.

Last year the Corporation of Nottingham were prepared to follow in the wake of the towns mentioned. They considered it had become urgently necessary that they should apply to Parliament for a Bill enabling them to compel persons building in a rapidly-extending part of the borough to fix the levels of their buildings above the flood-line of the river Trent. They also considered it desirable to secure Parliamentary powers to lay out, maintain, and provide for the use of large spaces of ground in various parts of the town, allotted, in loose terms, under a Local Inclosure Act, for Public Recreation Grounds. They further desired the power to clear away a number of courts and alleys—"hot-beds of zymotic disease"—wherein, although the most ordinary sanitary provisions were wanting, no power existed to compel the owners to adopt them. Besides these three, there were other powers required of more or less importance, affecting the health and convenience of the inhabitants of Nottingham. These, it will be seen, were matters of every-day occurrence, common to all large towns in some particulars, and requiring no special legislation apart from that previously granted in similar cases. They were, also, absolutely necessary works.

But before the Corporation of Nottingham applied for their Improvement Bill, the Borough Funds Act had been pushed through Parliament, and the Corporation found themselves not the masters, but the veriest puppets, of the situation. Before incurring any expense in the promotion of such a Bill as they desired, they were required to fulfil the provisions of the Borough Funds Act. In the first place, the Act requires that no expense shall be incurred in promoting or opposing a Bill in Parliament, except with the approval of the Local Government Board in respect of matters within its jurisdiction, or the approval of one of Her Majesty's Principal Secretaries of State in respect of other matters. In either case these "Government" authorities have power to direct a local inquiry to be held (at the cost of the persons making an application under the Act) by any person or persons whom they may choose to nominate; and these, or other nominated persons, have the further power to examine and allow all costs, charges, and expenses incurred under the provisions of the Act before the same can be paid.

The Act further requires that the consent of the owners and ratepayers of the district shall be obtained by means of polling, in the manner provided in the Local Government Act (1858) for the adoption of that Act, before the costs of promoting or opposing any Bill in Parliament can be paid out of the borough funds or rates. The Council of any Municipal Borough, the Board of Health, Local Board, Improvement, Paving, and Lighting Commissioners, or Trustees, are required, on their part, to carry a resolution at a special meeting, by an absolute majority of their governing body, in favour of opposing, or promoting any Bill in Parliament;

and, further, to confirm, by an absolute majority, at a second special meeting, to be held within fourteen days after the Bill in question has been deposited in Parliament, before they can proceed to incur any costs in their corporate capacity, "even when the sanction of the Government," and the consent of the owners and ratepayers, have been obtained.

Without stopping to disentangle these complicated provisions—which really seem to have the paradoxical effect of incurring costs while avoiding them—we may proceed to record the best practical comment upon the act, which is this fact: the Corporation of Nottingham found its provisions utterly impracticable in their case; all the leading Corporations are endorsing their views, and public works are stopped. Considerably too late, the Corporations are preparing to reclaim their prerogatives and privileges, and ought, by this time, to be conscious of the blame they have incurred by allowing their duties to be encroached upon. At the same time, while they are only preparing, the public is suffering. Sanitary progress, public health and convenience, the improvement of miserable localities, the construction of gas-works, water-works, bridges, thoroughfares, recreation-grounds, and the adornment of streets and public places, are not only brought to a deplorable dead-lock; but they are left to the energy of those who may take advantage of the occasion to obtain private Acts of Parliament for their own, and not the public, welfare. No Corporation could oppose them.

Why such a bungling, obstructive measure should have been passed cannot easily be explained. It does not meet, in a remote degree, the difficulties of the case of the Sheffield Water-works, out of which it arose. It has not been demanded by any cases of extravagant or unnecessary expenditure, or incompetence on the part of the local authorities of those towns which have set the best example to the country in the matter of improvements. Who has heard of any public outcry against the works in any one of the towns we have enumerated? To whose ears, except official, have come the carping complaints of obstructionists with vested interests, who are to be found in all large communities?

Again, such an Act has not been required by any precipitate action on the part of "governing bodies." Years pass before the inhabitants of a town are sufficiently "educated" to assent to expenditure upon a scheme of improvement. Instances are extremely rare in which a proposal, manifestly to the advantage of a community, has been carried out without interminable discussions, agitation, and wearisome postponement. An extremely rare case occurred in Salford a few weeks ago, when the Corporation, after rigid scrutiny and discussion, adopted an improved scheme of drainage for their borough, at a very short notice. Nevertheless, the enormous death-rate of the borough, and other circumstances demanding a speedy decision, amply justified and made highly commendable the course pursued in that case. Instances of this kind are the almost solitary exceptions. Oxford, with the University element in its collective counsel, has been for more than seven years postponing the expenditure of a necessary sum for the completion of its outfall drainage. The malodorous condition of the Old Town in Edinburgh is proverbial to the whole world, in the phrase, "Sweet Edinburgh, I smell thee noo;" and the vileness of its old tenements, its slimy and precipitous stairs, closes, and wynds, were for generations notorious nuisances. The late Prince Consort began a good work there by erecting model working-men's houses overlooking Holyrood Park, just on the outskirts of the locality. Some piecemeal pulling down and rebuilding gave the new Cockburn-street, but the grand opportunity to grapple with the condition of "Auld Reekie" was reserved, as such matters always are, until one man came to the front possessing the will and commanding the con-

fidence of his fellow-citizens, alike necessary for the work. Robert Chambers accepted the power and authority vested in the Lord Provost of Edinburgh, and by the good use to which he applied his influence, the slums of "Auld Reekie" vanished! The slope of its hill-crest became as bare as though it had been cleft clean by a destroying angel, and there it is—the one-time rearing-ground of social pests—now being covered with wide thoroughfares, churches, mansions, and houses for honest men. What would the Borough Funds Act have done to aid the Lord Provost Chambers? What nominee of one of Her Majesty's principal Secretaries of State would have been competent to know, as the resident townsman did, what the true interests of the locality demanded? And further, popular and favoured as the Lord Provost Chambers was, can any man living assert that he would have obtained, at a polling of owners and ratepayers, a majority in favour of incurring the preliminary costs incidental to his great work? Now, exactly what he did, other members of local governing bodies have to do, in a greater or less degree. Their hands, as the Sheffield case shows, require to be strengthened, not tied tighter. Until a clear case is made out as to their incapacity, there is no reason for making them ludicrous victims of the revolutionary tendencies in the administration of our local public affairs. Until a more worthy substitute for their authority has been suggested and approved, they ought not to be ignored. Until they become indifferent to the public welfare, they should be allowed an extension of that freedom of action which they enjoyed up to August last. At the same time, the present cessation of public works, with the inability to act for the promotion of the public welfare, health, convenience, and taste, are calamities for which the apathy of local governing bodies is mainly accountable. Their submissive conduct has courted the load of officialism with which they are now borne down on one side, and brought upon them the load of obstructive interests with which they have been weighted on the other by the Borough Funds Act. They are reduced to the condition of "Issachar," and, for the nonce, might change their heraldry, and take his name for their motto.

QUANTITIES.—No. XIX.

ABSTRACTING AND BILLING.

A WORD or two on abstracting and billing the quantities, before bringing my subject to a close. These may appear trivial, when compared to the labour and skill required in "taking off"—and so, indeed, they are. Usually they are placed in the hands of a junior, and to him I will, therefore, particularly address my observations. Many surveyors are very particular as to the manner in which their abstracts are prepared—and rightly so. Any item ought to be as readily found in the abstract as it is in the bill; and it should be so arranged that the items follow each other in the same order as they appear afterwards in the bill, the latter being, of course, merely a *summary* of the former. As I have in my Tables given the order of the various items in each trade, it will be unnecessary for me to recapitulate here. I can always tell whether a man has had much experience in quantities by the manner in which he prepares his abstract. Items are misplaced, and, owing to a want of forethought and experience, insufficient room has been allotted for their insertion in their proper places. It would be, of course, impossible for me to lay down any specific rule for the guidance of young surveyors, as, of necessity, it must be varied to suit the job; but the following remarks may not be inopportune, and may be applied in every case:—

Glance through the dimensions before commencing the abstract, so as to obtain an approximate idea of its nature—that is, of the

class of building. If a large, first-class building, the items are likely to be multifarious. Use plenty of paper, and keep the items sufficiently far apart to admit of a few interlineations, which are likely to occur afterwards, where the items are not taken out in regular order. Take every trade on a separate sheet of paper, except in very small jobs. As a rule, take the cubical items firstly, then the "supers.," then the "runs," and lastly the numbered. In each case, those of the least value should be placed first, and the others should follow in order according to their relative values, the most expensive, consequently, appearing last. There is, however, an exception to this, in the case of articles measured at per foot run, which, as in the case of the mason, carpenter, and joiner, are measured in the order of their scantlings in preference to that of their value, those of the small scantling being taken first. Also in the case of "supers.," articles that are measured by the rod or square are placed in advance of those measured by the foot super. The amount of space to be allotted to the various items depends upon the size of the job, and a little experience is therefore necessary. Care should be taken to leave sufficient space to reduce the items to the standard or weight, where such is necessary, as in the case of brickwork, ironwork, &c. I have explained the method of abstracting the Bricklayer when speaking of that trade, and I would add that very little difficulty will be experienced in any of the trades where the person has a practical acquaintance with building. The Carpenter and Joiner's trades are perhaps the most complicated, but with a little experience they are easily overcome, if the student always pursues a certain course, and that I suggest is the one generally adopted, and the best.

With respect to "Billing," that is, bringing the summary of the dimensions from the abstract into the form of a bill, for the purpose of enabling the builders to price them, this is simple enough. The student has only to copy the various items, in the order in which they appear in the abstract, keeping each trade separate. In a large job, each trade is made a separate bill of, and the total of the estimate carried to a summary; but in a small bill this is seldom the case, the bill being continuous. It is customary to give a description of the materials to be used in the several trades, before taking the items, such description being taken from the specification. Some, however, prefer to keep them apart from the dimensions, and place them before the quantities; in which case they form a sort of preface. Conditions of contract are sometimes attached to the quantities, and should, I think, always be so attached. At the end of each trade it is customary to provide an item for "Attending upon the other trades," leaving all clean and perfect at completion, &c., &c. In the summary make provision, where it is required, for "Insurance," "Maintaining works for — months after final certificate of completion," and any other incidentals that may be required, and lastly, but not the least, for Surveyor's charges for "taking off" the quantities, and the cost of lithography, &c.

REPAIRS.

The experienced quantity surveyor is often puzzled when he has to deal with repairs and alterations.

Certainly, compared to new buildings, the difficulties are far greater in old buildings and alterations. Therefore a ready expedient is often resorted to of "lumping," which, though in practice it is most usually "near the mark," cannot be recommended, for the reason that the object of quantities is to give exactitude, and not a *near approach* to the measurement.

Let me instance a few of the difficulties in this branch of the subject.

1st. Piecing stories.

2nd. Taking down walls out of the perpendicular, and rebuilding, with all the incidence of scaffolding of a special nature; the using in of some part (what part?) of the old bricks; the making good of disturbed internal work; the making good of the peculiar cornices and skirtings.

3rd. The removal and reinstatement of rotten joists, and the renewal of disturbed ceilings and other parts of the building.

4th. Raking out and pointing portions of the walls, and estimating what scaffolding (if any) will be requisite.

5th. The quantity of labour to repair decayed stone in sinks and other parts.

6th. The reinstatement of drains and traps; the difficulty is great, as so often the stoppage is under ground.

7th. The chimneys, chimney-pots, and reinstatement of injury to chimney-pieces.

8th. The money value of reinstatement of stove-backs and fronts.

9th. The reinstatement of injured paint-work; what quantity or number of coats is sufficient to make good.

10th. The value of *hacking* out.

11th. The injury to iron fencing.

12th. The taking up broken and putting sound pavement.

All these show the difficulties which attend this small branch of my subject; and they are only to be overcome by practice. I can only give the outline to guide.

REPARATIONS.

TABLE XVIII.

This Table has a double use: it shows the order of taking the items, and the method of measurement.

BRICKLAYER AND TILER.

All open joints to brick flat or brick on edge coping.	At per foot super.
Defective filletings . . .	At per foot run.
Defective tile creasing . .	"
Pointing to pantiling . . .	"
Removing defective tiles, finding and bedding sound.	"
Taking down bulged, cracked, or split brick-work, and rebuilding, including scaffolding.	At per rod.

(Note.—Allowance must be made for the bricks that are sound, and can therefore be re-used.)

Sound chimney-pots and setting.	At per number.
Pointing open joints of brickwork.	At per foot super.

(Note.—State height from ground, and whether scaffolding will be required, and what kind.)

Cesspools, if they require emptying, size and depth must be taken.	At per number.
Earth, soil and rubbish. Quantity must be taken and distances to which they are to be taken.	At per yard cube.
Sash frames (The quantity of pointing required.)	At per foot run.
Door frames (The quantity of pointing required.)	At per foot run.

SLATER.

The removal of broken or defective slates. The fixing of loose.	At per number.
The re-nailing.	At per square.
Ridging defective or deficient.	At per foot run.
Shelves, slabs, paving . .	At per foot super.

CARPENTER.

The removal of broken or decayed rafters, purlins, wall plates, joists, and replacing with sound.	At per foot cube.
The removing of broken laths and replacement with sound.	At per square.
The re-fixing loose boarding and weather-boarding.	"
The providing new do. in lieu of decayed, and fixing.	"
The providing sound wooden gutters and trunks, and fixing, including removal of old.	At per foot super

Removing decayed boarding to dormers, roofs, gutters, and flats, and reinstating with sound.	At per foot super.
The reinstatement of decayed skylight bars.	At per foot run.
The removal of decayed cills of sash and door frames, and providing and fixing sound.	"

(Note.—Be sure to notice if those to be removed are oak or deal, &c.)

The removal of broken sash-lines, and providing and fixing new.	At per yard.
Providing new beads	At per foot run.
" pocket pieces	At per number.
Piecing out bars	"
Providing and fixing sound in lieu of decayed rails and sashes	At per foot run.
Sound panels in lieu of split in doors.	At per foot super.
Making good injuries to stiles or rails.	At per foot run.
Nosings to stairs	At per " "
New treads	At per foot super.

MASON AND PAVER.

Copings	As described to new work.
Curbs	"
Channels	"
Sinks	"
Sink stone	"
Steps and landings; piecing must only be taken where it can be done	"
Walls or other masonry if loose or unsound	"
Paving (remembering that the existing tho' broken may be squared and re-used, the new quantity required will only be sufficient to cover the space after all the stones are squared and used)	At per foot super.
Taking up sunk paving and relaying to proper level	At per foot super.
Chimney-pieces cleaning	At per number.
Do. reinstating	"
Do. where chipped making good	"
Hearths, front and back	At per foot super.
Pointing to decayed or open joints	At per foot run.
Cramps, defective	At per number.
Do. reparation	"
Ashlaring and other stone works, and reparation of parts broken	As new work.

(Note.—It must be remembered all stonework may be made good by *piecing*.)

PLASTERER.

Cutting out cracked or bulged ceiling, plaster and set, or plaster, float, and set.	At per yard super.
(Note.—If re-lathing necessary, add lathing.)	"
Cutting out loose or bulged plastering of walls, render and set, or render, float, and set.	At per yard.
(Remember this will necessitate an addition in Painter, of making good paper, or of colouring, as the case may be.)	"
Enrichments, mouldings, skirtings, and cornices.	As new work.
(A special price must be placed if the work is old-fashioned, or there is a difficulty in <i>matching</i> it for any good reason.)	"
Repairing cement work of fronts.	At per yard super.
Copings	At per number.
Cornices	"
Trusses	"
Caps	"
Cills	"
Plinths and stringings.	"
Reveals	"
Dressings	"

PLUMBER AND ZINC WORKER.

Refixing loose work on flats or flashings	As new work.
Removing inefficient lead or zinc work, and providing and laying new	"
Soldering	At per foot run.
Repairing flashings, ridges, hips, valleys, aprons, dormer-tops, cheeks, cisterns.	At per weight.

Rain-water pipes and heads. Care must be taken that the design of present head is followed in the new work	At per foot run.
Sinks	At per weight.
Pipes of all other kinds . .	At per foot run.
Water-closet apparatus . .	At per number.
Water-closet pans	"

PAINTER.

Rub down and paint in — coats of oil-colour	At per yard.
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GLAZIER.

Hack out and re-glaze . .	At per foot super.
Make good decayed putties.	At per foot run.
Reinstate bandings and cementings of lead lights	At per number.

SMITH AND IRONMONGER.

Iron railings. (Particular care is required as to pattern; a sketch should be given.)	At per weight.
Gratings	At per " foot super.
Gates, making good . . .	At per number.
" hanging or fastening	"
Rain-water pipes	At per foot run.
" shoes	At per number.
" gutters	At per foot run.
" cistern-heads	At per number.
Iron doors	At per " foot super.
Linings to doors	At per number.
Locks	"
Latches	"
Hinges	"
Bolts	"
Bars	"

(Note.—In taking the quantity, state if new required or reparation; if the latter, if new springs, or what deficiency has to be supplied.)

Beams	At per weight.
Columns	"
Ties	"
Supports	"
Balconies or balconets . .	"

(When unsafe or defective, it will be necessary to carefully take the exact work necessary to make them secure and perfect.)

PAPERHANGER.

Paper	At per piece.
Canvas	At per yard.

In taking the quantity of paper, the surveyor must try to find out if the pattern can be matched, as if so, only the reparation must be taken; if it cannot be, then the papering of the entire room must be taken in the quantities.

In concluding this portion of the subject, I may, perhaps, mention that it is seldom the surveyor takes the trouble of measuring up what is necessary in the shape of repairs, as in most cases the specification is handed to the Builder, and he prepares his estimate therefrom, taking his own dimensions from the building; and whatever is done extra thereto is customarily charged as daywork—i.e., the time expended on the labour, and the quantity of material used. But, at the same time, how is the surveyor to estimate the cost of dilapidations, for example, without measuring the various items? That in many cases they are not measured is proved by the wondrous difference in their estimates. I have given, therefore, this Table for the guidance of such as are disposed to adopt the most businesslike method of treating repairs. Of course the items are taken, in many cases, the same as new work; but a full description must be given as to the requirements, as the price will be considerably in advance of the new. Great care is necessary, therefore, when dealing with repairs.

RESUME AND CONCLUSION.

Land at last! How I can sympathise with the expression! The yearnings of the sailor for land and home can scarcely exceed in intensity the feelings for *Finis* which a writer on a strictly technical subject has.

Of course, the prosaic will say, Why write at all; or, at all events, consider the payment you receive its equivalent.

Yet I venture to think my readers will

think otherwise. They will appreciate the efforts that I have made to render these articles a *text-work* on this subject, to be referred to at all times. First, however, let me recapitulate what objects I have had in view:—

1st. The drawing attention to this particular subject, which has been, and is, much neglected.

2nd. Enabling students, in the most concise and easy method, to acquire this branch of the profession.

3rd. To bring, what I venture to consider, the true practice before the large and rising body of the profession, that it may be criticised, and in the result we shall obtain uniformity, which, I am sure, all must desire.

4th. To make a work of reference for the maturer members. At present there is no work which can be called a text-book or guide.

5th. By the use of the tabulated form to render these pages most easy of reference; and for economy of space I have made my tables answer a double purpose.

I may mention I have used this tabulated method from the great success which has attended (even beyond my expectations) the same principle which I first adopted in "Dilapidations."

There can be no doubt, I opine, that the most careful quantity surveyor will find an advantage in having these tables before him; it will prevent his missing any item, and if this is the case, how much greater must be the advantage to the less experienced man! It is to such a one almost his Alpha and Omega.

Never, probably, could the reply of that celebrated man, who, when asked how it was that he accomplished so much, made answer, "System, sir—system," be more appropriate than here. No subject requires it more; and it is only by system and method that the most experienced surveyor can hope to avoid omissions.

What a fruitful subject that one word suggests—the looming in the future of actions by builders because our quantity surveyor had omitted an item.* Marvellous is it that nowadays there is not one profession which is not threatened, at some time or other, with the strong arm of the law. We have just shown that the quantity surveyor is not free. The architect and the surveyor I need scarcely mention, as all my readers well know the liabilities we are exposed to; the lawyer (with him we, perhaps, have less sympathy), the auctioneer, the medical man, &c.—scarcely a week passes that you do not read in the papers of some action for want of due caution or want of proper skill, and where, in consequence, compensation is claimed in the action against the professional man.

If my reader has carefully gone through these papers, and will refer to the tables on all occasions, I believe he will be master of the subject, and that no matter of what building he has to take out the quantities, he will be able to do so in a satisfactory manner; in fact, he will find a pleasure in his work, and even sigh for some more difficult building. None can I mention, except the fancy of the poet, which must estop the energy of the quantity surveyor.. Imagine the quantities required of the following, with prices:—

"Build the entrance high and proud,
Darkening and eke brightening,
Of a riven thunder-cloud
Veined with lightning.
Use one with an iris-stain,
For the door within,
Turning to a sound like rain,
As we enter in."

I mention this to show the "practical"

* I well remember two instances of important omissions by different quantity surveyors, both men of experience—one case where the whole of the sleeper walls were omitted in the quantities of a large public building; the other where the surveyor omitted the figure 2 before the dimensions, thereby entirely omitting one wing of the hospital.

man that there is a limit to his sphere, and when he can most fully accomplish "dilapidations" and "quantities," he need not rest content, but may essay the higher and more poetic—namely, designing. Should he do so, he must remember that he will have fewer rules to guide him; that he will leave firm ground, and be entirely at sea (in more senses than one); that what one critic will admire, another (of a different school) will condemn; that beauty and novelty will not atone for the design being of the wrong school. By wrong, I mean the school which is in the minority, or is the one which your critic condemns.

With "quantities" you are much safer, and they—no mean advantage in these times of high prices—pay well. B. F.

ABBREVIATIONS.

HAVING concluded the series of articles on the measurement of builders' work, I have been solicited to give some of the more common abbreviations adopted by the profession to shorten, in some measure, the task of so much writing. I have already stated, at the beginning of the articles, that abbreviations, whilst being of service to the more mature members of the profession in taking off the quantities, are, in certain cases, unadvisable—where, for instance, the dimensions had to be abstracted by a second person, who, if he does not understand them, will lose the time in finding out already gained by the person taking off. Again, abbreviations vary so. Persons adopt their own, and each system may be different. When, however, the person taking off also abstracts and bills, abbreviations are, to a certain extent, advantageous, owing to the saving of time; but as, at a future period, a question may arise, and a second individual have to go over the items, my objection will, I think, hold good. Still, there is no reason why the same system of abbreviating should not be pursued throughout the profession, and then all would be right. I submit the following, therefore, as being the most usual, and those most frequently applied. All uncommon items or expressions should invariably be written in *extenso*. I classify them according to the trades. They are used more extensively in the Joiner than in any other trade.

TABLE.

BRICKLAYER.

Item.	Abbreviation.
Brick	B., as 1 B. (indicating the thickness of wall), B. on edge, B. flat.
Bedded and pointed	B. & P., as Frames B. & P.
Pargetted and cored	P. & C., as Flues P. & C.
Rough cutting	R. C.
Cutting to skewbacks	C. to Skew.
Relieving arches	R. A.
Bird's mouth	B. M.
Squint quoin	S. Q.

MASON.

Half-sawing	½ Sawg.
Plain work in beds and joints	P. W. in B. & J.
Plain face	P. F.
Sunk face	S. F.
Moulded face	M. F.
Circular plain face	C. P. F.
Fair ends	F. E.
Ends cut and pinned	Ends C. & P.
Weathered and throated	W. & T.

CARPENTER AND JOINER.

Deal	D.
Rough	R.
Wrought one side	W. 1 S.
Framed	F.
Beaded	B.
Braced	Br.
Chamfered	Ch.
Splayed	Sp.
Moulded	M.
Rebated	R.
Feather Edged Springer	F. E. S.
Tilting Fillet	T. Fillet.
Herringbone strutting	H. B. S.
Boarding	B.
Proper door case	P. D. C.

Deal wrought rebated and beaded frame	D. W. R. & B. Frame.
Double rebated and beaded jamb linings	D. R. & B. J. Linings.
Proper ledged door	P. L. Door.
Six panel deal double margined door—the lower panels bead flush and square, and the four upper panels bevelled moulded and raised one side, and bead butt at back.	6 P. D. D. Margd. D. Lower P. B. F. & Sqr., 4 up. P. Bol. M. & Raised 1 S. & B. B. at back.
Deal cased frames, oak, sunk cills, 1½ in. ovolo moulded sashes, double hung with brass axle pulleys, patent lines, & iron weights	D. C. F., O.; S. C.; 1½ O. M. S.; D. H.; B. A. P.; P. L.; & I. W.
Treads and risers, with moulded nosings, and strong fir carriages, glued, blocked, and bracketted	T. & Risers; M. N.; & S. F. C.; G. B. & B.
Wrought rebated and beaded outer string	W. R. & B. Outer String.
Rounded ends	R. E.
Returned ends	Retd. E.
Mitres	M.

SMITH AND FOUNDER.

Wrought iron	W. I.
Cast iron	C. I.
Chimney bar	C. B.
Rain water pipes	R. W. P.

PLASTERER.

Render	R.
Render, float, and set	R. F. & S.
Lath, plaster, float, & set	L. P. F. & S.
Lath, plaster, float, set, and twice whiten	L. P. F. S. 2ce. W.
Stucco	S.
Wash, stop, and whiten	W. S. & W.
Twice	2ce.

PAINTER.

Oils	O.
Flatted	F.
Grained	G.
Varnished	V.
Stained	S.

As the next number commences a new volume of the BUILDING NEWS, we shall commence a series of practical articles on "Compensations." B. F.

EDINBURGH.

[FROM OUR OWN CORRESPONDENT.]

FINE architecture, as well as high farming, cannot make up for the want of natural beauty. The existence of either almost always supposes the destruction, at least in great part, of the latter. In Edinburgh, where the beauty of situation is great, and we have retained a large portion sacred to the memory of "nature's infant face," any one can understand the feeling of delight with which we hail the leafy month of June. Even the autumnal blasts cannot make this beauty altogether bare—though our leafless months certainly do give point to the criticism of sundry popular writers that the modern Athens must rest her claims to be a city of palaces, not so much upon her architecture, as upon her unequalled position, her material, and her masonry. Winter, alas, brings into relief the monotony of our plans and elevations, our repetition of outworn details; miles of masonry, pierced with equidistant and equal parallelograms; and convinces us, at least till summer comes, that we have not made much progress, if any, since the earlier parts of the new town were built. We are coming round to the conviction that we have sacrificed to an ideal symmetry the cheap and effective beauty which variety of form and individuality of design might have imparted to our streets and squares, had we followed out in graceful development the style of the ancient city. Times have changed since the first commonplace houses of the new town were considered grand in comparison with the design of the quaint old architecture which it is now fashionable to admire and copy. No one would now claim pre-eminence

for the bald design of Queen-street over that of the elevations of the new Improvement Scheme, or could fancy an architect in the far future seeking hints for a design in any of the streets lately added to the west. Wider thoroughfares, more spacious dwellings, and our many gardens, are the greatest advantages which have come with the extension of the city. If no ruthless winter came to dispel the charm, we might justify even much of the poverty of our street architecture, by an appeal to the approach of summer. Edinburgh

"Keeps not summer, when the summer comes,
Without her gates, but takes it to her bosom."

Her gardens and her trees—when these "put their Corinthian beauties out"—give a charm to the Doric simplicity of her streets, which greater variety of outline and detail might not, perhaps, augment. Even Queen-street, with its æsthetic vacancy of face, or Princess-street, with the absurd alterations of its skyline, when fringed with the summer green of bank and tree are pleasant pictures; and there is hardly any point in the New Town from which, in the "green prime" of summer, such pictures may not be seen. With these results before us for guidance, it is sad to think that there is a disposition on the part of the proprietors of the ground to grudge the growing city this great advantage of healthy air and lungs. In lands set out for building in the west, and belonging to Heriot's Hospital, the excellent design of Messrs. Peddie and Kinnear has been rejected for a paltry saving of a few hundred pounds. A few trees and narrow strip of garden-ground is all that the street architecture of the West can show to relieve the monotony of the design, which is just the old story of symmetry and Chambers' "Architecture." It is no wonder if the passing stranger finds a melancholy lack of interest in it, or thinks evil of a style which exhibits little but perfection of masonry.

Here, as elsewhere, the interests of good architecture, as distinct from house-planning, have been sacrificed to fencing-plans and building speculation. A necessary evil it seems to be, but one for which, surely, it is possible to suggest a remedy; and summer, with her endless change of form, seems to point out the way. Readers of the BUILDING NEWS must often have met with the complaint, and its suggested remedies. One of the latter, I remember to have seen, consists in our returning to the old and natural system of giving individuality to houses, or to groups. So long as our best streets (to be genteel) are designed under the bar and ban of the present system, there is little need, and less hope, for architecture exhibiting any novelty or grandeur of design. The interest and aim of the student will lie, not in the study of invention, but in the mastery of a few old details, ringing changes upon architrave and cornice, mouldings, balconies, and balustrades. Originality of design will not revive till the public desire is for something more to look at than masonry and polish. By the present system, the limits of architectural practice and improvement are also immensely narrowed. The design for whole streets and squares is confided to the "stagnant pool of a single mind," which meets the exigency by making the houses all very much alike, on the true principles of symmetry and breadth. The architect is forced to ignore that great element of his strength, the beauty that lies in proportioned variety of form. Cockburn-street, to take an executed work, is a marvel of design compared with all the "grand" elevations of the west. It is not easy to see why, especially without its advantages in the matter of extensive garden ground, we should cling with such conservative tenacity to the traditions of the New Town when our national style can give us all the variety we could desire, and is capable of some kind of development, whereas the other treads the same weary round.

Nor does it seem impossible to convince the speculative builder that variety of design

would have its own marketable value. It cannot be altogether pleasant for the proprietor who would have it otherwise, to find his mansion displaying on its exterior only the beauties of the parallelogram, and the unæsthetic polish of the stone—to have all its individuality lost in exact likeness of all beside it. There is in such a system neither the same opportunity for the purchaser making his own selection, nor for the builder getting a better customer. Intending proprietors could employ their own architect for the exterior as well as for interior design, subject, of course, to revision by the owner of the land, or his advising architect: and the charm of the departed science would be replaced by interesting features of another kind.

The machinery invented by Mr. Adams for polishing stones of any scantling promises to be a great success. The details will no doubt be found in the pages of the BUILDING NEWS. Polished ashlar is not, however, always an element of beauty, though the builder may imagine so. In the new street of Forrest-road the circular corner has been despoiled of half its beauty by the employment of ashlar. It is a curve of great radius, and carries pediments atop. From the first floor to pediments there is no line to break the surface, and even on the chamfered sills I doubt whether the city sparrow could find a resting place. The contrast of polished dressings with the natural surface of the stone has been discarded, which tells to so much advantage in all the other elevations of this most picturesque addition to our architecture. The design of this tenement is inferior to the others, and if a polished surface were required, it was all the more necessary to provide some projection to relieve the monotony of its colour.

The palaces of Edinburgh are her schools,—from the High School to the Fettes College, which is now finishing a third boarding-house to accommodate 50 scholars. Readers of the BUILDING NEWS must receive the statements made in a late number as to the ill-ventilated condition of our schools *cum grano*. It is a comparatively easy task, with plenty of funds, to convert the lofty apartments of the Hopetoun Rooms into well-ventilated class-rooms. Schools, such as the Normal School by Mr. Smith, built many years ago were considered models in respect of ventilation; but where some old tenement, by process of cheap repair, has to do duty as a school, the case is hardly one for official interference. The probability is, that schools in general are not worse, in respect of ventilation, than our drawing-rooms and churches. The nose of any one entering any apartment recently vacated by a crowd is very apt to protest against the ventilation. The party to be pitied is the teacher; but if the magistrates were to be responsible for providing costly experiments in ventilation their duties would be overwhelming. They have at present plenty of similar work upon their hands, and are diligent in their business, notwithstanding formidable opposition. They have just condemned as uninhabitable several tenements in the Old Town.

I am sorry to say that the barracks for married soldiers are likely to remain a blot on the fair landscape of the city. Probably not even from a balloon can they possibly appear in harmony with the surroundings. Sunk in a deep cutting at one extremity, they rise to a hideously disproportioned height at the other. What with windows opposite each other, door and ventilating grating to the outer air, there is little fear of vitiated air, but it is doubtful if in winter the tenants will be able to keep out the cold. The representation of the authorities has obtained official acknowledgment that a great mistake has been made; but as both parties are to blame—the deviser of the structure, and the Dean of Guild Court in not sounding the alarm in time,—the expense will probably prevent anything being done to remove or abate this nuisance.

ANNUAL DINNER OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE annual dinner of this Institute was held at Willis's Rooms, King-street, S. James's, on Saturday evening last, the President, Sir George Gilbert Scott, R.A., in the chair. About 100 members and visitors sat down to table, including Lord Elcho, M.P., Sir Francis Grant, P.R.A., Sir John Gilbert, Mr. Hawksley (President of the Institution of Civil Engineers), Colonel Hogg, M.P. (Chairman of the Metropolitan Board of Works), Mr. Horace Jones, F.R.I.B.A. (the City Architect), Mr. George Vulliamy (Architect to the Metropolitan Board of Works), Mr. Waterhouse, &c., &c. The Right Hon. A. S. Ayrton, M.P., First Commissioner of Works, who had accepted an invitation to be present, did not put in an appearance, owing to a domestic bereavement.

Sir GILBERT SCOTT said the first toast among loyal Englishmen always was and always would be the same, "Our Sovereign"; and if this toast was always enthusiastically responded to in every other company, how much more ought it to be so in a society like the Institute, which, by the special permission of the Queen, called itself the "Royal Institute of British Architects," and which was commissioned by the Queen annually to confide in her as to the appropriation of an honour which she always had awarded to those who were considered by the Institute most worthy of it in connection with the profession of architecture. The toast was received with the usual honours, as was the next toast proposed from the chair—"The Prince and Princess of Wales and the other members of the Royal Family."

Mr. HORACE JONES proposed the next toast, "The Army, Navy, and Volunteers," coupled with the name of Lord Elcho, whose devotion to the volunteer movement was highly eulogised by the speaker.

LORD ELCHO, in responding, entered at some length into the question of military organisation, remarking that in order to make the volunteer force of any real service to the country, it would be necessary to adopt some form or other of compulsory service within its ranks.

Mr. CHARLES BARRY said the President had asked him to propose the toast of "Art and Science." He thought it would be very difficult indeed to propose any toast more grateful to the feelings of the gentlemen present. Had he any hesitation in proposing this toast, his hearers would have no hesitation in giving it a most cordial reception, especially when he mentioned the names of the gentlemen with whom the toast was to be associated. In connection with art he would mention the name of Sir Francis Grant, the President of the Royal Academy, and in connection with Science the name of Mr. Hawksley, the President of the Institution of Civil Engineers. As architects, they would all agree that he was right in placing Art first and Science afterwards, although on a recent occasion he had heard it given as "Science and Art." In connection with Art, he could not help alluding to the high position which Sir Francis Grant had so worthily held for many years as the representative of art in its highest walk in this country. As President of the Royal Academy, he was the representative of Art everywhere, and therefore fitly present on that occasion. He had had the pleasure of personally knowing Sir Francis for many years, and he could say that the particular branch of art to which Sir Francis's life was devoted was by no means the only branch of art with which his sympathies were in accord. Although a painter, he had such sympathy with architecture as to render him a fit exponent of the toast of Art in an assemblage of architects. Another consideration which would commend Sir Francis Grant to them was, that in personal qualities, he was a very parallel character to the late President of the Institute, Mr. Thomas Henry Wyatt, to whom they had so recently done honour. Both gentlemen were pre-eminently characterised by the kindness and urbanity which enabled men occupying such high positions to get over all the difficulties—and they were many—of those positions, and which enabled them, in the discharge of their duties, not only not to lose friends, but on the contrary, to gain them. Coming to the other branch of the toast—"Science"—connected as it so worthily was with the name of Mr. Hawksley, the President of the Institution of Civil Engineers, Mr. Barry said it would be bad taste in him to attempt to pass any eulogium upon Mr. Hawksley's abilities and his eminence

as an engineer. At the same time he might perhaps be allowed to express some of the feelings which all architects possessed with regard to engineering. Mr. Hawksley had identified himself more particularly with a branch of his profession of the greatest possible utility to the public—namely, that of supplying the people with pure water and of securing efficient drainage, and, therefore, health. On a recent occasion he had been present when Mr. Hawksley was called upon to respond to the toast of "Science and Art." Mr. Hawksley seemed quite at home in speaking to "Science," but when he came to the question of Art, he was in some difficulty as to what he should say, but at the same time he expressed the feeling, which the speaker (Mr. Barry) had experienced very strongly, that there ought not to be so much difficulty in a scientific man returning thanks for an honour done to Art, and that there ought to be little difficulty in an artist returning thanks for an honour done to Science, because Art and Science ought to be more intimately connected in all the daily life and professional studies of artists and scientific men. When we looked upon the grand opportunities which the engineers had had, and always would have, both as to the magnitude of their works and the comparatively unlimited means at their disposal—the latter a condition to which architects were almost strangers—he could not but express his deep regret that the importance of the study of art was not more fully recognised in the earlier education of men who were to fill such positions as Mr. Hawksley occupied—that it did not form more a part of the preliminary practice of the engineer. The toast he had the honour to propose would, he knew, be received on its merits, but he had thought it only respectful to the company to endeavour to set forth, however feebly, the claims which it possessed.

The toast having been duly honoured,

Sir FRANCIS GRANT, P.R.A., in reply, assured the company that he felt very highly flattered at the compliment they had paid him in connecting his name with the toast of Art, and he said he especially appreciated the compliment as coming from a body of architects, for he felt that painters and architects were brothers and fellow-labourers in Art. Mr. Barry had very justly said that although he (Sir Francis) was a painter, he could appreciate architecture. He honestly confessed that he thought there was no department of art more important than architecture. The historical painter might produce upon a piece of canvas a fine picture; the portrait-painter might hand down to posterity the likenesses of the illustrious men of his day, and the landscape-painter, if he had something of the genius of the remarkable Constable, might so represent beautiful green fields as to be really refreshing to the eye of the City man of business. The sculptor, again, if he were very clever, could put life into the coldest marble, and create some beautiful form to adorn some noble corridor or gallery. But when he contemplated great works of architecture, such as Westminster Abbey or St. Paul's Cathedral, or any other great architectural monuments, such as we in this country possessed, he felt very strongly that the best exertions of the painter and sculptor fell into insignificance in the presence of such mighty and magnificent monuments of architectural art. (Applause.) He was glad to be able to compliment the architects of this country upon the vast improvement which was now taking place in the architecture of this great metropolis. A few years ago it was the reproach of England that London was only a huge assemblage of ugly brick houses and warehouses. Now, wherever one went, both at the City and West-end, there were to be seen fine and noble structures, which were an honour to the country, and he firmly believed that in twenty or thirty years hence, London would be, through the exertions and genius of its architects, a capital city of which the country might well be proud.

Mr. HAWKSLEY, in responding to the toast in the name of Science, said he must begin by retorting upon his friend the proposer of the toast, who had been so good as to make some allusion to what had occurred at a previous gathering. He did not think he could reply in a better way than that in which Lord Erskine replied to a toast on one occasion when called upon very suddenly by the Lord Provost of Edinburgh. Lord Erskine, in responding, narrated a story of an Edinburgh thief, who was detected in the act of stealing the plate belonging to one of the churches there. In order to escape, he ran up into the bel-

fry, and finding he was pursued, thought to elude his pursuers by descending on the outside of the tower by means of the bell-rope. As, however, he descended by aid of the rope, the bell revealed his whereabouts, and he was captured on reaching the ground, when he apostrophised the bell thus: "Had it not been for your lang tongue and your empty head, I should have made my escape." (Laughter.) Speaking in the presence of a body of gentlemen who were engaged in pursuits into which Science very largely entered, he might say, even although he was on that occasion the representative of the Institution of Civil Engineers, that he had never been able to see any reason why Engineering should be divorced from Architecture. (Hear, hear.) He believed that by-and-by the occupation of the engineer would again be united with that of the architect. He looked upon the gentlemen of his own profession as the ephemeral of art. It was because Science had discovered something of which architects had formerly no knowledge, and which, up to the present time, they had not studied as they ought to have done, that the civil engineers as a body had sprung up and increased in numbers and influence. Almost every new mode of construction had been introduced by engineers, because their metallurgists had been able to present them with materials which architects had not only not been accustomed to use, but which they had almost up to the present time been disinclined to use. Had architects been disposed to work otherwise than in brick and stone, mortar and cement, and to make the best possible use of new materials of construction, he did not believe that the engineers would have sprung up as a separate and distinct body. Had architects been fully alive to their opportunities, they would have been the great bridge-builders and constructors of the day, and even now, if they would only give attention to what chemistry had done, and was doing, for the metallurgic arts, and include amongst their other and more beautiful studies the study of new materials and new modes of construction, they would soon level all distinctions between the engineer and the architect. (Hear, hear.) Although he made no claim to be an artist, yet in the execution of any works which he might be called upon to perform, his first thought was how to carry them out so as not to be an eyesore and a disgrace to an architect or any man of taste. It had been said that it was the business of the architect to beautify a town, and he was painfully conscious that it too often seemed to be the mission of the engineer to make it ugly. He hoped, however, that the engineers were in some degree removing themselves from that disgraceful position, and the more they improved in this respect the more nearly would they approach the artistic excellence of an architect's works.

Mr. GEORGE VULLIAMY, F.R.I.B.A., proposed "The House of Commons," and expressed his regret that Her Majesty's Minister of Works was not present to respond. With the toast he begged to couple the name of Lord Elcho.

Lord ELCHO, in response, after observing, amid much laughter, that he was not at the head of Art in this country, as Mr. Ayrton was, proceeded to make some remarks in mimicry of the views of the First Commissioner of Works on Art topics, imitating the manner as well as the matter of Mr. Ayrton's speeches—a course of procedure which some of the gentlemen present seemed to consider hardly decorous, especially in Mr. Ayrton's absence. Having referred to the alleged mismanagement of the Office of Works in the instances of the new Natural History Museum at South Kensington and the new Post-Office buildings in St. Martin's-le-Grand, Lord Elcho contended that it was but reasonable for the Royal Institute of British Architects to urge the undesirability of all public works in the metropolis—whether undertaken by Government, by corporate bodies, or otherwise involving the expenditure of public money—being left, as regarded the selection of the architect or the design, to merely haphazard exigencies of political convenience or necessity. On the contrary, it was greatly to be desired that there should be established a permanent body of men of taste and judgment in art to advise the official or political head of the Public Works Department. (No, no.) He did not know whether the gentleman who said "No, no," dissented from the action of the Institute on this subject, but he held in his hand a memorial embodying the views of the Institute as to the great abominations which were per-

petrated in this country under the name of Architecture, and he gathered from that memorial that something like the foreign system of supervision or control should be adopted here—a course which was recommended to the House of Commons in 1869. Such a committee or council of taste should be permanent, and selected totally irrespective of party politics. It had also been before recommended that models and designs of any public buildings or works proposed to be executed should be prepared and exhibited for the approval of the public and the House of Commons before being executed in brick and stone. If this suggestion as to models, &c., were acted upon, and if there were to be established such a body as suggested by the memorial, composed, for example, of the Presidents of the Institute of Architects, Institution of Civil Engineers, and Royal Academy—would any one attempt to maintain that the present haphazard, happy-go-lucky, and ramshackly state of things would be tolerated? He thought not, and this he said in the presence of his hon. friend Colonel Hogg, the Chairman of the Metropolitan Board of Works. With reference to the proposed removal of Northumberland House, he might remark that the evidence of the late President of the Institute (Mr. T. H. Wyatt), of Mr. E. M. Barry, and of Mr. Hardwick, had had considerable weight with the Committee, and he was convinced that great good would result from the memorial which had been drawn up by the Institute. It had already had the effect of getting in "the thin end of the wedge," and he hoped that in future, when any questions arose affecting the architecture and beauty of the metropolis, the Government would consult such able professional men as were to be found in the ranks of the Institute. Upon art matters the House of Commons was, he believed, as a whole, most properly very diffident in pronouncing an opinion, although a few of its members had very eccentric notions of their own, and he believed the House would be entirely in favour of a council of advice being established in the manner suggested in the memorial, and that the House would gladly avail itself of the advice of such a body.

Sir GILBERT SCOTT, the President, proposed the next toast—"The Visitors." Had the First Commissioner of Works—who, he thought, had been rather harshly dealt with by the preceding speaker—been present, he should have been able to divide the visitors who were in authority into two classes—those who represented the Executive Government, as Mr. Ayrton, and those who, like Lord Elcho and Colonel Hogg, represented the great authority of all—the House of Commons, Colonel Hogg being, in addition, the representative of local authority as manifested in the Metropolitan Board of Works. In the absence of Mr. Ayrton, he would not venture to say more than that in all ages of the world the architectural remains of preceding periods had represented the art and civilisation of those periods to those who came after, and he must express his hope that the House of Commons and the Metropolitan Board of Works would take care that the architectural and other works which they called into existence worthily represented the nineteenth century, so that our successors might form a correct judgment as to the art of this period. Another class of visitors included the President of the Royal Academy (as the representative of Art generally embracing painting, sculpture, and architecture); Sir John Gilbert, as another representative of art; and Mr. Hawksley, as the representative of constructive skill. He earnestly hoped that those who, like Mr. Ayrton, were in authority, would resolve that the architecture and art of this country should be handed down with honour and glory to future ages. With the toast he begged to associate the name of Colonel Hogg, Chairman of the Metropolitan Board of Works.

Colonel HOGG, in reply, said he was sure he spoke in the name of all the visitors when he said that they had spent a very pleasant evening, and would not be slow to avail themselves of any future invitation with which they might be favoured. He had great pleasure in proposing what he considered to be the toast of the evening viz., "Prosperity to the Royal Institute of British Architects" (applause), and cordially as that toast would be received, it would be much more cordially responded to when he coupled with it the name of the distinguished President of the Institute, Sir George Gilbert Scott (applause), a man who had made the name of British Architects famous throughout the world, almost,

and who had devoted his genius and talents to the great and glorious work of restoring to their pristine state of beauty those great and ancient fabrics, those magnificent abbeys and grand old cathedrals, which were erected by the piety of our ancestors to the honour and glory of God. Great and noble were such works for any architect to be employed in; and what would the people of this country do, as civilised beings, without architects to erect their dwellings? Why, they would have to wander over the fields, like Bedouins! There was one peculiar connecting link between architects and the Board which he had the honour to represent: It was the function of the Board to see where improvements could be effected for the benefit of the citizens, and it was for the architect to carry out those improvements with a due regard to beauty and economy, and, also, with a due regard to ancient monuments. In reference to the tilt he had had with his hon. friend, Lord Elcho, respecting the removal of Northumberland House, he might be allowed to say that with the constitutional feelings with which he was animated, he would never allow any one to lay a sacrilegious hand on any old monument, except the public convenience absolutely demanded such a sacrifice. The evidence given by architects with regard to the proposed new approach to the Victoria Embankment had great weight, and a clause was inserted to the effect that the elevations for the new street should be submitted for the approval of the Council of the Institute; but he believed that clause was utterly unnecessary, and that it was put in with very little consideration. However, the Board would loyally carry out the clause, and he was sure that any proposal which was brought before the Council would be fairly and liberally considered. (Hear, hear.) His Board had an able officer in the person of its Superintending Architect (Mr. Vuliamy), who was a Fellow of the Institute and an ornament to the profession, and no doubt if he lived long enough he would one day occupy the distinguished position of President of the Institute. It would not ill-become him (the speaker) to take this opportunity of paying a last tribute to the memory of a valuable colleague of his at the Metropolitan Board of Works, and who was also one of the earliest and most distinguished members of the Institute (Sir W. Tite). Though differing in politics, and sitting on a different side of the House of Commons, he could not help saying how deeply he deplored the loss which the nation had suffered. He was glad to find that the number of the Institute's members was increasing, and hoped that they would continue to increase, and that the Institute would be able to render valuable assistance to the Government and local bodies upon all questions connected with architecture and public improvements. Having both engineers and architects under him in the service of the Metropolitan Board, he looked upon the latter body as a sort of connecting link between the two professions, which he should be pleased to see more closely united. Colonel Hogg concluded by giving the toast "Prosperity to the Royal Institute of British Architects," coupled with the name of Sir G. Scott, which was enthusiastically received.

Sir GILBERT SCOTT, in responding in the name of the Institute, said, he was not the President when the question of Northumberland House was brought forward, and could not offer any decided opinion upon the matter, but he was bound to say that we had already too few public buildings to bear the loss of even one of them, unless imperatively required. He would therefore destroy none, except from absolute necessity. He should like to say that whatever faults the Government had committed in reference to the public works of this country, they were not all to be attributed to the present First Commissioner. For instance, he believed that Mr. Ayrton was in no way responsible for the architecture of the new Post Office building. Personally, he must say, that he was indebted to Mr. Ayrton for many acts of courtesy and kindness.

Mr. F. P. COCKERELL (Hon. Sec. for Foreign Correspondence) proposed the last toast of the evening, viz., "Success to the Kindred Architectural Societies, particularly the Architects' Benevolent Society." He was very imperfectly heard, but his remarks were understood to be an acknowledgment of the work which the professional societies in the provinces had done, and were doing, in promoting the study of architecture and the advancement of æsthetic knowledge. In conclusion, he ably pleaded the cause of the Architects' Benevolent Society.

Mr. E. TANSON, on behalf of the Architects' Benevolent Society, acknowledged the toast, and expressed the hope that those who had spent so enjoyable an evening would not forget the claims which the Benevolent Society had on the profession. Applications of a most distressing nature were constantly being made and only partly relieved, owing to the paucity of funds.

Mr. EWAN CHRISTIAN warmly advocated the claims of the charity, and remarked that the lukewarmness with which it was supported was a disgrace to the profession.

The PRESIDENT having expressed the hope that every one present would subscribe according to his means, the party broke up at about half-past ten o'clock.

THE PROPOSED TITE MEMORIAL.

By SOLOMON SET-SQUARE.

SOME years ago one might see in our public journals the momentous question, oft repeated, "Shall Cromwell have a Statue?" We blush to own our present ignorance of what ultimately was the solution of that question. Our purpose at present is to speak, not of that sturdy "Lord Protector" of the realm, but of a smaller notability, lately taken from our midst—the antepenultimate President of the Royal Institute of British Architects: we wish we could by any means curtail his title, which is surely a little too sonorous and specific.

But, the late Sir William Tite was something more than a P.R.I.B.A. He was, as many of our readers must remember, an influential Member of Parliament, always sure of his seat; and (therefore, we suspect) a Knight and Companion of the Bath. He was, moreover, a respected member of the Metropolitan Board of Works, and eke a Middlesex magistrate. We might go on to name the many scientific societies of which he was a member, and the many Insurance and other companies of which he was director or chairman; but, for the purpose of our article, it will be sufficient for us to remember the late Sir William Tite in his triple capacity as a practising architect, a prominent member of the Institute, and a Middlesex magistrate.

Sir William was doubtless a very successful architect: he successfully erected some public edifices—which is *nothing*; but, he succeeded in realising a handsome fortune by the practice of his profession—which is *something*. Any architect nowadays can erect public buildings, by the score; but (as we shall presently show) not every architect can realise a competency by the operation. Looking at the comparative paucity of Sir William's public buildings, the wonder is how he made a fortune at all. The natural inference is, the lucrative nature of his career consisted—not in the raising of public edifices, but—in that species of practice, as a building-surveyor and valuer, which in our time the Institute, over which the deceased C.B. presided, has done so very much to discourage, if not to actually destroy, as an honest means of making a living. For, what did Sir William build? We have a tolerable acquaintance with modern works, and their designers; yet we are unable just now to call to mind more than half a dozen public edifices of any consequence, for which we are indebted to the pencil—shall we say the pencil? Well, the pencil—of the deceased architect. He built the Royal Exchange, with its Corinthian portico, chiefly remarkable for its ample proportions, and for its feebly composed sculptured pediment, so inferior to that of the Mansion House it faces. He built also an earlier work—the eccentric Edward Irving's church, near Regent-square, Gray's-inn-road, a very commonplace galleried structure, much admired in its day for its stone street façade, with its two flanking towers, copied in miniature from no less ambitious a prototype than the west front of York Minster. The whole façade might, we daresay, be pushed somehow through the west window of the famous Yorkshire fane; but, as the conventional robber says in the play, "no matter." Sir William erected also some railway stations

"On t'other side of the water,"

and a country church in the Italian style, near Uxbridge, which the writer of an article, on the High Wycombe coach, told us a few months ago looked like a railway station. Singularly enough, the wicked criticism on this church, and the notice of its architect's demise, appeared in the same number of our contemporary, the *Standard*. We have never seen the edifice, so it may be as well

to dissociate ourselves from all complicity with the writer, holding (as we have good reason to do) a somewhat low opinion of the architectural criticism aired from time to time in the daily papers. The structures raised by the deceased architect were, however few in number, far from being altogether destitute of merit: they were all infinitely superior to the tame productions of Sir Robert Smirke, if not to the more daring efforts of his eccentric contemporary, Sir John Soane. Such, however, as they were, they give token of no very formidable strides in art, but leave architecture pretty much in the state it was when Sir William first began to cultivate it. As a great artist, therefore, we fail to perceive any reason for rendering him posthumous honour by the erection of a statue or other memorial.

As an architect-magistrate and President of the Institute, our review of Sir William's career must perforce take a positive, rather than a negative, shape. Remembering him in this dual capacity, we see, not only how little of active good he effected for the welfare of the profession he belonged to, but how much of passive evil he failed—or more strictly speaking, neglected—to avert from his brethren. As President of the Institute he was certainly a party to the schedule of professional charges drawn up, printed, and circulated by that body. Conspicuous in that schedule was an assertion of the customary architectural commission of 5 per cent. on outlay; a commission which Sir William, with other architects, had been receiving from time immemorial, without, as far as our own acquaintance with architects demonstrates, the manifestation of very inordinate wealth as the happy lot of the fraternity. Very few architects indeed have accumulated large fortunes by their traditional time-honoured commission of 5 per cent. As a rule (especially when we consider their known hard application to business), they are a poor class of the community. We could narrate some very distressing episodes of the struggling career of very many worthy members of the profession, justly eminent in their day. Well: in days very recently gone by, when Sir William Tite sat veritably "*in cathedra*" (or, *in cathedras*) as Institute President and Middlesex Magistrate, it occurred to a worthy member of our metropolitan bench that *architects were growing altogether too wealthy, or too well-paid for their services*. Architects have, indeed, an unhappy knack of walking about with their gloves on; and, we make no manner of doubt, the intelligent county magistrate, with possibly little or no acquaintance with the craft, marvelled, as many others have done, "what-ever architects found to do:" any way, the perceptive J.P. gave notice that, on a certain day, he would move that henceforth the members of the craft who might be employed for all time under the Middlesex magistracy should, unless the cost of the work were within the vast sum of one solitary thousand pounds sterling, no longer receive the exorbitant commission of 5 per cent., but should be paid by a sliding scale, 4 and 3 per cent., as the case might dictate.

At this time, Sir William Tite was President of the Royal Institute of British Architects. As a Justice of the Peace, he would certainly receive plain printed advertisement of what was coming on at the ensuing meeting of his brother magistrates; we never heard that he, as a Justice of Middlesex, nor the Institute, of which he was, not only Fellow, but President, moved a finger in the matter; and, consequently, the precious sliding scale we have just described became, on the prescribed day of meeting, *nemine contradicente*, "Justices' justice" for all architects who, from that day forth, may take suit and service under the magistrates of Middlesex. Sir William Tite, in fact, in his capacity of Middlesex magistrate, must always go down to posterity as one of the sapient concoctors of that very injurious measure. We call it an "injurious measure," for we have no desire to insinuate that the 5 per cent. commission ordinarily received by the late Member for the City of Bath was at all, to his knowledge, an extortionate charge to his clients.

Sir William was doubtless a useful senator, and an amiable man in private life. In these capacities we have never heard a word to his disfavour. Sir Charles Dilke has, we learn, promised £100 to the contemplated subscription for the Tite Memorial. This is all well enough, but, as to Sir William's claim on the veneration of architects, we quite fail to see it. We should say of him, in all charity, "*Requiescat in pace*," for he achieved in a long life very little for architecture, and, as we have shown, worse than that little for architects.

OUR LITHOGRAPHIC ILLUSTRATIONS.

PALACE ON THE GRAND CANAL, VENICE.

We give a perspective view of a mansion erected for the Countess Marioni de Verone, in one of the most beautiful situations on the Grand Canal, which divides Venice. Two façades of the building face the canal, and the regular disposition of their parts cannot but command notice. The decoration is all in terra-cotta, except the ground floor, which is covered with Verona marble—which is better calculated to resist damage from the barges which ply on the canal. The older part of the building at the back is masked by a garden, which adds to the beauty of the building, and affords facilities for the summer fêtes in which the Venetians delight.

S. PATRICK'S CHURCH, SOUTH KENSINGTON.

We give perspective, interior looking east, and interior looking west (double page), and plans of basement, triforium, &c., of S. Patrick's Church, Cromwell-road, Kensington, which is about to be erected from the designs of Mr. Henry Conybeare, architect. The original drawings form a portion of the Royal Academy Exhibition this year. Not having received the necessary data from the architect in time, we are obliged to postpone giving a description of this beautiful building till next week.

VISIT OF THE ARCHITECTURAL ASSOCIATION TO THE TOWER OF LONDON.

THE last of the Saturday afternoon visits of the members of the Architectural Association to works in progress or buildings of interest was made on Saturday afternoon last, to that ancient and historical structure, or rather group of structures, known as the Tower of London. It was announced that Mr. Thomas Blashill would, as on the occasion of the Association's visit to the Tower five years ago,* describe the architecture of the building, but somewhat unexpectedly the visitors were met at the lodge by Mr. W. Hepworth Dixon, F.S.A., author of "Her Majesty's Tower," &c., and by the tacit consent of the visitors, that gentleman acted as guide in place of Mr. Blashill, who, having previously accompanied the members over the interesting congeries of houses, towers, and prison-like edifices which go to make up what is known as "the Tower of London," said he had nothing new to say. Mr. Hepworth Dixon, as he conducted the visitors over and around the buildings, recalled most graphically a few of the many important historical incidents connected with the Tower, saying comparatively little as to the archaeology of the place. It may be stated that the party was an inconveniently large one, which prevented the interiors of several of the most interesting portions of the buildings from being visited, unless with great delay, for which there was no time to spare, although the visitors spent nearly three hours within "London's fortress." The visitors were first conducted by Mr. Hepworth Dixon on to the wharf or quay alongside the river, whence a good general view of the buildings was obtained. Mr. Dixon remarked that, as he was not an architect, and had so little special knowledge of architectural antiquities, he was afraid he should not have much to say that would interest the visitors as architects, although every stone almost of the Tower was replete with the most thrilling interest to the historical students of this country. The curious pile of buildings which they were then viewing might be said to be the outgrowth of three or four architectural periods, some of which were very widely separated from the others. The Tower of London was, as the intelligent architect and engineer could not fail to observe, a creation of art of a very remarkable kind. Beyond a doubt the Thames had formerly washed the base of the White Tower, or keep, which was by far the oldest of the whole group of buildings, and contained within its walls a most interesting and curious specimen of Norman architecture, lately restored, and known as S. John's chapel. All the ground between the White Tower and the river had been reclaimed, bit by bit, from the river. That portion of land which now forms the present wharf or quay was the last portion recovered from the tide (*temp.* Henry III.), and this work occupied fifteen years in construction, for, slowly as the work proceeded, by reason of the somewhat primitive engineering appliances

of the day, it was further hindered by being time after time washed away and destroyed by the tide, the scour of which was, and still is, very strong at this point. At about the same time the great barbican (of which the Water Gate or "Traitors' Gate" beneath S. Thomas's Tower forms the centre) was built. [Mr. Blashill here assisted Mr. Dixon by exhibiting and explaining a rough plan of the Tower.] Properly speaking, there was only one legitimate entrance into the Royal Ward or King's portion of the Tower, viz., that afforded by the gateway under the Bloody Tower. The Royal Ward included all the strongest portions of the Tower, and was surrounded by "The People's Ward," and the Kings of England never had the power to exclude the people from this portion of the Tower. On the site now occupied by some large warehouses for stores, Mr. Dixon said there once stood the "Great Hall," as it was called in the records. There were very few drawings of this building extant, but one very remarkable one, which had been recovered from Holland, and was now in the great "Gardiner Collection," showed this hall to be, on a small scale, almost a facsimile of Westminster Hall. Here were formerly held the sittings of the Court of Common Pleas, the Court of King's Bench being held in the White Tower, or Keep. The latter building was undoubtedly the oldest of the series of buildings known under the general name of "The Tower." It is greatly to be desired, as Mr. Dixon remarked, that the little church of S. Peter-ad-Vincula (which serves as the parish church for the residents of the Tower, and was formerly the chapel of the People's Ward, whereas S. John's Chapel in the White Tower was the Royal Chapel) should be restored in the same conservative spirit as had marked the restoration of S. John's Chapel, for it is greatly disfigured by the vagaries of Churchwardenism. Whether the White Tower, especially the lower part of it, was wholly Norman, was well known to be a moot question, and one on which there would always be differences of opinion. There were two theories as to this White Tower—the modern and generally-received theory being that it was built by that celebrated architect, Gundulph, Bishop of Rochester. But, on the other hand, there was a very great deal of ancient evidence—some of it most difficult to do away with, in favour of the lower part of this particular structure having been built by the Romans. In the first place, the old Saxon chronicles certainly mentioned a Roman fortress as existing on this spot in the time of Canute. Whether that Roman fortress was all demolished or not when Gundulph commenced building it was impossible to say, but the evidence afforded by the mortar seemed to be more conclusive. Norman mortar, Mr. Dixon believed he was right in saying, was essentially different in its composition to Roman mortar. In Roman mortar there was invariably a large admixture of pounded tiles and pebbles. In Norman mortar, on the other hand, there was never found any pounded tile whatever, very little pebble, either pounded or unpounded, and a great deal of sand. In the composition of the two descriptions of mortar there was such a difference that the architect could generally pronounce upon the age of a building by examining the mortar. Now it was a remarkable fact that the mortar of the substructure of the White Tower was Roman in composition. It was remarked that the arch of the Water Gate or Traitors' Gate had been restored comparatively recently. The present arch was certainly not the original one, which must have been of much smaller span. The Rialto at Venice was little more than the arch now spanning Traitors' Gate, and the Rialto was quite recent in date compared with the time of Henry III., who built S. Thomas's Tower. The Wakefield or Record Tower, otherwise known as the Middle Tower, was pointed out as next in point of antiquity to the White Tower, and was supposed to date from the time of King Stephen. In this tower was for four hundred years the private chapel of the kings of England, but disused as such after the murder of Henry VI. by the Duke of Gloucester. The national records were kept in this tower until seven or eight years ago, when the new Record Office in Fetter-lane was built; the State jewels or regalia are now kept here. Having visited the Bloody Tower, and the raised terrace adjoining known as "Raleigh's Walk" (from the fact of Sir Walter Raleigh having been allowed to pace up and down it when a prisoner in the Tower), the company proceeded to the Lieut-

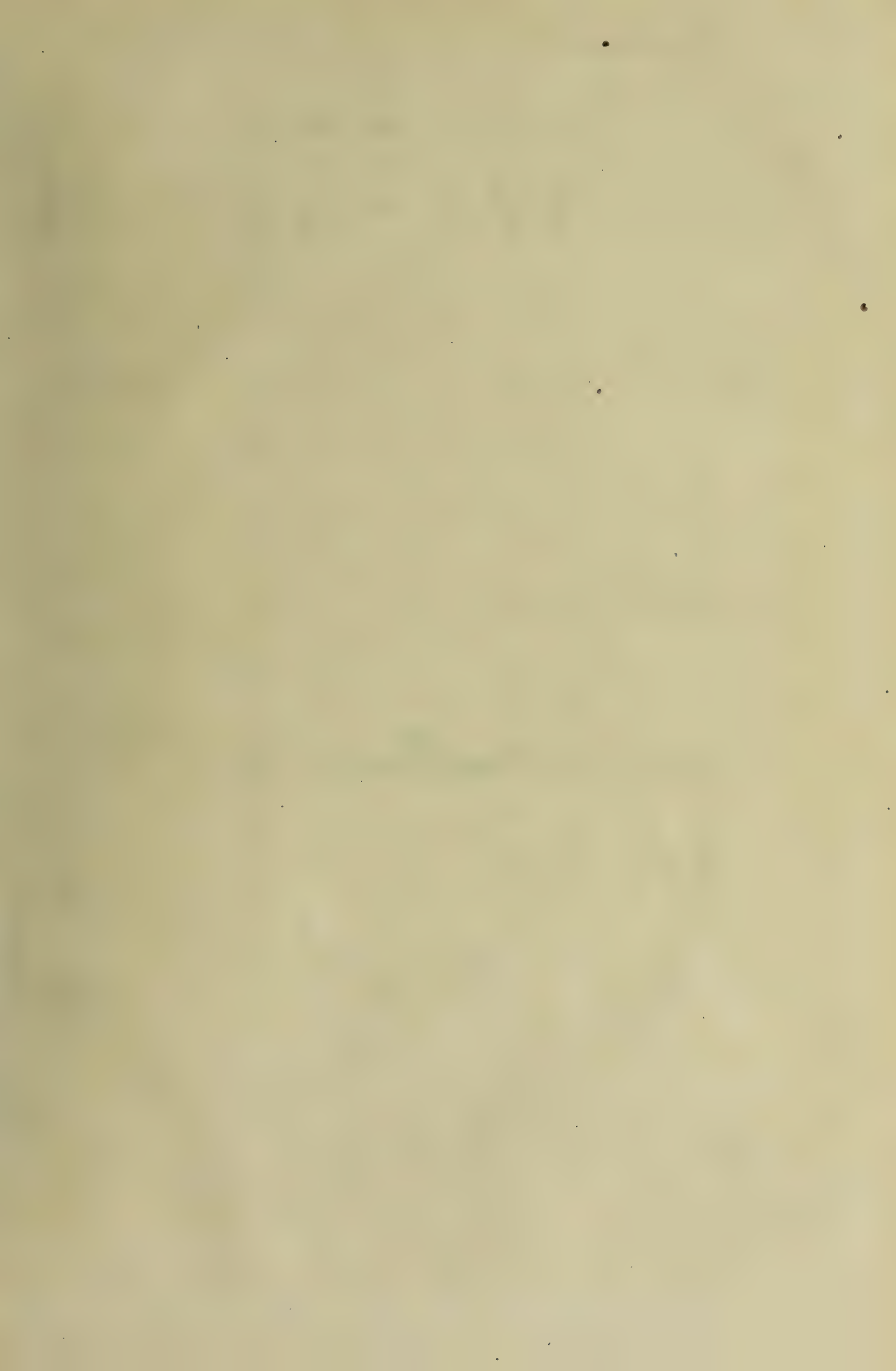
tenant's House, which dates from the time of Henry VIII, being an exceedingly good example of the domestic architecture of that period, and remaining materially unchanged. The King's Council Chamber and other apartments of historic interest in this house were next inspected by the visitors, who then proceeded to the Beauchamp, or Cobham Tower, and afterwards to the Church of S. Peter-ad-Vincula, which, as before intimated, would be all the better for judicious restoration, which could be effected at so moderate a cost that Mr. Dixon did not believe that even the present Chancellor of the Exchequer would demur to the outlay. The visit was concluded by an inspection of the armoury and the White Tower. The walls of that portion of the White Tower known as Queen Elizabeth's Armoury, were stated to be 13ft. thick. In the armoury Mr. Planché, F.S.A., an acknowledged authority on the subject, was awaiting the visitors, and he was just proceeding to describe some of the more remarkable specimens of armour when Mr. Dixon suggested that as all the members of the large party could not hear Mr. Planché, the party had better divide itself, those who preferred armour to remain to hear Mr. Planché, while those for whom architecture possessed superior charms would follow Mr. Dixon in an exploration of the White Tower. The effect of this request was to leave Mr. Planché with hardly a single listener. The Norman Chapel of S. John was much admired, and its restoration seemed to give great satisfaction. Only a few years ago the chapel was full of lumber and rubbish. Having ascended to the roof of the White Tower (which Mr. Dixon explained, although now covered by lead flats, was formerly a platform for heavy guns, the timbers being of unusual massiveness in order to support the weight), the peculiarities of the four angle turrets of the keep were pointed out, it being stated that the circular or north-east turret (the clock tower) was formerly used for the purposes of an observatory. After thanking Mr. Dixon for his courtesy in accompanying them over "Her Majesty's Tower," the visitors shortly afterwards left the fortress, this, the last of the Association's Saturday afternoon visits for the present session having been exceptionally pleasant and interesting.

THE OLD TABARD INN.

THE old Tabard Inn in the Borough, where nearly five hundred years ago Geoffrey Chaucer and the nine-and-twenty pilgrims lay, on their journey to Canterbury, was on Thursday last offered for sale by auction by Messrs. Debenham, Tewson, and Farmer, but the highest bid procurable for the premises and space of 29,000 feet which they cover being only £21,000, the property was bought in for the proprietors. The Tabard, which derived its name from a peculiar dress formerly worn by the nobles, but now only worn by heralds, changed that name for "The Talbot," by which it has been since generally known, in 1676, on the occasion of a change of proprietary or a renovation of the premises, when, according to Aubrey, "the ignorant landlord or tenant, instead of the ancient sign of the Tabard, put up the Talbot or Dog." Tabard or Talbot—one or both—it will soon be a memory instead of a monument of the past, unless the movement for its preservation, commenced by Lord Ronald Gower, in a letter to the *Times* on Friday last, is successful. His lordship observes that, "In any other country such a venerable and historical building would have long since been cared for by the State—it would have been converted into a place like the Hôtel Cluny, at Paris," and asks, "Is there not enough enterprise in this town to preserve such a landmark of old England from destruction?" Mr. E. M. Ward, R.A., suggests that if it is too late for anything more important to be done, the Government might at least become possessed of the timber of which the building is mostly composed, and that out of it might be reconstructed at least the galleries, &c., surrounding the inn-yard, to be placed in one of the public parks in the vicinity of the metropolis, either as a lodge or for any other suitable purpose. Thus one of the most ancient and interesting relics in England might not entirely disappear nor be carted away as rubbish.

The new church of S. Andrew, Bath, the erection of which is proceeding rapidly, will be consecrated on the 11th of September.

* BUILDING NEWS, June 19, 1868, Vol. XV. p. 414.



THE BUILDING NEWS. JUNE. 27. 1873.

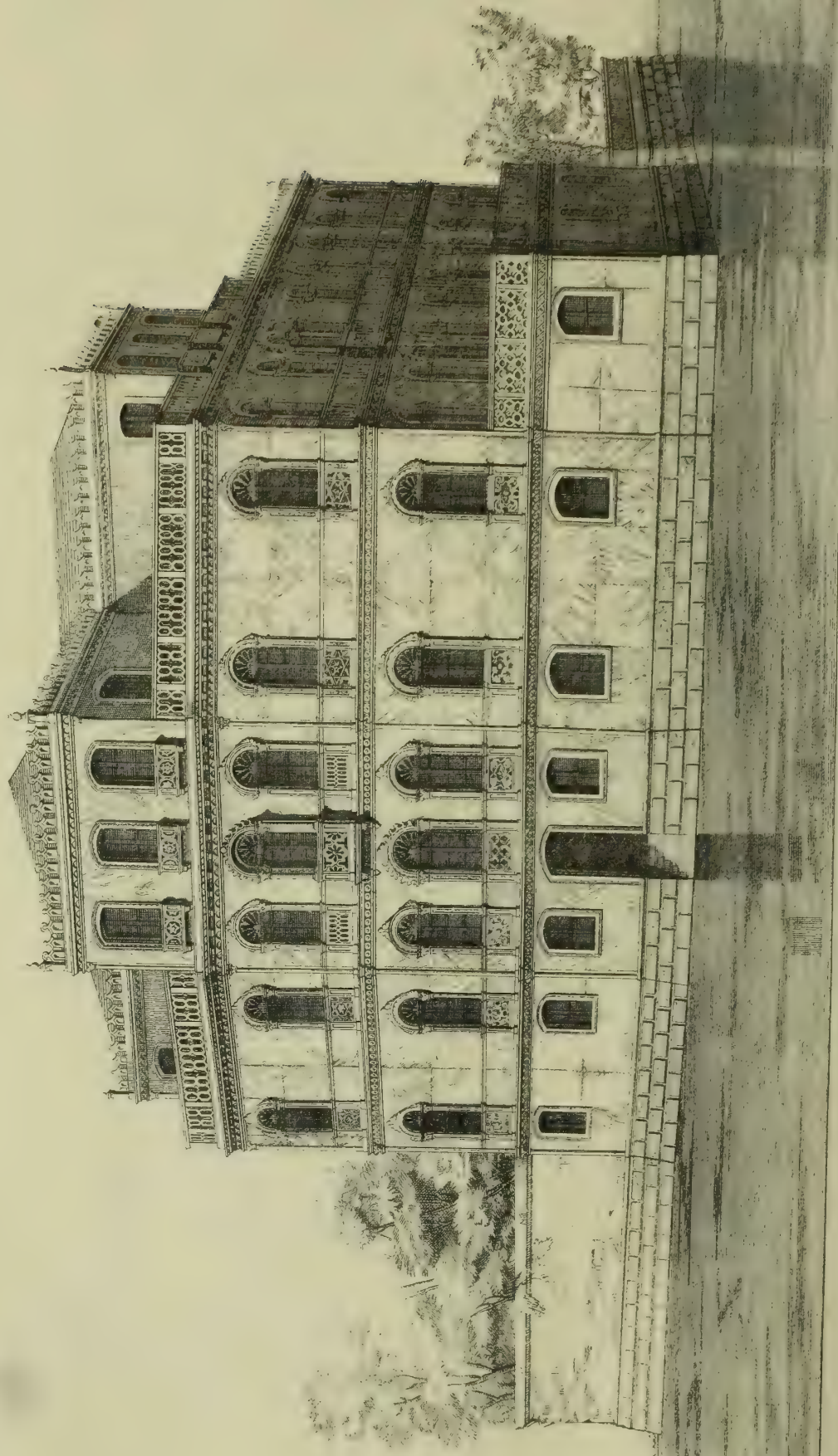
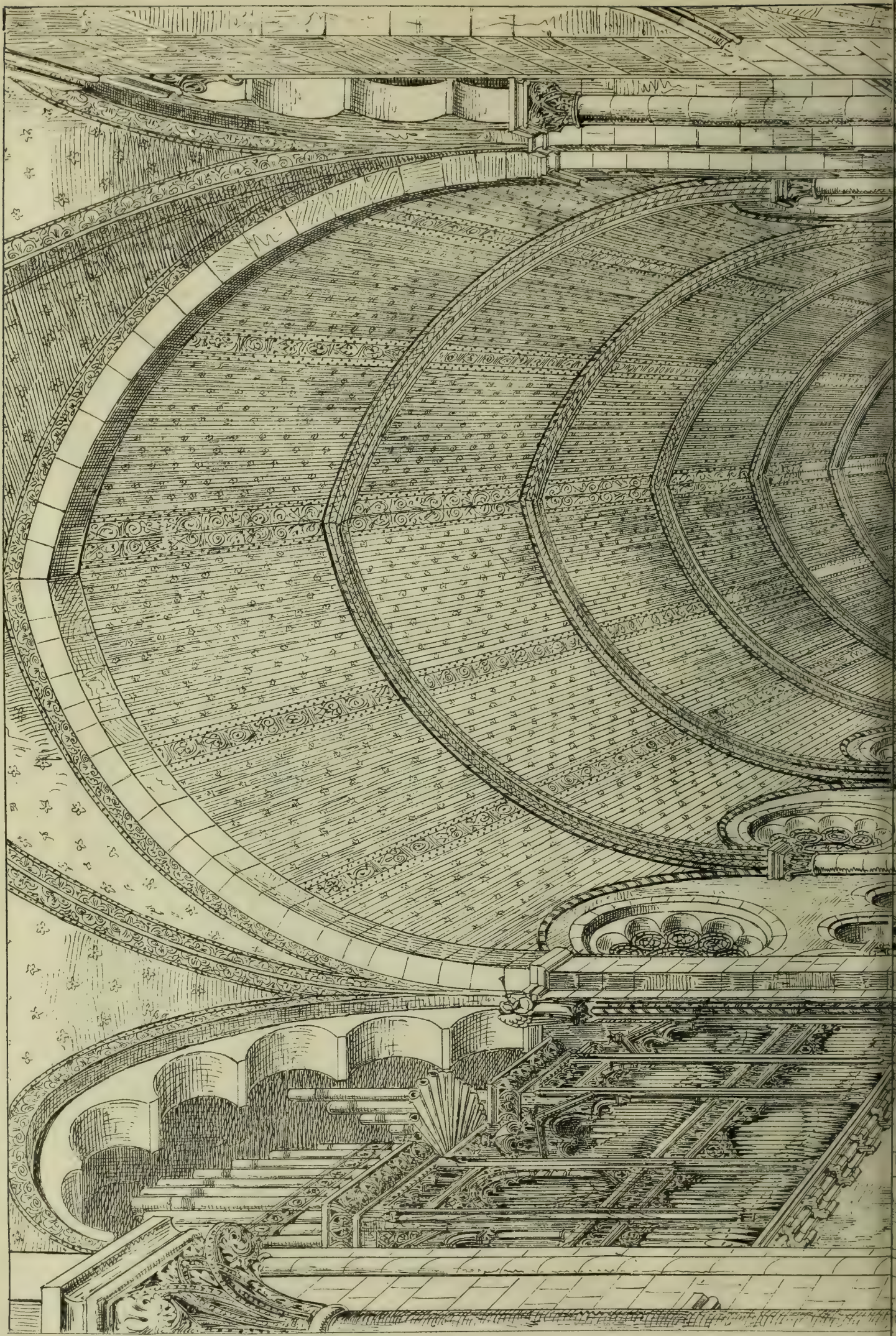


PHOTO-LITHOGRAPHED & PRINTED BY JAMES ABERNETHY, ST. MARTIN'S ROAD, W.C.

PALACE ON THE GRAND CANAL, VENICE.



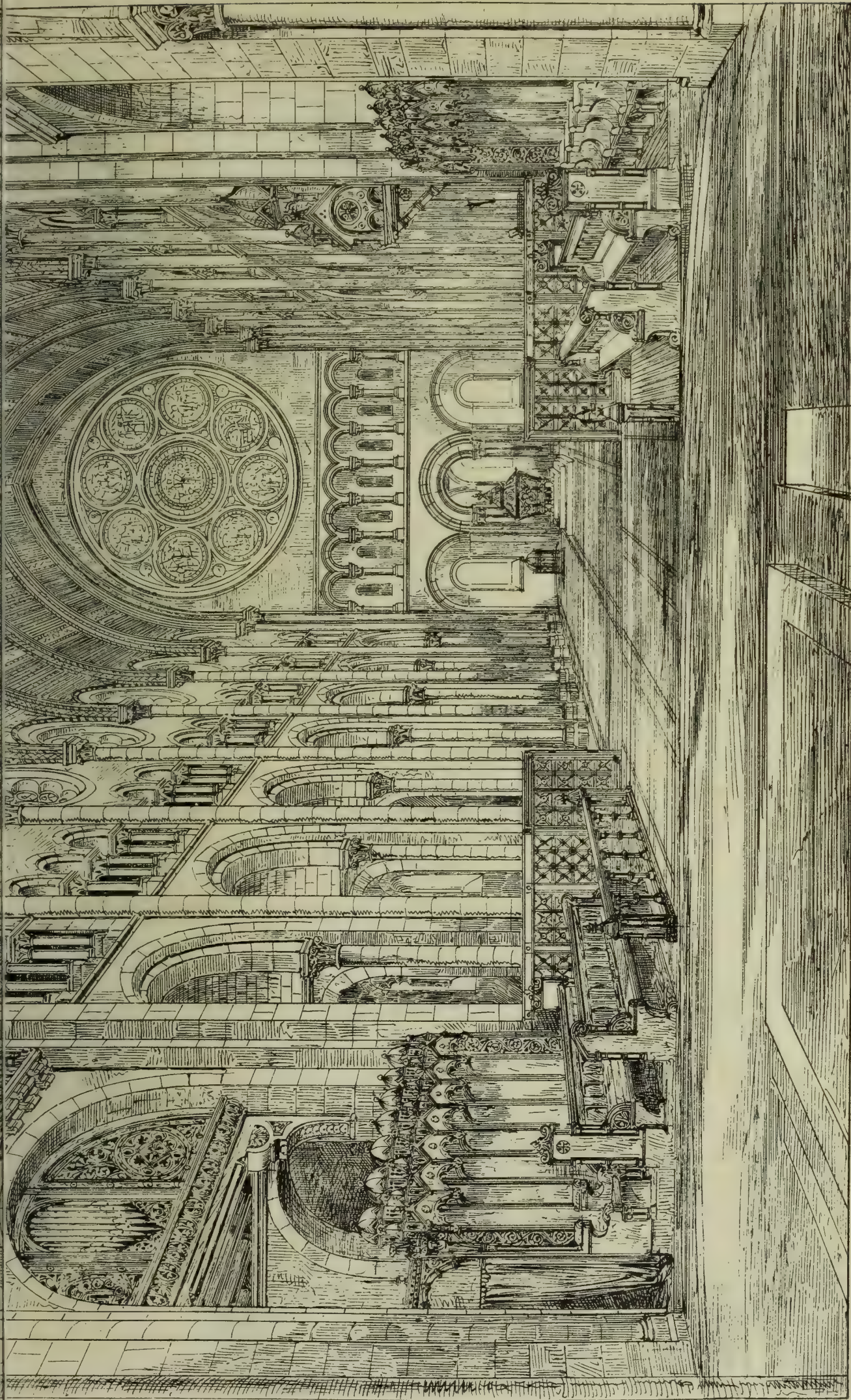


PHOTO LITHOGRAPHED & PRINTED BY JAMES AGERMAN, 31 GROSVENOR ROAD, W.C.

ST. PATRICK'S CHURCH, KENSINGTON.
INTERIOR LOOKING WEST, ——— HENRY CONYBEARE, ARCHT.

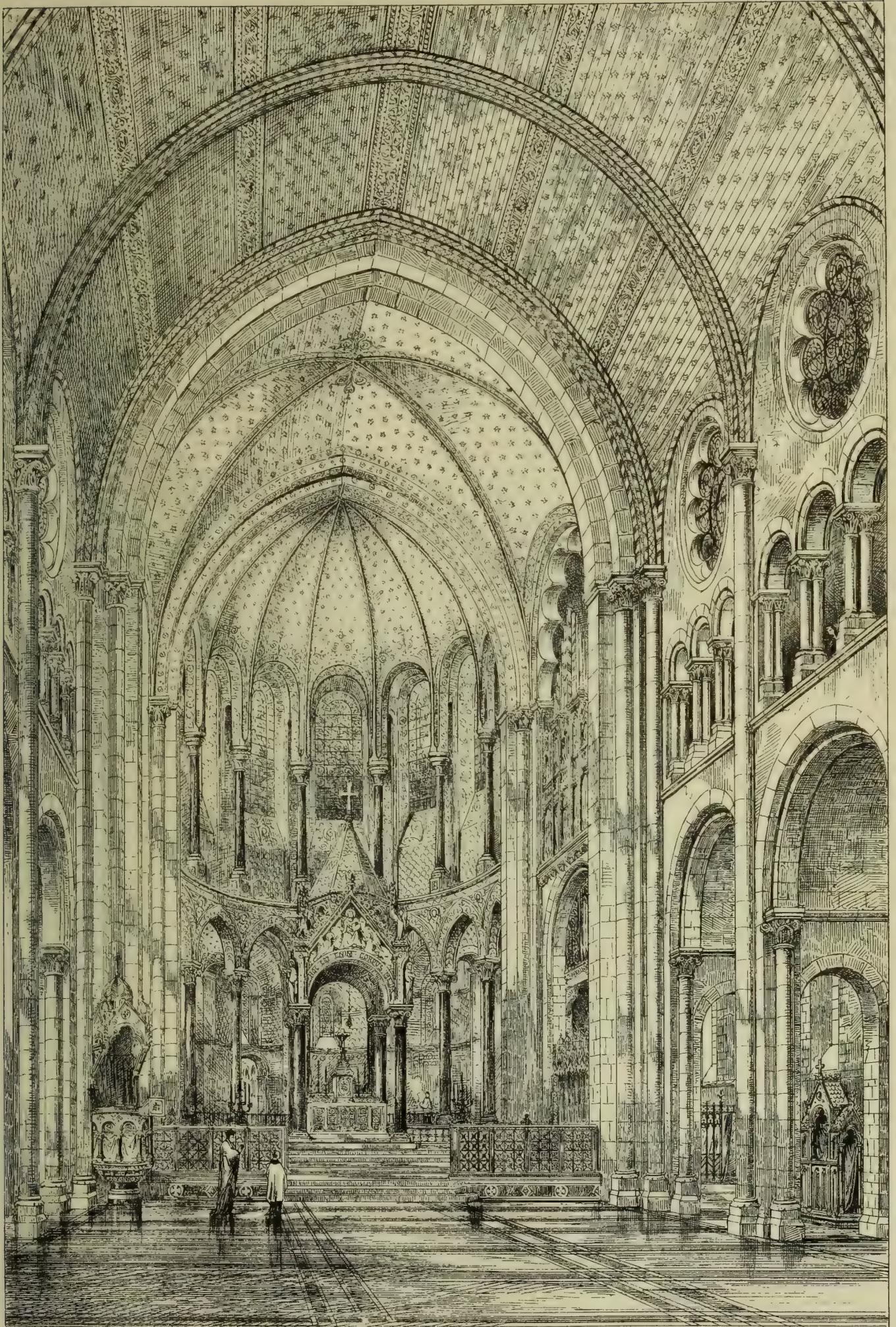
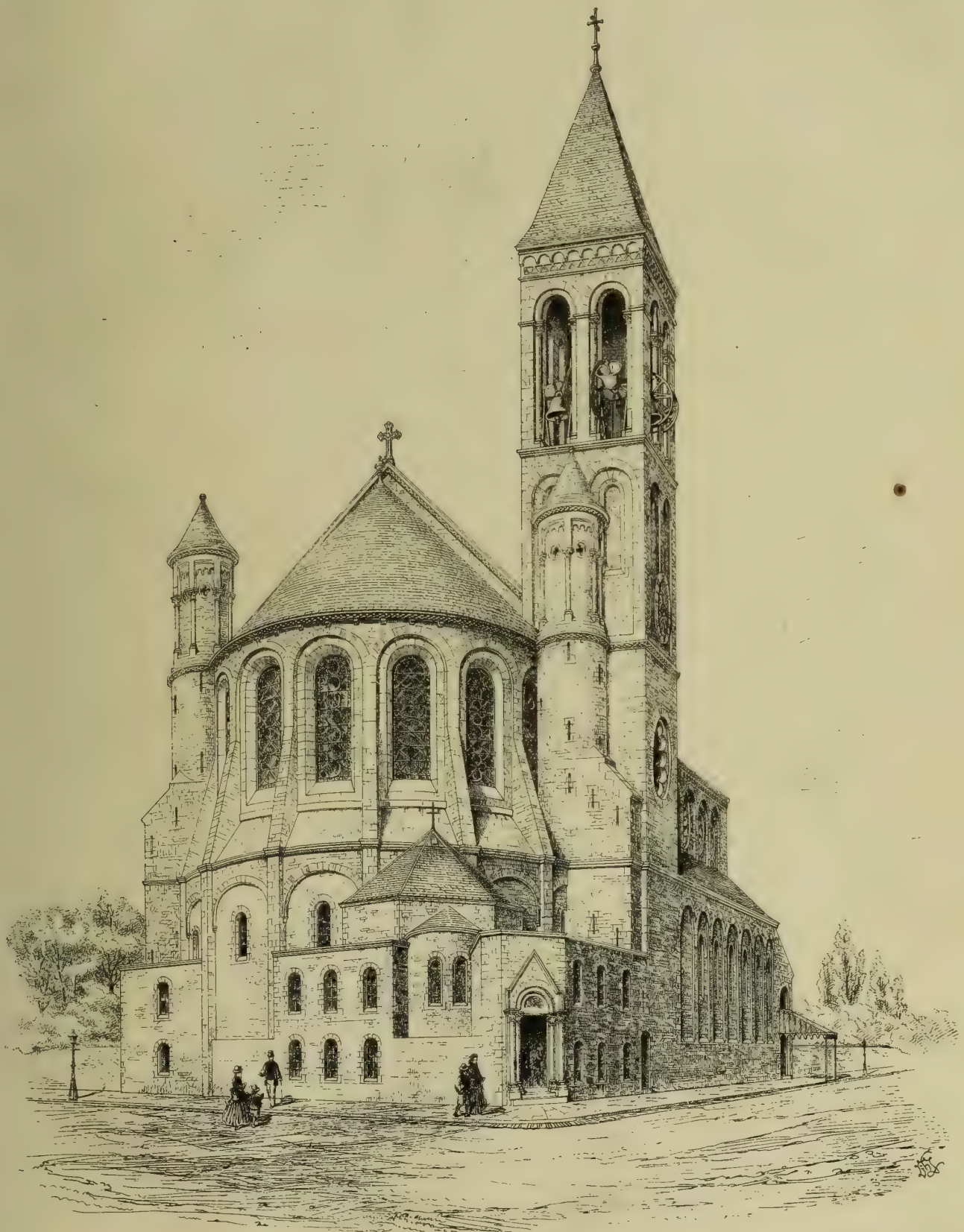


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ST PATRICK'S CHURCH, KENSINGTON.
INTERIOR LOOKING EAST, ——— HENRY CONYBEARE, ARCHT.



ST PATRICK'S CHVRCH CROMWELL ROAD KENSINGTON
AS IT WILL APPEAR FROM THE CROMWELL ROAD HENRY CONYBEARE ARCHITECT



HENRY O'NEIL, A.R.A., ON ART MATTERS.

ON Monday afternoon last Mr. Henry O'Neil, A.R.A., delivered a lecture in the Lecture Theatre, South Kensington Museum, on the Philip and Creswick Collection at the International Exhibition, and other subjects relating to art. After speaking at considerable length on the merits of the Philip and Creswick Collection, the lecturer said:—If the progress of art were to be estimated by the prosperity of its professors and the interest universally taken in all things pertaining to its advancement—then, indeed, its present condition must be regarded as very flourishing. But the quality of a work must not be measured by the price it will fetch, even in a public sale. The love of luxury, the desire to work less and to gain more, so prevalent at this time, ever acts most perniciously on those whose first object should be to attain fame, and who should let fortune ever follow and not be pursued. One great evil has arisen from the present prosperity of art. Its ranks are daily swelled by recruits who have not been even moderately educated for the practice of their profession. For this evil our public critics are chiefly to blame. They have preached the pernicious doctrine that technical excellence is of no importance so long as a work betrays genius, forgetting that for the development of genius an adequate power of expression is required. A genius is a noble sight; but a stuttering or un instructed genius, if not an object of ridicule, is one deserving of pity. Thus it arises that our exhibitions betray an amount of negligence, inexperience, slovenliness, and audacity, which cannot be satisfactory to any one who is interested in the real progress of art. Without endorsing the crude and conceited opinions put forward by a writer in the last number of the *Quarterly Review*, I feel bound to say that the present condition of art is neither healthy nor sound; nor until we return to the sober ways pursued by all those who have hitherto attained an illustrious fame is there any hope for the progress of art. Much of the slovenliness and incoherent rendering so painfully apparent in our present Exhibitions is due to the influence of French art. In all that relates to the progress of art I am perfectly cosmopolitan in my views, but unless reason is exerted in selection that influence can only thwart the object in view. Moreover, not only does the prevailing desire to attain swiftly a desired end affect our established painters, but their example is highly detrimental to the rising generation of artists. It leads them to paint before they can draw the commonest object correctly—and they naturally will be led to imitate what, at its very best, is but the result of long experience. I advise students in art who are here present, above all, to be thoroughly conscientious in all they attempt to perform, and to be ever earnest, industrious, careful, and patient, during their educational career; for, trust me, no amount of labour or repentance in later life will ever atone for early negligence. Never be deterred from that path which has ever led to real greatness by hearing your works denounced as common-place. My present experience leads me to observe that if any work is produced in defiance of all established rule, that work is declared at once to be an effort of genius. But genius must be shown by the effort of the worker, and not by the capricious fancy of critics. Fully endorsing all the value which Mr. Froude, a few weeks ago, attached to the Press, I cannot help saying that art can never thrive in a state of agitation, wherein any public writer can pronounce sentence without the verdict of a jury. Such agitation is the work of the public press. At the last dinner of the Literary Fund, Mr. Gladstone, after acknowledging its power and its utility, alluded to its evils. "But," said the right hon. gentleman, "we know that the Press is not infallible, and divergence of opinion corrects these evils." Such a system may be beneficial in political matters, but it is detrimental to the progress of art. We are all patients, in a broad sense, and with common sense we seek for good advice where we hope to find it, though in most cases our innate weakness or strength generally sets it aside. But supposing a patient, in the real sense of the term, finds a hundred doctors around him, all prescribing different courses of treatment, he would say, "I will trust to nature alone;" and thus, thanks to the times they lived in, old masters became great painters. Italian art, German art, Spanish and Dutch art, did

flourish without, whilst modern art has visibly declined under, such inexperienced dictation. Happily, common-sense, though slow, upsets all ephemeral reputation. If you can believe this, you need never despair of receiving a full reward for your labour and patience. To feel that you have, at least, striven earnestly to do your duty, that you have performed your allotted work to the best of your ability, never taking advantage of the general haste and ignorance to palm off slovenly workmanship—therein lies the road which will lead you to a fame of which you may well be proud, and to a fortune the possession of which need never raise a blush.

I have lately shared the duty of examining the works sent up by the Schools of Design established happily throughout the United Kingdom. I must confess that the duty was irksome, but I shall never feel regret at having performed it, for it has enabled me to thoroughly appreciate the value of those schools. I cannot however discuss this subject without paying my tribute of admiration for the work which Mr. Cole and Mr. Redgrave have performed so successfully; and I tell them, from experience, that every artist I have spoken to cordially agrees with me on this point. Mr. Cole has the good or bad fortune to be called the best-abused man in Europe. He is accused also of a contemptuous disregard of public criticism, his detractors forgetting that his shortcomings in that direction constitute his chief virtue. Like the hero in the *Arabian Nights*, he has toiled up his mountain, undeterred by the stones thrown at him, and I wish sincerely that all who work for fame would treat the stones thrown at them in the same way. From what I have seen during the last six weeks I think he may justly smile at his opponents. I should take up too much of your time were I to enlarge on the good the Schools of Design have effected; I will confine my remarks to the one great benefit acquired through their agency. No amount of loud-talking or shouting about Great Britain's supremacy can ever disguise the truth that, as regards taste as applied to manufactures twenty years ago we were far behind Continental workers. That deficiency is now a thing of the past. I have seen lace designs from Nottingham, patterns from Manchester, ribbons from Coventry, applications of natural forms from many schools, and thorough good work in most schools, which might compare well with any foreign work. In the more difficult study of the Antique I have seen drawings of figures which would be very formidable in any competition with the students of the Royal Academy. Moreover, I have seen in elementary work such conscientiousness as well deserves a word of praise. I will mention no names; but in examining work from the school at Huddersfield, only of one year's duration, we were astounded by the efforts of one pupil, only eighteen years of age. She contrived in that one year to send up, counting books of elementary drawings, no less than ninety works. In each of the nine stages she attempted, every drawing was so conscientiously carried out that I am sure the examiners would have only been too glad to have sent up all her works as a good example for students to follow. I would ask, with all due deference to those gentlemen who have more practical experience of the Schools of Design than I can have, whether it would not stimulate the efforts, both of the masters and pupils, if, in the national competition that takes place annually, a worthy prize were given to that student who produces the most complete works during the year. I believe such an inducement to industry and care would be productive of good results. I know men of great capabilities who lament that in their youth they slighted the proper duties of a student, and hence they still stumble in their efforts, not only with waste of time, but with comparatively little ultimate success. Ambition is the ladder of greatness; but I pray you not to enter an advanced stage in your educational progress before you have well mastered the one in which you are engaged. The more perfect you are in one stage, the easier you will find it to overcome the difficulties of each next step to progress. I have gladly paid testimony to the good work done in the Schools of Design. I should be unworthy to address you if I did not say a word about the bad work. Generally oil paintings betray a fatal error. Hopeless is the progress of any student who begins deliberately from that point to which great painters unwillingly descend. Learn to

creep before you try to walk; to be proficient you must be efficient. The adoption of a manner by imitation, and not through experience, is fatal. So let me pray you never to commence a new work before you have expended all your ability on the one you have in hand. Believe me, you will ever gain more by correcting your errors than by any resolution to amend them in future attempts. Such patience and care will produce that tone of mind, and promote that honesty and true courage, which are essential to attain success. The scales of art are very different from the scales in common use, and one complete drawing will weigh down cartloads of incomplete work. Finally, let all your attention be directed to the means, and the end will come in its appointed time.

Before I conclude, I wish to call your serious attention to a question which I trust will always be discussed calmly, for the intellectual condition of a nation, especially in art, should never be made a subject for any sectarian agitation. This is not the first time, by many years, that I bring this subject publicly forward; but I regret to have lost a worthy colleague. Some years ago, Mr. Gregory—then member for Galway, and a trustee of the National Gallery, but now a colonial governor—introduced a Bill for the purpose of opening collections of Art and Science on Sundays after one o'clock. Unfortunately a count-out put an end for the time to any discussion on the merits of his proposal. But we are "eminently a practical nation," and one moreover that never succumbs under momentary defeat. I have alluded to our inferiority in taste as regards designs for manufacture. Much of our deficiency has been remedied by the Schools of Design; but our artisans still labour under great disadvantages when compared with their foreign brethren. If we turn our attention to Continental States, we find that collections of Art and Science are not confined to the capital only, but exist in every hive of manufacture. Moreover, whether the State religion be Catholic or Protestant, those sources of innocent pleasure and of moral intellectual improvement are open freely on a Sunday—that day which throughout Europe is recognised as the "working man's holiday," or day of rest. Yes, by all means let it be a day of rest, as far as the labour of the hand is concerned; but as to the mind, inactivity is simply impossible; and our chief care should be to provide such food for the mind as may conduce to its health and strength. The Creator allows no day or hour to interfere in the beneficent labour of nature to supply the wants of the body; and it is simply perversity or blindness which prevents us from reaping what He has planted in man to satisfy the wants of the mind. Our worship is best revealed in gratitude, which springs from a due appreciation of everything created for our welfare; and of the Creator's gifts, human genius is the highest—a spark, however feeble, of the Divine Intelligence. So let our rulers decide whether a working man—reluctantly I use that title in its narrow sense—would not be better employed on a Sunday afternoon in contemplating the productions of art and science than in idly lounging against the door of a public-house, with a wistful eye on the church clock opposite. Though I am no ruler or statesman, I have no doubt on that question, for I believe the surest way to make the opening of the public-house ineffectual is to open other places on Sundays, if only during the afternoon, which would offer more profitable and wholesome amusement.

I put this serious question to you, as I have often put it to others, with a hope that in regarding it you will divest yourselves of that prejudice which clings to all men, whatever may be their creed. Let us look broadly to the end, and not narrowly at the means, nor believe that what improves man socially and intellectually, can be profane. Pulpit denunciations and legal restrictions are but poor means to promote the general welfare. Weak men may mourn that human nature is not so perfect as they would wish; but their lament betrays an ignorance, if not a contempt, of the Creator's great design. Your true philosopher and philanthropist—in a word, your real Christian—accepts humanity, created as it is, with capacity for good or ill, and strives, by appealing to its natural feelings and instincts, to lead it in a right direction—even as children, to apply a homely simile, are coaxed to learn the alphabet from looking at pretty pictures. Let us follow some similar method to improve the moral and intellectual state of our

fellow-creatures. Above all, let us not think that any day can be unfitted for the performance of such a noble and holy duty.

And now to conclude. Do not think art a mere luxury. The mind requires food as well as the body, and so art is a pure necessity. To you who have children under your care, I pray you to encourage any bias they show for Art. For, believe me, whatever may be our position in life, the love and study of art will all the more enable us to perform that duty, which I regard as the highest privilege of art, namely, by our works to contribute to the delight, the welfare, and the happiness of our fellow-creatures.

GOVERNMENT BUILDING SOCIETIES BILL.

A MEETING of the committee of the Building Societies Protection Association was held on Monday evening, to consider the Government Bill, No. 3, when the following reasons for opposing the Bill were unanimously agreed to:—1. That the Bill No. 3, while avoiding some of the objections referred to in the reasons against Bill No. 2, retains the highly objectionable spirit and principle of that measure by ignoring the principles on which building societies have hitherto, for upwards of forty years, been safely and successfully worked, and embodying the totally different principles of the Companies Acts. 2. That the Bill would virtually compel all existing societies adopting its provisions, and all new building societies, to become, in effect, companies with unlimited liability. 3. That the whole spirit and principle of the Bill is in direct opposition to the report of the Royal Commission. 4. That the passing of the Bill would prove highly prejudicial and disastrous to these useful and important institutions, and would, by the cumbrous and expensive machinery provided by the Bill, entirely prevent the formation of small societies in the future. 5. That the provisions of the bill relating to lists of members are highly burdensome and objectionable, would occasion alarm, and, considering the fluctuating character of the membership of such societies, are useless and impracticable. 6. That the bill incorporates the whole of the provisions relating to winding-up under the present Companies Acts (107 clauses), which provisions have proved most expensive and ruinous in their operation to many thousands of persons, and are entirely inapplicable to the constitution of building societies. 7. That the bill does not provide any restriction on the borrowing of money or the amount receivable on deposit, as recommended by the Royal Commission, thus opening up an unbounded field for dangerous speculation. 8. That the bill brought in by Mr. Cross provides a simple, speedy, and inexpensive method of dissolution or termination of a society; is consonant with the spirit and operation of the existing law; provides for improvements suggested by practical experience, and in nearly every point would carry out the recommendations of the Royal Commission, and has been almost universally approved by the representatives of building societies throughout the country.

ARCHÆOLOGICAL SOCIETIES.

EXCAVATIONS IN LINCOLNSHIRE.—The remains of the church and conventual buildings of Louth Park Abbey have been disinterred by Mr. W. Allison, who has laid bare the entire plan of the church, chapter-house, cloister court, and other buildings. The abbey used to belong to the Cistercian monks. The church proves to have been 249ft. in length, only 20ft. shorter than the parent abbey of Fountains. The bases of the pillars are laid bare, and the foundations of the transeptal chapels can be distinctly traced. In the chapter-house the stone coffins of two of the abbots have been discovered. Many other relics of great interest have been disintombed.

KENT ARCHÆOLOGICAL SOCIETY.—This society proposes to hold its annual congress on the 24th and 25th of July next, at Cranbrook. The council have to lament the loss of the valuable services of their honorary secretary, T. G. Godfrey-Faussett, Esq., F.S.A. Finding himself unable to continue the duties which he has so ably performed for the past ten years, that gentleman has, in a letter to Earl Amherst, president of the society, expressed his desire to resign. Two years ago Mr. Faussett was asked, and obtained, the election of the Rev. W. A. Scott Robertson as his coadjutor in the secretariat. Mr. Scott Robertson will now continue the work alone.

PARLIAMENTARY NOTES.

THE FLOORING OF THE NEW BUILDINGS AT THE NATIONAL GALLERY.—In reply to a question from Mr. Bowring, Mr. Ayrton said there had been some difference of opinion between the trustees and the architect as to whether the flooring of the new buildings at the National Gallery should be composed of tiles or wood. The architect was in favour of ornamental tiles, but the trustees preferred wood, and as they were to have the care of the building their opinion ruled.

VACANT LAND AT SOUTH KENSINGTON.—On Thursday week, in reply to Sir H. Hoare, Mr. Ayrton said that, being an *ex-officio* commissioner of the Exhibition of 1851, he had made inquiries on the subject of the leasing for building purposes of certain pieces of land fronting Kensington-gardens, and lying between Queen's-gate and the Albert Hall. The commission was constituted by two Royal charters, the second of which conferred on the commissioners licence and authority to purchase and hold lands and hereditaments in any part of the Queen's dominions, and provided that such lands and hereditaments might from time to time be applied to such purposes as might be deemed fit. The commissioners had therefore an absolute discretion to sell and appropriate the land. Under these circumstances they purchased a large extent of land in the neighbourhood of the Exhibition, and in the exercise of their powers sold some of it in order to raise funds for the objects which they had in view. Some of the land had been let on lease for building purposes—in fact, for private residences. As the leases fell in the commissioners disposed of the land in the best manner they could. It was quite a misapprehension to suppose they were pledged to devote the land to any particular purpose. They had let land to the Albert Hall, the Horticultural Gardens, and for Government purposes, and in doing so they had not exceeded their authority.

Building Intelligence.

CHURCHES AND CHAPELS.

BECKINGTON.—S. Gregory's Church, Beckington, Wilts, was reopened on the 12th inst., after undergoing a thorough restoration, directed by Mr. J. P. St. Aubyn, architect, of the Temple, London. The interior walls have been divested of their coating of plaster and whitewash, and have been painted throughout. The old windows have given place to new tracery ones, and have been glazed with cathedral glass. The north aisle roof, which was formerly flat, is a new and open one, while the main roof has been repaired and retiled; the floor, doors, and benches are entirely new. The pulpit is of Bath stone, simply carved. The tower, which had been closed for a considerable time, has been opened, and the groined roof reconstructed. The west window is filled with painted glass, the gift of Admiral Edgell, C.B., and a new four-light painted window has been placed in the north wall of the chancel. Both windows are the work of Messrs. Horwood Brothers, of Frome, who have carried out the architect's designs for the decoration of the building. The latter window, together with the costly reredos, in three panels, has been presented by the rector, the Rev. Sainsbury Langford Sainsbury, in memory of his father, mother, and wife. The reredos is the work of Mr. Earp, of Kensington. The contractors for the builder's work were Messrs. F. P. and G. Brown, of Frome. The total cost has been about £1,000, exclusive of works of art. Four handsome lamps have been placed in the chancel by Mr. W. Singer, of Frome, and the organ has been rebuilt and enlarged by Mr. Prosser, of Road.

GREASBRO', NEAR ROTHERHAM.—The foundation-stone of a new Congregational Chapel was laid at Greasbro' last Monday, by Frank Sellars, Esq., of Nether Haugh. The style of the building is Early English, the material is red brick with Hooton stone dressings, relieved by ornamental brick bands. Accommodation is provided for 450 persons. The total cost of the building (exclusive of site) is £1,600. The site has been given by B. Sellars, Esq., who has also generously promised a new organ at a cost of £250. Mr. J. Platts, of Rawmarsh and Rotherham, is the architect, under whose superintendence the edifice will be erected. Messrs. Alt Brothers and Gardner, of Rotherham, are the contractors.

GREAT GRANSDEN, S. NEOT'S, HUNTS.—The parish church has been reopened by the Bishop of Ely, after a complete restoration, which has been carried out under the superintendence of Mr. G. Vialls, architect, of London. The works executed include the thorough repair of all walls and stonework generally, the renewal of all the roofs in oak, the old character being carefully reproduced, the reseating of the nave and aisles with oak benches, new floors, glazing, &c., throughout, and the addition of a new north porch. The chancel has been repaired at the expense of Clare College, Cambridge, and a new vestry and organ-chamber added, and elaborate choir stalls in English oak provided by T. V. Webb, Esq., who was also the chief contributor to the general fund. A heating apparatus, by Mr. Bower, engineer, of S. Neot's, has been provided. The works were executed by Mr. Brown, builder, of Lynn, at a cost of upwards of £3,000.

LAWFORD.—S. Peter's Church has been entirely rebuilt, from designs by the late Mr. William Slater and by Mr. R. Herbert Carpenter. With the exception of the Norman doorway, the north arcade, and two curious lancets in the chancel, there was nothing of interest in the old church, excepting the timbers of the nave and chancel roof, which have been repaired and re-used. The church has a nave of five bays, with north and south aisles, and a long chancel, with organ-chamber and vestry, on the south side. It seats 300 persons. The walls are built in coursed Attleborough stone, with Attleborough stone dressings. The tower stands at the west end, and is of entirely new design, the former one being but late and poor in character; the parapet and turret are of the usual embattled Warwickshire type. The contractors were Messrs. Law, of Lutterworth, under Mr. Thompson, as clerk of works; the carving has been executed by Mr. Harry Hems.

LONGFORD.—On Wednesday the foundation-stone of a new church was laid at Longford, near Coventry, to be dedicated to S. Thomas. The church is to be built from designs supplied by Mr. John Cotton, of Temple-row, Birmingham, and will be built by Mr. W. Nelson, of Dudley. It will comprise nave, with aisle on the north side; chancel, with organ chamber and vestry, also on the north side. There will be a tower and spire at the north-west angle of the building, the lower portion of which will form the porch. It will be built of red brick, the internal facing being of buff-coloured pressed bricks. The stone dressings are being executed partly in Attleborough and partly in Box-Ground Bath stone. The roof, which will be open, will be covered with brindled coloured plain tiles, and the accommodation will be for 300 persons. The cost of the building will be nearly £3,000.

MAIDSTONE.—The new West Borough Congregational Chapel, at Maidstone, was opened on Wednesday week. The exterior is composed of Kentish rag, with Bath stone dressings, and the inside of plain brickwork, with different coloured bricks, and cement concrete between the two. The chapel will seat over two hundred people, and was designed by Mr. Henry Bridge, the builders being Messrs. Cox Brothers and H. Bridge. The entire cost has been about £1,015.

MANCHESTER.—The foundation-stone of a new synagogue for the Spanish and Portuguese congregation of Jews, in Manchester, was laid in Cheetham Hill-road, on the 11th inst., by Sir A. D. Sassoon. The style of architecture adopted in the construction of the building is the Moresque, and the principal feature in the front is the entrance, which will be in brickwork, with ornamented vitrified marble bosses. The remainder of the elevation is of brick, with stone dressings. The interior has an open wooden roof, with galleries supported by marble columns. The ark will be in the centre, and in a recess a large circular window will be filled with stained glass, as will be all the other windows. The interior of the building is especially designed for future decoration, and there is accommodation for 200 gentlemen and 100 ladies. The architect is Mr. E. Salomons, and the builder Mr. S. Warburton.

NEWCHAPEL.—The memorial stones of a new Wesleyan chapel were laid at Newchapel, in the Potteries, on Monday week. The dimensions of the chapel internally are 45ft. by 36ft., in addition to which there is to be a vestibule in front and a vestry, with orchestra over, at the opposite end behind the rostrum. The accommodation is for 320 sittings. The style will be Italian; the materials to be used are red bricks, with bricks

of other colours introduced. The cost of the building will be about £1,400. Mr. Geo. B. Ford, of Burslem, is the architect, and Messrs. Brindley and Critchlow, of Burslem, the builders.

OUNDLÉ.—On Wednesday week the chancel of Barnwell S. Andrew's Church was reopened, after undergoing extensive repairs and alterations, under the direction of Mr. Edward Browning, architect, of Stamford. The floor has been concreted and repaved with Maw's rich encaustic tiles; a new stone screen has been erected dividing the church from the chancel, with perforated crosses. On the north side of the chancel a new chapel is built, which is called the Latham Chapel, on account of its containing the monument of a local benefactor. The builders for the work were Messrs. Halliday and Cave, of Oakham; the brass work, hangings, and carpets were supplied by Messrs. Jones and Willis, of Birmingham; the painting, graining, gilding, and monumental work by Mr. Daniel Stevens, of Barnwell.

ROCKLEY.—On the 16th inst. a new church, dedicated to All Saints, was opened at Rockley, Wilts, under license from the Bishop of the diocese. It is said to be an exceedingly picturesque building, and consists of a nave and chancel, with porch at the south-west end. It is built of the Sarsen stone of the county. The architect is Mr. Baverstock, of Marlborough; the builder, Mr. Barrett, of Swindon; and the decorations and fittings are the work of Mr. Baverstock, Jun., of Marlborough.

WYMONDHAM.—On Wednesday week the parish church of Wymondham was reopened (after having been re-floored and benched). Within the last ten years £1,400 has been spent in the restoration of this edifice. The last portion of the work, namely, the laying of a new stone floor and the erection of open benches, was commenced in April last, and has just been finished. The amount of the contract for the undertaking was £398, and the estimated cost of the whole work, including architect's charges and extras, is £500. The floor is of stone, and the benches are open. Mr. J. J. Fast, builder, of Melton, was the contractor for the work.

BUILDINGS.

EXETER.—New Police Offices and Barracks, to be used as head-quarters of the Devon Constabulary, have just been completed at Exeter, at a cost of £5,000. The entire building, as well as the internal fittings, have been carried out from the designs of Mr. E. H. Harbottle, of County Chambers, Exeter, architect. The clerk of works was Mr. James Ferman, of Exeter. The builders were Messrs. Moass, of Exeter.

RAWDON.—A new Convalescent Home is about to be erected at Rawdon, Yorkshire. A design to accommodate sixty-four inmates has been prepared by Messrs. Andrews and Pepper, architects, Bradford. The style is an attempt to engraft upon Gothic the domestic characteristics of Yorkshire architecture of the sixteenth century, with mullioned and transomed windows and gables. The south front will be 300ft. long, divided into two pavilions, with a large winter garden, 24ft. by 45ft., in the centre. The work has been let to Messrs. Booth, Illingworth, and Sons, Bradford.

S. HELIER'S, JERSEY.—New premises for the Jersey Banking Company at S. Helier's are being built by Messrs. Fallaize and Tostevin, at the corners of New-street and Library-place, from designs by Mr. John Hayward, architect, of Exeter, who carried out the restoration of S. Ouen's and Trinity Churches, Jersey. The style of architecture chosen by the designer is quite unique upon the island, as applied to secular buildings, and is known as Early Geometrical, with a deal of Early French Gothic in its type. The building is to be of native granite, the walls being of the pink and the quoins of the grey variety. All the dressings to the windows, the cornices, &c., are to be of Portland stone, and the whole of the carved and sculptured work will be executed in the same material. The columns in front of the mullions of the various windows will be of polished red Aberdeen granite. All the capitals upon these columns will be carved, and the label moulds stopped by carved bosses and corbels. The treatment of the ornamentation upon the ground-floor windows will be similar to the upper ones, excepting that the foliage of the capitals will be somewhat more ornate upon the lower row. Between the two floors there will be

carved and enriched cornices running the entire length of the building. The carved work is in the hands of Mr. Harry Hems, of Exeter.

WARRINGTON.—The new Town Hall and Bank Park, at Warrington, which have recently passed into the hands of the Corporation, were opened on the 20th inst. The building and the surrounding grounds had been for generations the residence of the Patten family, and about twelve months ago Colonel Wilson Patten, M.P., made known to the Corporation his intention to dispose of the property, the rapid increase of the manufacturing portion of the town having encroached upon the privacy which the mansion previously enjoyed as a private residence. The Council finally decided upon purchasing the thirteen acres of land surrounding the Hall for £13,000, half an acre being afterwards deducted for the purpose of making a street between Sankey-street, at the junction of Wilson Patten-street and Frog Hall-lane. In addition to this, £9,000 was given for the mansion and gardens, making a total of £22,000. Thanks, however, to private munificence, not one half the amount of the purchase money fell upon the ratepayers. The building has not undergone any alteration since the Corporation became possessed of it. It has the appearance of a comfortable old mansion, faced with brick, but neither internally nor externally is it adapted to the purposes of a town hall, though there is more room than the Warrington Corporation will ever require for municipal business.

WREXHAM.—The new Public Hall and Corn Exchange, Wrexham, which has been converted out of the old Yorkshire Hall, at a cost of £5,000, has been opened. The new hall will seat over 1,500 people. The larger hall is 80ft. long by nearly 50ft. wide, and lighted from the top. A balcony runs all round, capable of holding 400. A stage is erected at one end, and behind are green-rooms, lavatories, cloakrooms, and other conveniences. Running round the hall on the ground floor are suites of offices and store-rooms; on the first floor are also offices and refreshment-rooms. The architects were Messrs. Holden and Co., Manchester; and the contractor is Mr. W. E. Samuel, Wrexham.

SCHOOLS.

BURFORD.—The foundation-stone of a new school was laid at Burford on Wednesday week. The edifice, which is to be erected from designs by Mr. Ernest A. Day, of Worcester, will comprise a school-room, 32ft. by 18ft., and a classroom, 16ft. by 12ft., with a suitable house for master and mistress. Mr. Page Mason, of Tenbury, is the contractor for the brick, stone, and plaster-work.

LONDON.—At the meeting of the London School Board on Wednesday, on the motion of Mr. C. Reed, M.P., on behalf of the Works Committee, the Board agreed to accept the tender of Messrs. T. G. and E. Howard, to build schools at Forest-hill at a cost of £5,395, and that of Mr. J. Tyerman, of Brixton, for schools at Southwark for £5,200. The Board also agreed to purchase sites and interests in sites. After a variety of general business had been transacted, the Board adjourned.

ART AT THE ANTIPODES.—With regard to the cultivation of artistic studies in New South Wales, the Sydney correspondent of the *Times* writes:—"We are not quite insensible to art, absorbed though we are in mining. It is true we are yet deficient in a picture gallery, and pictures and statuary, but there are a few art students. The art spirit is growing. Ours is a climate somewhat akin to that of Greece and Italy, only more genial; and if sensuous imagery was the product of climate in those countries, why should it not be here? Doubtless, the earnestness of national life and the haste to be rich will check the tendency here; but still in some sort it will work, and art will find a home here in which to abide and flourish. A year or two ago a few enthusiasts in this city started an art academy with an exhibition of pictures, and managed to get together enough funds to send home for some plaster casts, and open a design school of a humble kind. I don't think the school has succeeded, but the movement, together with an annual exhibition for works of native artists which opens a market for colonial art, and the competition aroused by the offer of prizes, has brought some latent ability to life, and really some very creditable work is produced."

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements 9d. per line.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Cases for binding the half-yearly volumes, 2s. each.

SPECIAL NOTICE.—NEXT WEEK.

COMMENCEMENT OF NEW VOLUME.—The large increase in the circulation of the BUILDING NEWS since its enlargement at the commencement of the present year caused a more than ordinary demand for the early numbers of the volume, many of which are out of print. We regret the disappointment of those who have been unable to complete their sets, and would remind intending subscribers that the commencement of a new volume with the quarterly number, which will be issued on Friday next will afford a favourable opportunity for commencing subscriptions.

Z. E.—Ask some schoolmaster.

J. TAYLOR.—The drawings to hand and returned.

J. H.—Yes.

E. B. B.—In a few weeks.

A. WILSON.—Ask through Intercommunication.

E. W. BROWN.—You should protect by Letters Patent before you publish an account of the invention.

RECEIVED.—L. and G.—W. P. B.—W. K. P.—Dr. S.—E. P. S.—C. B. A.—S. Brothers.—W. and Co.—Plate Layer.—E. P.—J. H.—J. N.—E. F. C.

Correspondence.

THE ARCHITECTURAL PROFESSION—ITS ART AND ITS TRAINING.

To the Editor of the BUILDING NEWS.

SIR,—In some previous remarks, the writer has shown the haphazard and illogical training students of architecture receive. In an able paper by Mr. Chambers, read before the Architectural Association, and reported in the BUILDING NEWS, "On the Popular Estimate of Architecture," the subject is looked at from a popular standpoint, and the relative positions of *Medicus* and *Architect* are very significantly sketched, and in a way worth the perusal of all students.

Great and comprehensive as the true significance of "architect" really is, its present practice and status is certainly far below those of other professions. The reason was well put in the above lecture: it is because Law and Medicine are sciences, things "to know and to be learnt,"

and are recognised by some test of proficiency. A diploma or certificate would doubtless confer a certain status on the recipient, but till such a guarantee to the public, but till such a test of proficiency is made compulsory, the public appreciation of architects will chiefly rest on admitted proofs of qualification. What are these? In all other scientific professions what are they? The fundamental basis of them all will be found to be simply well-ascertained laws and principles of action. Next to *Medicus*, indeed, no professional man has to deal more with ascertained facts and natural laws than architects and engineers. The noblest duty of an architect is to create form out of matter—to equilibrate or harmonise the forces of nature. Thorough mastery, then, of matter, the laws which affect it, and the forms which these naturally assume, is the essence of his requirements. Unlike *Medicus*, his knowledge must be creative. But what do we find to be the case?—the very opposite of all this: an irregular education, piecemeal knowledge, a lamentable want of method, and the most irrational copyism. As a consequence, we find matters trivial to the "architect" of the present day, but all important to his clients, neglected—drainage, ventilation, and other sanitary matters, construction, convenience, and the special conditions of buildings to various uses.

It would be well if, instead of sketching, drawing, and archaeological study, geometry, physics, and Comte's "Philosophy" were to become the leading attainments of young architects. Such studies would give an impulse to creative art, while they would form a rational basis for the imagination, but they would also become a guarantee to their possessor and his clients that the great essentials of building were not overlooked.

As Mr. Chambers remarked, there is a notion prevalent that architecture is akin to botany or conchology; that it is a science of "species" and "variety"; and that every building should be brought under some species or "order." Such a notion has originated from architects themselves. They have left essentials to transcribe the external results of past ages, and here is the great weakness of our teaching manifested. Our fashionable "architects" are doing the same thing now. They even employ deputies to "design" for them, as these pages lately made known.

The great evil is our method of instruction, as I have before remarked. Instead of beginning at the practical and real we begin at the ideal; our students spurn the workshop or the scientific studio. What if *Medicus* were to ignore the hospital and clinical experience? Cause and effect—the great secret of all knowledge—is lost sight of amid the petty rivalry of schools, styles, and details, and the dusty remains of antiquity. I am, sir, &c., G. HUSKISSON GUILLAUME.

WORKING PATENTED INVENTIONS IN AUSTRIA.

SIR,—We have just received the following communication from our agents at Vienna, regarding the time of working inventions in Austria:—

"Please notice that although the Ministry of Commerce here have hitherto not refused a single petition for extension of working-time for a second and for a third year, they have now suddenly intimated their intention to stop granting third year's grace, to grant second year's grace only in exceptional cases, and not to grant any extensions of working-time on patents now being issued."

The above is very important at the present moment, so many patented inventions being within the walls of the Exhibition Building, which were not made in that country, although patented there.—We are, Sir, &c., ROBERTSON, BROOMAN & CO.

166, Fleet-street, London.

QUANTITIES.

SIR,—In going through your article in the BUILDING NEWS of May 23rd, "Quantities—XVI., Mason," there are a few dimensions I cannot understand, which I think must be printer's errors; and I should be much obliged if you would kindly explain them in an early number of the BUILDING NEWS. I should have written before, but I was hoping some one else would have stumbled over the items, and drawn your attention to them.

First, on p. 581, last dimension at bottom of centre column—

2 10

9 Sunk work (top).

Ought not this to be

2) 3 10

9

Second.—Fourth item from top of third column

3 10 2 Stops.

4 Add moulding top.

Should not "2 stops" be a separate item, and have a line to itself? And then the next line should be

2) 3 10

4 Add moulding top.

also "1 mitre" a separate item.

Dimensions for truss:—

Seventh item

2) 1 2

6

Add face.

Ninth item

2) 1 2

3

Add in rebates.

I cannot understand how these items are made up; also the last—

2

9 narrow circular sinkings, 4in. high, &c.

Ought not this to be

2) 11

Narrow, circular, &c.

While on this subject, I must express my gratification with your able and lucid articles from time to time in the BUILDING NEWS, and the pleasure and profit I have derived in reading and studying them—all of which are of such a practical nature.

I hope you will be induced to publish your articles on "Quantities" in a separate form, similar to your work on "Dilapidations"; for it is, so far as I have seen, the best and most practical work on this branch of the profession.

With reference to the pamphlet, "Rules and Regulations of the Measurement of Mason Work in Edinburgh, &c.," mentioned in the same article, I should like to see it given *in extenso*, in connection with your articles, as I think it must interest many readers.—I am, Sir, &c.,

June 17th, 1873.

WM. W.

Intercommunication.

QUESTIONS.

[2894].—Fixing Charcoal or Pencil Drawings.—Is there any known or recognised method to fix a charcoal or pencil drawing? If any of your readers are aware of such a means and would answer in your columns, they would oblige.—A. J.

[2895].—Dry-Rot.—Our foreman-joiner would be glad if you could inform him whether there is any process by which timber may be rendered impervious to dry-rot.—H. ROBINSON & Co., Wigan.

[2896].—Abstracting.—Would Mr. Banister Fletcher, in concluding his excellent article on "Quantities," give an illustration of the process of abstracting?—A READER. [Given this week on p. 722.—ED.]

[2897].—Lightning Conductor.—Permit me to inquire with reference to lightning conductors, whether they should not, for efficiency, be detached from the building which they are intended to protect. No doubt I appear exceedingly ignorant in asking this question, but it was suggested to me by seeing, whilst going over St. Paul's Cathedral a short time since, the conductors in several places quite firmly bedded in the joints of the masonry by cement. Is not this quite wrong, or am I in thinking it so?—STUDENT.

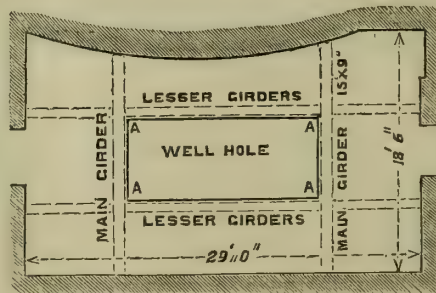
[2898].—Centrolinead.—I am tolerably well up in perspective, but do not know how to set and use the centrolinead. Will any reader kindly explain, with diagram if necessary, but please let him not refer me to books; I have no means of consulting any which contain the desired information.—A POOR GENERAL ASSISTANT.

[2899].—Persian Houses.—Apropos to the visit of the Shah, will you be good enough to describe the modern Persian house, and the manner of its construction.—W. GLAZEBROOK.

[2900].—Omnimeter.—Will any one tell me the advantages of this instrument, its maker, and cost?—A YOUNG SURVEYOR.

[2901].—Quality of Lead and Glass.—How can I tell practically, with but small samples, the quality of lead whether it be 5lb or otherwise, and of sheet glass whether it be 26oz. or 21oz.—JOHN MARKS, Hull.

[2902].—Well Holes.—You would greatly assist me by allowing me to ask through your Intercommunication column how to plan the framing of a wooden floor, in the centre of which there must be a large unobstructed well hole, without weakening the main girders by mortising the lesser ones into them. Want of height necessitates the



latter being kept within the depth of the former. The sketch plan is subjoined. A A show points of difficulty.—CARPENTER.

[2903].—Stone Quarrying.—Will any one give a short account of the process of quarrying stone as practised in England.—G. S.

[2904].—Orophilite.—What is Orophilite? I fancy it is some kind of roofing material; if so, how is it applied?—T. SUMNER.

[2905].—Gas-Works.—Will any reader assist me in the following difficulty?—I have to do with a small gas-works. It has been our rule to reduce the pressure on the mains to about 5-10lbs during the day by means of a Braddock's governor. Lately a firm has commenced which use gas in their trade, and they require to have the same pressure during the day as we have at night, which is causing us to have a very heavy leakage account. Is there no remedy for this? Is there no such thing as an exhaust meter that would draw the gas? How do other gas companies do that are placed in similar positions?—D.

[2906].—Indian Kacha Walls.—Will some one give me some particulars of the construction of Indian "Kacha" walls?—BLUE CLAY.

[2907].—Construction of Barracks.—Would any one give sketch showing one or more units of barrack-rooms, with synopsis of buildings necessary for a battalion of infantry 1,200 strong?—K.

[2908].—The Churches of SS. Faith and Gregory next Old St. Paul's.—I, in common with many other readers, am looking with some interest for the illustrations promised in connection with Mr. Longman's new book on St. Paul's Cathedral. Can any one who has the book say if he gives therein an account of the old churches of SS. Faith and Gregory, formerly attached to the old Cathedral?—URBAN.

[2909].—Ventilation of Buildings.—Will any one give me, or tell me where to find, Professor Tyndall's table of expansion of gases for an increase of temperature equal to 1° Fahr., as a guide to the ventilation of buildings?—A. D.

[2910].—Lightning Conductors.—I have read with much interest the recent queries on lightning conductors, and should be much obliged by a practical answer as to how I am to apply them to my special case, which is as follows:—My house is an isolated one, standing on a hill of 1/2 acre, and surrounded at distances of say 100 yards with oak and other trees. The main building of my house is about 45ft. by 80ft. square, with two chimneys running up through the interior of the house to 6ft. or 7ft. above the ridges, and two other chimneys in the outside walls 5ft. or 6ft. lower. The house is surrounded with 5in. iron gutting which collect all the water to one spot, from which it is discharged by zinc pipes into the main stack, which conducts the water into a large rain-water tank 8ft. diameter, and 7ft. deep. The iron stack-pipe, 4in., goes up, 1ft to 2ft. into the ground, and then branches horizontally, or nearly so into the well. Its mouth is usually some feet above the water. How can I effectually protect it by lightning conductors. As my house is a type of hundreds, a clear plan of doing it would be an advantage to many of your readers as well as to—POPULARIS.

[2911].—Furnace Shafts for Sewer Ventilation.—It was stated in a recent number of the BUILDING NEWS that the sewer authority of a provincial town are about to construct a new system of sewerage, and proposed to utilise some or all of the factory chimneys on the line of route of the main sewer, for the purpose of ventilation. Has not this been tried and found wanting in London, owing to explosive gases being drawn up and brought into contact with the furnaces? If so, can any correspondent say what gases they were, and whether they were the products of decomposing sewage matter?—ETOMI-ENSIS.

[2912].—Street Urinals and Charcoal Street Ventilators for Sewers.—I have received directions to construct several public urinals, and am at a loss to know which of the many forms generally in use is the best. Can any reader inform me? And I should be glad of advice as to the best kind of charcoal street ventilator for sewers in which the charcoal does not become useless by damp.—LOCAL BOARD SURVEYOR.

[2913].—Brickwork Measurement.—A year since, I took out the quantities of a building in the country for a London architect, and entered the brickwork as "Bonds Reduced Brickwork in Mortar." The builder now asserts that he priced it as 272ft of 9in. work per rod, and demands the value of the extra half brick throughout the building. Who is right?—SURVEYOR.

REPLIES.

[2888].—Polishing Alabaster and Marble.—To polish marble, rub with snakestone, then with felt and putty-powder, using just enough water to keep it damp. Finish with "elbow-grease" and the felt only till the polish comes. For alabaster, use first fine sand, and finish with putty-powder on soft thick leather, such as soldiers' belts are made of.—KAPPA.

[2889].—Summer Sketching.—At a recent committee meeting of the Architectural Association, at which the establishment of a proposed travelling studentship was discussed, 15s. per diem was agreed upon, I believe, as the sum to be allowed in calculating its prospective value. The same Association later on quotes 12s. 6d. as the probable daily expenditure of each member joining the annual excursion. The first sum appears to me to be an excessive allowance, and I should even call the latter a very full price. I can only say that I managed for several weeks in early summer, in Northants, on 7s. a-day, and had a very fair time of it.—C. S. W.

[2887].—Fences.—Marble Slabs.—"J. E." is incorrect. The usual rule for determining to which land a wooden fence belongs is the way the nails are driven. The fence belongs to that land to which the point of the nail is driven. Therefore the posts would be placed within the boundary of the party to whom the fence belongs. As to the second query, the hearth being marble does not affect the question. Of course, however, if a tenant, during his tenancy, has taken up a stone hearth and placed in lieu a marble one, he may remove the latter, but in that case he must replace the stone one in a sound condition. If a marble hearth was there at the commencement of lease and is injured, it must be reinstated.—B. F.

STAINED GLASS.

PAIGNTON CHURCH.—The west window of this church has recently been filled with stained glass. It is in four lights, and has figure-subjects illustrating The Acts of Mercy, under rich canopies; in the tracery are angels bearing scrolls. The window is the production of Mr. Pepper, of 381, Euston-road.

STATUES, MEMORIALS, &c.

THE LATE GENERAL SIR JAMES OUTRAM.—A few years since, a movement was set on foot by a committee of Indian officers to erect a statue to General Sir James Outram in Calcutta. The work was intrusted to the eminent sculptor, Mr. J. Foley, R.A. This statue has now been completed, the casting having been executed in bronze by Messrs. Masefield & Co., of the Manor Ironworks, Chelsea, who have previously turned out several art productions. The work is of heroic size, the figure of the General being 10 ft. high. The General is represented leading his men, sword in hand, to a charge, reining in his horse while he looks round for his men. The whole conception of the statue is extremely spirited, the fire and force of character in the countenance of the General and the action of his charger being ably expressed. The casting weighs about six tons, and was made from bronze guns captured by the General. The founders have ably reproduced this important work, and have succeeded in making a fine casting, the finish being carefully carried out in every detail. The statue is at once to be removed from the foundry to a temporary pedestal which has been prepared for it in Waterloo-place, where it will remain for a short time prior to its removal to its final destination in Calcutta, where it will be placed near the equestrian statue of Lord Hardinge.

WATER SUPPLY AND SANITARY MATTERS.

THE CHOLERA IN AMERICA.—Dr. Janes, Sanitary Superintendent of New York, has made a report to the Board of Health of that city, calling attention to the probability that, as there is no quarantine protection against arrivals by land, cholera may soon reach the city by some of the routes of land travel from infected places. He observes that as it is now generally admitted that the germs of cholera poison are thrown off by persons having premonitory diarrhoea, it is of the utmost importance to secure their immediate disinfection and the isolation of the patient. With a view to the destruction of such germs as soon as they are cast out, he has caused an inspection to be made of the arrangements and accommodation at the railroad depots, ferry-houses, and cheap lodgings. He says:—"The disinfectant which I have directed for present use is the old mixture which has proved so reliable on previous occasions—viz., ten pounds sulphate of iron, five gallons of water, and one half-pint of common carbolic acid. In order to give full publicity to what are now regarded as the most approved precautionary measures against cholera, it is desirable that a set of instructions be prepared, not only for the public press, but that printed copies be furnished to the agents of steamships from both foreign and domestic ports, to railroad officials, to the proprietors of hotels, to emigrant and sailor boarding-houses, to cheap and vagrant lodging-houses, and all similar places where strangers congregate. The same method of disinfection applied to the sinks and water-closets of private houses, if made general, would not only cleanse the house-drains, but through these the public sewers would be deprived of a great proportion of their poisonous gases. I would, therefore, respectfully recommend that some action be taken by which the desired information and instructions may be circulated as above proposed without delay."

LEGAL INTELLIGENCE.

THE NEW STREET IN S. LUKE'S.—*Tubbs and Lewis v. the Metropolitan Board of Works.*—This case, tried in the Sheriff's Court, Red Lion-square, on Saturday last, was a compensation claim of considerable magnitude for property in Old-street and Wilderness-row, required for the formation of a new street. The inquiry occupied two days, and Mr. Manisty, Q.C., presided as assessor, before a special jury. The claim was £70,000. The jury went to take a personal view of the property, and during the two days they were occupied, heard a good deal of evidence on both sides as to the value of the property, which had been leased to the claimants, who are elastic web manufacturers in the City of London, having warehouses in Manchester and other places, employing, it was stated, some 700 hands. Several surveyors were called on both sides. For the claimants the highest valuation of the property was £63,741, and the lowest for the Board of Works £39,822. The jury, after a deliberation of half-an-hour, returned into Court with a verdict for £45,054 as compensation for the property.

The old church of Pipe-and-Lyde, Herefordshire, has, during the past three months, been undergoing demolition in preparation for a thorough restoration. The nave and tower have been entirely razed. The corner-stone of the new tower was recently laid by the Bishop of the Diocese. The restoration is being carried out from plans prepared by Mr. Kempson, architect, of Hereford.

NEW PATENTED INVENTIONS CONNECTED WITH THE BUILDING TRADES.

3621. J. PICKUP, Bradford, Yorkshire. "Grate-bars."—Dated 2nd December, 1872.

This invention relates to further improvements in grate-bars, for which letters patent were granted to the present applicant, and dated May 28th, 1872. In the specification referred to, the inventor has described the use of a frame or support for the grate-bars, and this present invention relates: First, to improvements in such frames or supports; and, Secondly, in the construction of grate-bars. He employs parallel side longitudinal bars, but dispenses with the connecting bars, and employs in lieu thereof a fretwork formed by hexagonal openings or other like figures.

3635. J. BACON, Church Gresley, Derbyshire. "Kilns for burning bricks, &c."—Dated 3rd December, 1872.

This relates to continuous kilns composed of several chambers. Each chamber has a separate crown, and six or more external fire-holes. In the centre of each chamber is a funnel, not reaching to the top of the chamber. The hot air and gases, after passing up through the bricks in one chamber, pass down the funnel, then along a channel leading to the bottom of the next chamber; they next pass up through the bars of the several fire-holes, and through a perforated bottom of this second chamber, and so on from chamber to chamber, the course of the draught being regulated by dampers, as is well understood. The top of each funnel has a cover, which is closed when the draught has to be stopped at the corresponding chamber, an arrangement is provided for opening direct communication from chamber to chamber when the draught is bad. For some goods an inner chamber is constructed to hold the goods and prevent the gases coming in contact therewith. An important feature of the invention is that all back or waste heat is brought to the fire of what is for the time being the heating-chamber, and thereby utilised.

3638. E. LLOYD, Grantham, Lincolnshire. "Iron construction for the erection of buildings, &c."—Dated 3rd December, 1872.

Flat bars are trussed together at intervals to support framework for buildings, bedsteads, &c.

3640. C. F. LONGDEN, Sheffield, "Fireplaces."—Dated 3rd December, 1872.

The atmospheric air heated by the means described in the specification produces a more perfect combustion of the fuel and an increased production of heat, which can be used for warming rooms or heating ovens, boilers, or hot plates in kitchens, and for similar purposes.

3657. G. SMITH, Bradford, Yorkshire, "Fireproof buildings."—Dated 4th December, 1872.

The object of this invention is chiefly to prevent expansion and contraction of the metal pillars and girders, and to render fireproof wood pillars and beams and other woodwork, and consists in coating or covering the exposed surfaces with a layer of concrete or composition of small stones, bricks, or other materials, and mortar or cement.

3679. W. P. GARbutt, Kingston-upon-Hull, Yorkshire, "Bricks, &c."—Dated 5th December, 1872.

A cam upon the main shaft drives a piston to and fro by means of a double-ended lever, and also a slide to shut up the passage leading from the pug-mill to the cylinder in which the piston works when the piston is moving to force the clay out.

Our Office Table.

ARCHITECTURAL ASSOCIATION.—The last meeting of this Association for the present session takes place this (Friday) evening, when a paper will be read by Mr. Ernest C. Lee, A.R.I.B.A., on "Italian Decoration." The officers for the ensuing session will also be elected. Mr. E. J. Tarver, well known as a rising young architect, has been nominated as President, and will no doubt be elected. While Sir Gilbert Scott, the President of the Institute for the ensuing year, is a worthy representative of the senior architects who have given an impetus to the Gothic revival, the juniors of the profession will in Mr. Tarver have a President who has shown himself an apt pupil of the leaders of the revival.

BURIAL-GROUNDS IN BIRMINGHAM.—Mr. P. H. Holland, one of the Inspectors of the Burial Board Department of the Home Office, on Tuesday concluded his inquiry into the condition of the burial-grounds of Birmingham. Several of the grounds will be entirely closed, and in others interments will only be allowed in existing family or brick graves and vaults. In some instances permission will be given for burials in new brick graves or vaults in unused portions of the grounds, but in no case will common earth graves be allowed.

CEMENT OF CHALK AND SOLUBLE GLASS.—If fine chalk be well stirred in soluble glass, a cement may be produced which will harden in

the course of six or eight hours. The addition of powdered sulphuret of antimony will give rise to a black mass, susceptible of a high polish, and capable of receiving a fine lustre. Fine iron dust gives a grey-black mass of great hardness. Zinc castings can, it is said, be readily repaired by a paste of soluble glass and zinc dust.

ENGLISH RAILROAD STATISTICS.—The Board of Trade report for 1871 shows that at the close of that year there were in the United Kingdom 15,376 miles of railroad, 123 miles having been constructed during the year. The average cost per mile had been £35,943. These roads earned an average of £3,063 per mile, 44 per cent. being from passengers and 56 per cent. from freight; and the average working expenses were 48.4 per cent. of the gross receipts. The average income earned on the capital invested was 4.43 per cent.

IMPORTATION OF WOOD.—The quantity of wood of all kinds annually imported into Great Britain is not much less now than 16,000,000 cubic feet. The aggregate average quantity of timber of all sorts cut down yearly, and used in the United Kingdom for ship and house building, wagons, carts, dock-gates, and other marine works, props in mines, and all descriptions of implements, exceeds even the above large imports, being about 2,500,000 loads.

MUNIFICENT GIFT TO THE TOWN OF DERBY.—Mr. M. T. Bass, the senior member for Derby, has caused to be constructed at his own expense two spacious swimming baths for the free use of men and boys. The baths are erected on the free recreation ground, presented to the inhabitants of Derby by the same hon. gentleman a few years ago, at a cost of several thousand pounds. The new baths were opened on Saturday. Mr. Bass expressed his intention of erecting an additional free swimming bath for females.

NEW WOOD CARVING PROCESS.—M. Lanteigne, says *Annales Industrielles*, has invented a machine for producing wood carvings at the rate of a yard a second, and at a cost of about one per cent. of those executed by hand labour. The operation consists simply in passing the wood between cylinders forming matrices. The material, it is stated, is not deformed, and greater density is given to it by the pressure, while the sculpture is as delicate as that made by the chisel. The process can be used for producing cornices, furniture decoration, and similar ornamental work.

NEW TRADES' HALL FOR GLASGOW.—A prospectus has just been issued for the erection of halls suitable for the accommodation of the trades of Glasgow. The capital is put down at £20,000 in £1 shares, and the scheme comes out under the auspices of the leading members of the trades in Glasgow. The object, as explained in the prospectus, is to erect a block of buildings comprising one large hall, not less than the City Hall, suitable for aggregate meetings of the Glasgow trades, and great annual festivals or social gatherings; two smaller halls—one adapted for meetings of the smaller trades, the other to be used as a labour exchange, reference library, and reading room; and a suite of rooms for committee meetings of the various trades.

PRESERVING RAILROAD TIES.—A Dresden engineer proposes a method for increasing the durability of railroad ties, by which, he considers, they may be made to last four times as long as at present. The sleepers, of whatever kind of wood, are first allowed to dry for some time in air, then are artificially dried in a hot chamber. They are next introduced, while hot, into an impregnation apparatus containing heated coal tar, where they are impregnated thoroughly under pressure. Then they are coated with sifted sand or coal ashes and allowed to dry. Every fissure is carefully filled; the nails used in fixing the sleepers are first dipped in hot coal-tar, and any part of the work which may be exposed is carefully coated. The inventor further states that wood thus prepared has been also used for house-building purposes, and with excellent results.

SIR WILLIAM TITE'S WILL.—The will, with one codicil, of the late Sir William Tite, C.B., M.P., was proved on the 7th instant, by Dame Emily Tite, the relict, Robert Farre Dalrymple, and Francis James, Esqrs., the executors, the personal estate being sworn under £400,000. The only legacy of public interest is one of £1,000 to the Royal Institute of British Architects, to be invested, and the income "applied yearly in such manner as the President and Council for the time

being of the said society shall deem best calculated to promote the study in England of Italian architecture."

THE TUNNEL UNDER THE MERSEY.—The Mersey Railway Tunnel is progressing, though not very fast. Working began some months ago on the Birkenhead side near Woodside Ferry. The heading, which is driven from a shaft 300ft. from the river wall, has now reached a length of 40ft. under the river bed. Only capital is needed to carry on the work still more expeditiously, and in case the Birkenhead and North Wales Railway Bill passes the House of Lords Committee, plenty of capital will no doubt soon be forthcoming, as the two schemes hang very much together.

THE FLOORS FOR PICTURE GALLERIES.—The *Daily News*, commenting on Mr. Ayrton's reply to a question put to him this week respecting the flooring of the new buildings for the National Gallery, declares that ornamental tiles form the very best possible flooring for galleries full of precious works of art. They are handsome in appearance; they can be kept spotlessly clean; and, short of being calcinable, they are fire-proof, the last rendering them the best possible substance to be placed in contiguity to any heating or ventilating apparatus. In the Louvre, while the *parquet* of the Galerie d'Apollon is of costly inlaid woods, the pavement of the smaller picture saloons is of common red earthenware; but in England we should be able to call in the aid of our Mintons and Copelands, and make our ceramic flooring beautiful, as well as safe and cleanly. We could not afford to lay the floors of the new National Gallery with such rare and beautiful woods as are to be found in foreign palaces, and, moreover, English housekeepers do not understand the art of beeswaxing and polishing floors; while common deal or even oak would have to be frequently renewed, would be easily liable to destruction by fire, and at all times would harbour dust and insects in the crevices and in the interstices of the planks. But where is the use of arguing with "trustees" and "commissioners"? When Sir Christopher was just finishing S. Paul's to his liking, the governing body insisted that the building should be surmounted by a balustrade. In vain the illustrious architect urged that his cathedral was not a lady's petticoat, and needed no fringe. The commissioners at S. Paul's had their way, as the trustees in Trafalgar-square will have theirs, we suppose. In the next new National Gallery but one after that now in progress, a wooden flooring may perhaps give way to the cheap, beautiful, clean, and safe material of encaustic tilework.

FREING THE METROPOLITAN BRIDGES.—At a meeting of the Metropolitan Board of Works, on the 13th inst., Col. Hogg, the Chairman, made a statement to the effect that the Kew and other Bridges Committee, at their meeting on the 11th inst., received a report from Mr. Scott, their financial adviser, submitting the details of a plan by which the committee might be enabled to free at once from toll the remaining bridges contemplated by the Kew and other Bridges Act, without extending the period of the Coal and Wine Dues beyond the 5th of July, 1889. The bridges in question are those at Hampton Court, Chingford, and Tottenham-mills. The committee are authorised by the Act to raise a sum not exceeding £150,000, on the security of the Coal and Wine Dues for the year 1889, and those dues, as estimated on the basis of past years, will produce £437,360. The committee, at the outset of the proceedings, with a view of giving confidence to lenders, limited themselves to pledging a sum not exceeding £300,000, payable in 1889, which practically limits the borrowing powers of the committee. And as the committee have been obliged to expend more than they expected in the purchase of Kew-bridge, their resources are so far exhausted that they would only be able at the present time to raise £19,183 on the credit of the unpledged balance of the £300,000. Taking all the circumstances into consideration, the committee might possibly require a further sum of £38,300 to enable them at once to free the remaining bridges. The committee are much impressed with the importance of completing, at an early date, the whole of the duty cast upon them by the Kew Bridges Act, and thus redeeming the pledges given to the extra-Metropolitan contributors of coal-dues; and as they believe that the coal and wine dues in 1889 will, in all probability, produce a much larger sum than £300,000, they are anxious to take every

step in their power to accomplish the object in view. The simplest mode of effecting this object appears to the committee to be to obtain, with the consent of the Metropolitan Board of Works, a short Act of Parliament, authorising them to advance the balance of the money necessary to free the bridges, under the powers of their Loans Act, upon the joint guarantee of the Corporation and the Board that, in the event of there being any deficiency in respect of the produce of the coal and wine dues for 1889, which is extremely improbable, those bodies will meet such deficiency. The question was referred to the Works Committee, with power to act.

HOME-MADE PICTURE FRAMES.—Cut strips of stiff pasteboard about an inch wide the desired length, clip the ends to a point, and cover with any nice black cloth, like broadcloth or fine cassimere; lap the ends at the corners of the frames and fasten with a white or gilt button. Bind your picture and glass together with strips of gummed paper and glue, on to the frame. Hang against a white wall. Bronzed paper, which can be bought cheaply, may be used instead of cloth, in which case a short strip across the corners of the frame is a great addition to its comeliness.

THE RUINS OF BABYLON.—The *Daily Telegraph* has received another communication from Mr. George Smith, the Assyrian explorer, who on the morning of the 16th of March rode into the ruins of Babylon. "The first mounds I examined," he writes, "were those of the ruins now called Babil, but sometimes Mujelliba; it is the most northern set of mounds. These ruins consist of one vast oblong mound, surrounded by some smaller mounds, and the ruins of a wall which had at one time enclosed the structure. A number of Arabs were here at work, digging out the bricks from this wall, which in some places has disappeared, while the foundation is being excavated for material and sold for building purposes. From Babil I proceeded to the Kasr, and from Kasr to Amram. These ruins consist of immense irregular mounds of earth and rubbish, and look most unpromising as to excavations. Other smaller mounds cover the whole region, but the groves of palm-trees prevent one getting any good view of the sites. After a long survey I went into the town of Hillah, a place built, I may say, out of the ruins of Babylon. Hillah is on both banks of the Euphrates, and seems a thriving place. On the morning of the 17th I started for Birs Nimrud, and passing round a marsh on the west of the Euphrates, arrived at my goal and beheld an imposing sight. First we came upon an immense irregular mound, crowned by a modern tomb, and next the mound of Birs Nimrud itself, oblong in shape, formed by the ruins of an elevated platform of sun-dried brick. Above this rise the fragments of a tower, in stages, built of kiln-burned bricks. I could not count the stages myself on account of the ruined state of the structure, but Sir Henry Rawlinson, some years ago, ascertained by excavations here that they were seven in number. Each stage is evidently built of bricks differing in colour from the others; and, although large portions have fallen down, one grand mass of brickwork remains at the top, which seems as if it would defy the efforts of time. On the 18th I paid a second visit to the Kasr, and also viewed some minor portion of the ruins of Babylon. Looking upon those which represent the ancient cities of Babylon and Borsippa, I must confess myself unable to make out the positions of the various buildings mentioned by ancient authors. In modern times learned speculation has spent its strength in determining the sites; but now I have seen the ruins themselves, I am convinced that some—and perhaps most—of these speculators are wide of the mark. Nothing can be said on these points until the ground is properly excavated, and the excavation of the site of Babylon I consider the most important archaeological work in the Euphrates Valley. The Arabs, having learned the value of antiquities, are always turning over the rubbish in these ruins, and extracting fragments of tablets, cylinders, and other objects, while the trade in bricks from the mounds has been carried on for centuries. Babylon is slowly disappearing; you may see portions of it every day loaded on donkeys and brought into the town of Hillah; but it is such a vast area that it will take centuries still to remove the remains."

PRESERVATION OF SHEET-IRON.—The results of some experiments in regard to the preservation of sheet-iron used in railroad bridges have been published by the Directorate of the Government

Railroads of the Netherlands. From thirty-two sheets half was cleaned by immersion for twenty-four hours in diluted hydrochloric acid; they were then neutralised with milk of lime, washed with hot water, and while warm dried and washed with oil. The other half was only cleaned mechanically by scratching and brushing. Four of each kind were then equally painted with red lead, with two kinds of red paint of oxide of iron, and with coal-tar. The plates were then exposed to the weather, and examined after three years. The result was:—1. That the red lead had kept perfectly on both kinds of plates, so that it was impossible to say if the chemical cleaning was of any use. 2. That one kind of iron oxide red paint had better results on the chemically treated plate than on the other: in fact, a result equal to that of the plate painted with red lead, while the other kind of iron oxide red gave not very good results on the plates, when only scratched and brushed. 3. That the coal-tar was considerably worse than the paint, and had even entirely disappeared from those iron sheets which had not been treated chemically, but only cleaned by brushing.

THE BURNING OF THE ALEXANDRA PALACE.—Dr. Lankester concluded on Monday the inquest respecting the death of Thomas Larnier, who died from injuries he received at the burning of the Alexandra Palace. At the conclusion of the evidence the coroner said the jury had gone into the question of the origin of the fire, but the evidence on this point was not satisfactory. They could not tell whether it was caused by the plumbers, by the fireworks, or by spontaneous combustion. If the jury could not come to any conclusion, it would be better to return an open verdict, but this would not be satisfactory, as it would not show the origin of the fire. It had been stated there was not an adequate supply of water. They had conclusive evidence that such was not the case. The precautions taken by the company were rendered useless by the falling in of the dome and the injury to the hose. He did not think any blame attached to the directors, and it was a source of regret that no light had been thrown upon the cause of the fire. The jury returned a verdict as directed.

WHITEWASHING WALLS.—Sulphate of baryta has been strongly recommended as a substitute for lime in white-washing walls. Its advantages are said to be numerous. The mode of using it is as follows:—Four ounces of glue are soaked for twelve hours in tepid water, and then placed, until boiling, in a tin vessel with a quart of water. The vessel being placed in water, as in the usual process of boiling glue, the whole is then stirred until dissolved. Six or eight pounds of sulphate of baryta, reduced to an impalpable powder, are put into another vessel; hot water is added, and the whole stirred until it has the appearance of milk of lime. The sizing is then added, and the whole stirred well together, and applied in the ordinary way whilst still warm.

IMPROVEMENT OF THE CONDITION OF THE LABOURING CLASSES.—The anniversary meeting of the Society for Improving the Condition of the Labouring Classes was held on Wednesday at Willis's Rooms, London, Earl Shaftesbury presiding. The Secretary read a report of the proceedings of the society during the past year, which showed that the number of occupants of the various model dwellings of the society, either as families or as single persons, during the year, was estimated at 1,530, and the mortality returns less than 21 per thousand, 13 of the 32 deaths being those of children under three years of age. The amount received from all sources during the year was £5,751. 0s. 8½d.; which, with a balance in hand at the beginning of the year of £404. 16s. 11½d., made a total of £6,155. 17s. 7d. The current expenses of all the society's lodging-houses (including repairs) amounted to £3,278. 5s. 7½d.

DEATH OF MR. HENRY SHAW.—We regret to record the death, at the age of 73, of the distinguished antiquary, illuminator, and artist, Mr. Henry Shaw, whose works have been before the public for more than fifty years, his "Series of Details of Gothic Architecture" having appeared early in 1823. He also published "Illuminated Ornaments," "Specimens of Ancient Furniture," "Ancient Plate and Furniture," "The Encyclopedia of Ornament," "Dresses and Decorations of the Middle Ages," "Alphabets, Numerals, and Devices of the Middle Ages," "The Handbook of Mediæval Alphabets," and many other works, which derived their value from the skill and genuinely artistic feeling of a most industrious and accomplished illustrator.

CHIPS.

Arrangements have been made for a visit of the Members and Associates of the Society of Engineers on Monday next to the Royal Small Arms Factory, at Enfield, by permission of the Superintendent, Colonel Fraser. Members and Associates to meet at the Great Eastern Railway Station, Bishopsgate-street, at 12.30.

A 200,000-dollar theatre is building on Broadway, New York.

Colonel Andrew Derrom, of Paterson, United States, has taken out a patent for forming bricks into very large blocks, to be used in the erection of buildings in sections. This work is to be done by boys, aided by mechanical power.

Her Majesty's Commissioners for International Exhibitions have appointed Mr. H. Cole, C.B., as acting commissioner, at a salary of £1,000 a year, with a share in the profits of each annual exhibition.

On Saturday the Bishop of Chichester reopened, after restoration, the parish church of S. Mary, Balcombe, and also consecrated an additional burying ground for the parish.

The Isle of Man Legislature has sanctioned the proposed construction of a promenade pier at Ramsey, at a cost of £5,000.

The new church of Ogbourn S. Andrew, Marlborough, was opened on the 17th inst. It is built of Sarsen stone and flint, with Bath stone breastwork, and hollow walls 14 inches thick, at a cost of £1,200, the contractor being Mr. Barrett, of Swindon.

Trade News.

WAGES MOVEMENT.

EXETER.—The carpenters and joiners of Exeter have resumed work, after having been on strike for two months, for a reduction of the hours of labour from 58 to 54 per week, and an increase to 5½d. per hour in wages. They now go in to work for 50½ hours per week, and each man is to be paid according to his skill.

STRIKE OF THE FRENCH POLISHERS.—The West-end French polishers recently memorialised their employers for an advance in their wages from 6d. and 6½d. to 7d. per hour. Some of the employers have conceded the advance; but the replies of two large firms—Messrs. Jackson and Graham, Oxford-street, and Messrs. Holland and Sons, Piccadilly, having been unsatisfactory, the workmen in those firms have struck, and notices have been issued by the French Polishers' Society, cautioning the men in the trade from applying to the above firms for work pending the settlement of the dispute.

ASHTON & GREEN,

Slate, Iron, and Marble Merchants, and Quarry Agents.—Roofing Slates—Bangor Blue, Red, or Green, Blue Portmadoc and Whitland Abbey Green, the New "Permanent" Green (weight the same as Bangor, and uniformity of cleavage equal).

Prices on Wharf in London.			
34 by 12	22 by 12	20 by 10	18 by 9
37½s. 6d.	33½s. 6d.	27½s. 6d.	21s.
16 by 10	16 by 8	14 by 10	14 by 8
19½s. 6d.	14s.	17s.	11½s. 6d.
			6½s. 6d.

Per m of 1,200 Slates, Marble and Enamelled Slate Chimney Pieces, Inscription Tablets, &c. Stoves, Ranges, and Builders' Ironmongery. A. & G.'s Special Red Ridge Tiles. Large Show of all Goods at 14 and 15, Bury-street, S. Mary Axe, London, E.C. Drawings and Prices upon application, accompanying trade card.

TENDERS.

BERMONDSEY.—For building chancel and one bay of the nave of the church of S. Augustine, Lynton-road, S.E. Messrs. Henry Jarvis and Son, architects.

Thompson	£6,336 0 0
Cooke and Green	6,171 0 0
Tarrant	5,954 0 8
Whitaker	5,825 0 0
King and Son	5,811 0 0
Henshaw	5,427 0 0
Shepherd	5,036 0 0

HARROW-ON-THE-HILL.—For villa residence, with large music-room, at Harrow-on-the-Hill, near London. Exclusive of excavating. Mr. Sidney R. Stevenson, Architect and Surveyor.

Kindell	£2,205 10 0
Lander	2,197 10 0
Jelly (accepted)	1,850 0 0

HOLBORN.—Tenders for repairs at the Black Bull, Holborn. Mr. H. J. Newton, architect, 16, Besborough-street, Piccadilly, S.W.

Brindle and Co.	£91 10 0
Hockley	83 15 0
Taylor	85 0 0
Shurmer (accepted)	83 0 0

LONDON.—For rebuilding first portion of Botolph Wharf, Upper Thames-street, including river wall work, for Messrs. Besley and Wilson. Messrs. Snook and Stock architects.

Greenwood and Son	£27,000 0 0
Coleman	26,154 0 0
Crockett and Dickinson	25,977 0 0
Ryder and Son	25,850 0 0
Perry and Son	23,900 0 0
Munday	21,750 0 0

LONDON.—For additions to relieving offices, Newington Workhouse, for the Guardians of S. Saviour's Union. Henry Jarvis and Son, Architects, 29, Trinity-square, S.E.

Brindle and Co.	£599 0 0
Norman	593 0 0
Tarrant	542 0 0
Lawrence	537 0 0
Oldrey	510 0 0
Kent	494 0 0
Biggs	460 0 0
Robins and Co.	440 0 0
Battley	412 0 0
Castle	398 0 0
Lacy	387 0 0

LONDON.—For works, 10, Bathbone-place, W. Mr. N. E. Jennings, architect.

Elliss	£952 0 0
Hocking	735 0 0
Nightingale (accepted)	647 10 0

PUTNEY.—For various painting works required to be done at the Royal Hospital for Incurables, Putney. Chas. Gray Searle and Son, architects.

Beaumont	£309 0 0
Shaw	295 0 0
Pitman and Cuthbertson (accepted)	279 10 0

READING.—For additions to seed stores, Abbey-square, for Messrs. Sutton and Sons. Quantities supplied. Messrs. William and J. T. Brown, architects.

Sheppard	£2,371 0 0
Strong	2,333 0 0
Woodroffe	2,329 10 0
Barnicoat	2,320 0 0
Matthews (accepted)	2,285 0 0

READING.—For house and shop, Minster-street, for Mr. Oliver. Quantities supplied. Messrs. William and J. T. Brown, architects.

Sheppard	£1,027 0 0
Woodroffe	978 16 0
Matthews	977 0 0
Barnicoat	975 0 0
East	932 0 0

SOUTHWARK.—For new warehouse, Southwark-street, for Sir P. Tait. Messrs. Fowler and Hill, architects.

Dove Bros.	£6,575 0 0
Browne and Robinson	6,350 0 0
Carter	6,280 0 0
Oliver	6,249 0 0
Hart	6,180 0 0
Perry	6,095 0 0
Nixon	5,990 0 0
McLachlan	5,848 0 0
Taylor	5,687 0 0
Chappel	5,496 0 0

SUDBURY.—For new brewery and offices at Sudbury, Mr. G. Scamell, Great George-street, Westminster, architect. Quantities supplied by Messrs. Curtis and Son.

Brown	£5,775 0 0
Tooley	5,746 0 0
Mason	5,605 0 0
Grimwood	5,445 0 0
Warnford	5,100 0 0

VAUXHALL.—For new flour-mills for Messrs. Mumford. Mr. E. H. Badger, architect.

Myers and Son	£12,175 0 0
Wilson Bros.	11,954 0 0
Crockett and Dickenson	11,940 0 0
J. and F. Coleman	11,890 0 0
Rider and Son	11,810 0 0
Hill and Son	11,740 0 0
Brass	11,263 0 0
Nightingale	10,678 0 0
Trotter	10,583 0 0
Macey	10,579 0 0
Henshaw and Co.	10,373 0 0
Jerrard	10,284 0 0

WESTMINSTER.—For a block of offices in Clement's Inn. Strand. Architect. Mr. Raphael Brandon. Quantities supplied by Mr. Frederick Johnstone.

Myers	£9,980 0 0
Darby	9,573 0 0
Bird	9,185 0 0
Macey	9,182 0 0
Jackson and Shaw	8,875 0 0
Dove, Bros.	8,495 0 0

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Best Green Slates	Per 1,200 Slates	Equivalent to per square
Do. 14 by 7	2 17 6	16s. 6d.
Do. 13 by 8	2 17 6	16s. 6d.
Do. 13 by 7	2 5 0	14s.
Do. 12 by 7	1 13 6	13s.
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MESSRS. RANDELL & CO., Corsham, Wilts. Specimens at Museum of Geology, Jernyn-street, Piccadilly, W., and at Architectural Museum, Tufton-street, Westminster.

COMPETITIONS OPEN.

BASSENTHWAITE, CUMBERLAND, June 30.—For plans, &c., for the erection of a chapel. A premium of £25 is offered for the best design. Mr. Jos. M. Richardson, Hut-ton House, Penrith.

BRIDGEWATER, July 31.—For plans, drawings, and estimates for a new market. A premium of £10. 10s. will be paid to the architect whose plans are selected. J. H. B. Carslake, Town Clerk, Bridgewater.

LIMLY SCHOOL BOARD, July 10.—For plans and specifications for the three new schools, with classrooms and out-offices, and separate for master and mistress. P. De Eggesfield Collin, 37, John-street, Maryport.

LIVERPOOL, Sept. 30.—For designs and descriptive particulars for facilitating the transit of cattle and other traffic across the Mersey. Premiums of £200, £100, and £50 will be given for the first, second, and third best designs. Captain Pinhey, Woodside, Birkenhead.

MADRAS TRAMWAYS COMPANY, July 31.—The Directors offer a premium for the most approved system of checking the receipts of the conductors of cars. W. Davison Secretary, 17, Cornhill, E.C.

MANCHESTER, September 1.—For designs for the erection of a new fruit market and other buildings. First premium £200, to merge in the commission if the architect be selected to superintend the erection of the market; premium of £150 for the second, £100 for the third, and £50 for the fourth design. City Surveyor, Town-hall, Manchester.

NOTTINGHAM, July 15.—For designs for a new Gothic church. Premiums of £75, £50, and £25 will be awarded to the second, third, and fourth designs. The one accepted will be adopted by the Committee, should it fulfil all the necessary requirements. Mr. Wm. Clarke, The Park, Nottingham.

Geometrical and Encaustic Tile Pavements in every variety. Cheapest and best in the trade. Over sixty New Designs at 5s. 6d. per yard super. See BUILDING NEWS, December 27, 1872, *Mechanics' Magazine*, November 29, 1872, and other leading opinions. Designs and sample Tiles free; applications for which are earnestly invited. Note: quick delivery guaranteed.—HENRY C. WEBB Tiler, Worcester.—[ADVT.]

CONTRACTS OPEN FOR BUILDING ESTIMATES.

BALDON SEWERAGE WORKS, June 30.—For the construction of about 750yds. of brick sewers. J. Brook, Clerk to the Board, Baldon.

BERMONDSEY, July 7.—For the supply of 10,000ft. of best 2½in. tooled York paving, 10,000ft. second-class Rockhill, 3,000ft. Aberdeen straight edge curb, and 300ft. circular Aberdeen kerb. B. G. Wilkinson, Vestry Clerk, Malthy-street, Bermondsey, S. E.

BILLINGSLEY, SALOP, June 30.—For taking down and rebuilding the church, Mr. R. Griffiths, Architect, Stafford.

BLACKFRIARS.—For the erection of a range of warehouses in Tudor-street. Messrs. Smith and Seymour, architects, 1, Gresham Buildings, E.C.

BOMBAY GAS COMPANY, July 7.—For the purchase of surplus brass and iron gas fittings. W. Marshall, Secretary, 4, Great Winchester-street, Buildings, E.C.

BRADFORD, July 9.—For the erection of twenty y in Midland-road, near Manningham Station. G. Smith, Architect, 9, Market-street, Bradford.

BUENOS AYRES, July 1.—For the supply of cast-iron pipes. J. F. Bateman, Engineer, 16, Great George-street, S.W.

CHELtenham, July 12.—For the erection of a mission room in the Tivoli district. Mr. J. Middleton, Architect, Cheltenham.

CLAYTON, STOKE-UPON-TRENT, July 2.—For the erection of a schoolroom and outbuildings for the Local School Board. Mr. Thomas, Liverpool-road, Stoke.

CREWKERNE BURIAL BOARD, June 30.—For the erection of chapels, lodge, entrance gates, &c., for the new cemetery. C. Bridge, Clerk to the Board, Crewkerne.

CULM VALLEY LIGHT RAILWAY.—Contract No. 1. Fencing—21,648 yards run of larch, fir, or wrought iron fencing, with gates, &c., complete. No. 2. Earthwork.—The earthwork and ballasting from the Tiverton Junction Station to Selgar's Mill. No. 3. Earthwork.—The earthwork and ballasting from Selgar's Mill to Hemyock. No. 4. Stone bridges.—Widening one under-bridge and the construction of two over-bridges. No. 5. Timber bridges. Fifteen small timber bridges and 110 yards run of trestle work. No. 6. Timber Station Buildings.—Three small passenger sheds, three small goods sheds, and one engine-house. No. 7. Sleepers.—13,500 half-round larch, fir, or Dantzic pine cross-sawn sleepers. No. 8. Rails.—483 tons of 40lb. rails, with fish-plates and bolts, spikes and fang bolts complete. No. 9. Plate-laying.—Laying 7½ miles of main line and sidings. No. 10. Signal and telegraph.—Six signals and 7½ miles of telegraph. Mr. Arthur C. Pain, 5, Victoria-street, Westminster, S.W.

DERBY SCHOOL BOARD, June 30.—For the erection of boys', girls', and infants' schools in Nun-street. W. Cooper, Clerk to the Board, 116, Friar Gate, Derby.

DEWSBURY, July 8.—For the erection of a villa residence in Oxford-road. Messrs. Kirk and Sons, Architects, Huddersfield and Dewsbury.

DRIUGHTON AND ADWALTON AGRICULTURAL SHOW, July 12.—For a refreshment tent. J. W. Fearley, Secretary.

DUBLIN AND DROGHEDA RAILWAY, July 1.—For the construction of a branch railway about a half mile long in Dublin. Engineer's Office, Amiens-street, Dublin.

EPSOM, July 12.—For the erection of Schools. J. B. Harding, A.I.C.E., Surveyor, Worple-road, Epsom.

GREAT WESTERN AND MIDLAND RAILWAYS, CLIFTON, July 9.—For the construction of the stations at White Ladies-road and Montpellier-road. Messrs. Brunles and McKerron, 5, Victoria Chambers, S.W.

HANLEY, June 30.—For the erection of a stone spire and organ-chamber at Northwood Church. R. Dain, Architect, Hanley.

HARROGATE, July 2.—For the erection of cottage, coach-house, stables, conservatory, and alterations and additions to a house. H. E. Brown, Architect, James-street, Harrogate.

HIGH WYCOMBE SCHOOL BOARD, Aug 1.—For the erection of new buildings to accommodate 600 scholars, with teachers' residence and offices. Mr. Arthur Vernon, Architect, High Wycombe.

HOLLAND, LINCOLNSHIRE, June 30.—For the reconstruction of Pinchbeck Bars Bridge. F. T. White, Clerk of the Peace, Boston.

LEEDS, July 1.—For the erection of extensive premises in George and Dragon Yard, Briggate. Messrs. Wilson and Bailey, architects, Central Market Buildings, Leeds.

LEEDS, July 2.—For altering and re-pewing Rehoboth Chapel, Park-lane. J. Wright, Architect, Hull.

LEEDS CORPORATION GAS WORKS, July 7.—For the supply of best gas coals. C. A. Curwood, Town Clerk, Leeds.

LEICESTER, June 30.—For the works for carrying off flood waters. E. L. Stephens, Borough Surveyor, Public Offices, Silver-street, Leicester.

LINCOLN, July 14.—For the erection of a memorial Wesleyan chapel in the High-street. Messrs. Bellamy and Hardy, Architects, 23, Broadgate, Lincoln.

LLANTWITFORDRE SCHOOL BOARD, July 3.—For the erection of new schools at Pontypridd. H. S. Davies, Clerk to the Board, Pontypridd.

MIDLAND RAILWAY, June 30.—For the erection of a shed for milk carts, and straw shed at S. Pancras, and for engine turn-table foundations at Brent. Engineer's office, Midland Goods Station, S. Pancras.

NORTH LONDON RAILWAY COMPANY, July 1.—For the supply of 30,000 tons of steam coal. R. S. Mansell, Secretary, Euston Station.

NORTH LONDON RAILWAY, July 1. For the supply of 600 tons of house coal. R. S. Mansell, Secretary, Euston Station.

PIRTON, NEAR HITCHEN.—For the erection of four cottages and offices. Messrs. W. G. Habershon and Pite, 38, Bloomsbury-square, W.C.

PUDSEY, July 4.—For altering and enlarging a house. Messrs. C. S. and A. J. Nelson, Architects, Albert Chambers, Park-row, Leeds.

RAMSBURY SCHOOL BOARD, July 14.—For the erection of schoolrooms for about 300 children, with teachers' residences. Mr. Overton, Architect, Forest-hill, near Marlborough.

SHOREDITCH, July 1.—For repairing, altering, and renovating the town-hall. E. Walker, Vestry Office, Town-hall, Old-street, S.E.

STANNINGLEY, NEAR LEEDS, July 7.—For additions to the Baptist School. J. M. Fawcett, Architect, 73, Albion-street, Leeds.

S. LUKE, MIDDLESEX, July 1.—Formasons' and paviors work. W. W. Hayne, Vestry Clerk, Vestry Office, City-road.

WEAR NAVIGATION AND SUNDERLAND DOCKS, July 21. For the erection of a grain warehouse. Mr. H. H. Wake, C.E., Engineer's Office, Commissioners' Quay, Sunderland.

WELLINGTON SCHOOL BOARD, July 4.—For the erection of a school and schoolhouse at Hadley. Messrs. Bidlake and Fleming, Architects, Wolverhampton.

WILTON, NEAR SALISBURY, July 12.—For the supply of pipes and reconstruction of about 1,200ft. of 12in. and 9in. pipe sewers. T. Thring, Clerk to the Local Board, Wilton.

WOOD GREEN.—For enlarging the Royal Masonic Institution for Boys. Mr. Dennison, Architect, 32, Cheap side, E.C.

BANKRUPTS.

(To Surrender in London.)

Pickering, Edward, Old Broad-street, contractor, July 10, at 12.

(To Surrender in the Country.)

Garrett, Charles, Banstead, contractor, July 1, at Croydon.

SITTINGS FOR PUBLIC EXAMINATION.

July 10, F. Born, Berners-street, Oxford-street, iron piano-forte and parquet flooring importer.—July 14, J. Hibberd, Kensal-road, Westbourne-park, Harlesden, builder.—July 7, J. J. Phillips, Auckland-hill, Lower Norwood, builder.

DECLARATIONS OF DIVIDENDS.

F. T. Prebble, Benhill road, Brunswick-square, Camberwell, builder, div. 1s. 8d.—H. Illingworth, Bradford, joiner, div. 10s.—W. Wright, Swaffham, builder, div. 2s.

SCOTCH SEQUESTERINGS.

John Lawson, Son, and Company, Glasgow, engineers. June 27, at 12.—William Liddle and Co., Edinburgh, paint and colour manufacturers, June 24, at 12.

PARTNERSHIPS DISSOLVED.

Richards and Munks, Hucknall Torkard, Notts, and elsewhere, joiners.—Melling, Spencer, and Melling, Radcliffe, Lancashire, brass founders.—Hinkins and Wright, Oldbury, steel and iron merchants.—Freeman and Sanderson, Market Rasen, joiners.—F. and J. Newman, Ryde and Ventnor, architects and surveyors.—F. Cadby and Cadby and Parsons, Birmingham, glass manufacturers.—J. and H. Tingle, Bradford, stone merchants.—Corfe and Parker, Queen-street, Cheapside, architects and surveyors.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

(From the Public Ledger.)

LHD.			
Pig Foreign	pe ton	£23 0 0	£23 5 0
" English W.B.	"	25 0 0	0 0 0
" Lead Co.	"	24 15 0	0 0 0
" Other brands	"	23 7 6	23 15 0
Sheet Milled	"	24 10 0	24 15 0
Shot, Patent	"	25 0 0	26 15 0
Red or minium	"	25 0 0	0 0 0
White Dry	"	29 0 0	29 10 0
" ground in oil	"	0 0 0	0 0 0

TIMBER.			
Teak	load	£12 0 0	£14 10 0
Quebec, red pine	"	4 0 0	5 10 0
" yellow pine	"	3 5 0	6 0 0
" pitch pine	"	4 0 0	4 10 0
Quebec oak, white	"	7 0 0	9 0 0
" birch	"	5 0 0	6 0 0
" elm	"	4 15 0	6 0 0
" ash	"	4 10 0	5 0 0
Dantzic oak	"	5 0 0	7 0 0
" fir	"	3 10 0	5 0 0
" undersized	"	2 15 0	3 5 0
Riga	"	4 0 0	4 5 0
Swedish	"	2 12 6	3 0 0
Wainscot, Riga	"	4 10 0	6 15 0
Maats, Quebec red pine	"	4 10 0	6 0 0
" yellow pine	"	4 0 0	6 10 0
Oregon	"	9 0 0	12 0 0
Lathwood, Dantzic fm.	"	8 10 0	10 0 0
" St. Petersburg	"	11 0 0	12 10 0

Deals per C, 12ft. by 3 by 9in	"	20 0	21 0 0
Quebec Pine, 1st qual.	"	14 10 0	16 5 0
" 2nd do.	"	10 0 0	10 10 0
" 3rd do.	"	11 10 0	12 0 0
Canada Spruce, 1st	"	10 0 0	11 5 0
" 2nd & 3rd	"	10 10 0	11 0 0
New Brunswick	"	14 10 0	15 10 0
Archangel, yellow	"	12 10 0	14 10 0
St. Petersburg yellow	"	9 0 0	13 0 0
Finland	"	0 0 0	0 0 0
Memel and Dantzic	"	10 10 0	13 0 0
Gothenburg, yellow	"	10 0 0	10 10 0
" white	"	12 0 0	13 0 0
Geffe yellow	"	10 0 0	13 0 0
Christiania	"	7 5 0	10 0 0
Battens, all sorts	"	9 10 0	10 10 0
Other Norway	"	0 12 6	0 13 6
Flooring boards pr square of lin, first yellow	"	0 10 6	0 11 6
First white	"	0 8 6	0 10 6
Second qualities	"		

COPPER.			
British—Cake & Ingot	per ton	£90 0 0	£93 0 0
Best selected	"	90 0 0	100 0 0
Sheet	"	96 0 0	105 0 0
Bottoms	"	102 0 0	107 0 0
Australian cake	"	89 10 0	90 10 0
Spanish cake	"	88 0 0	0 0 0
Chili Bars, cash	"	80 10 0	82 10 0
" Refined ingot	"	90 0 0	91 0 0
Yellow metal	per lb.	0 0 9	0 0 9 1/2

IRON.			
Pig in Scotland, cash	per ton	£5 9 6	£0 0 0
Welsh Bar, in London.	"	13 0 0	12 10 0
" Wales	"	12 5 0	13 0 0
Staffordshire	"	13 10 0	15 0 0
Rail, in Wales	"	11 10 0	12 10 0
Sheets, single in London	"	16 10 0	20 0 0
Hoops, first quality	"	15 0 0	16 0 0
Nail Rod	"	13 0 0	15 0 0
Swedish	"	19 0 0	21 0 0

OILS, &c.			
Seal, pale	per tun.	£36 0 0	£0 0 0
Sperm body	"	94 0 0	94 10 0
Cod	"	40 10 0	41 0 0
Whale, South Sea, pale	"	37 0 0	0 0 0
Olive Gallipoli	"	42 0 0	0 0 0
Cocoonut, Cochinchina	"	39 0 0	0 0 0
Palm, fine	"	39 0 0	29 10 0
Linseed	"	34 5 0	0 0 0
Rapeseed, English pale	"	38 10 0	0 0 0
Cottonseed	"	28 5 0	0 0 0

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